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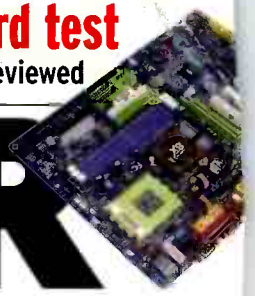

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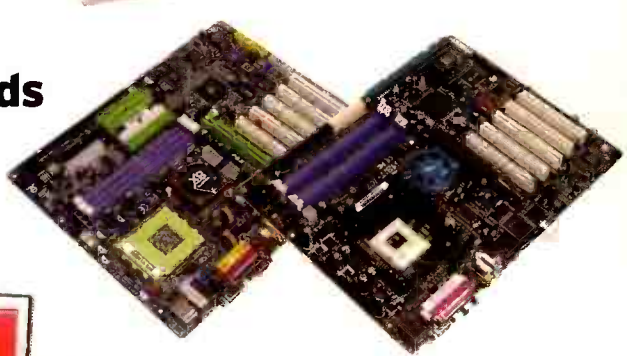

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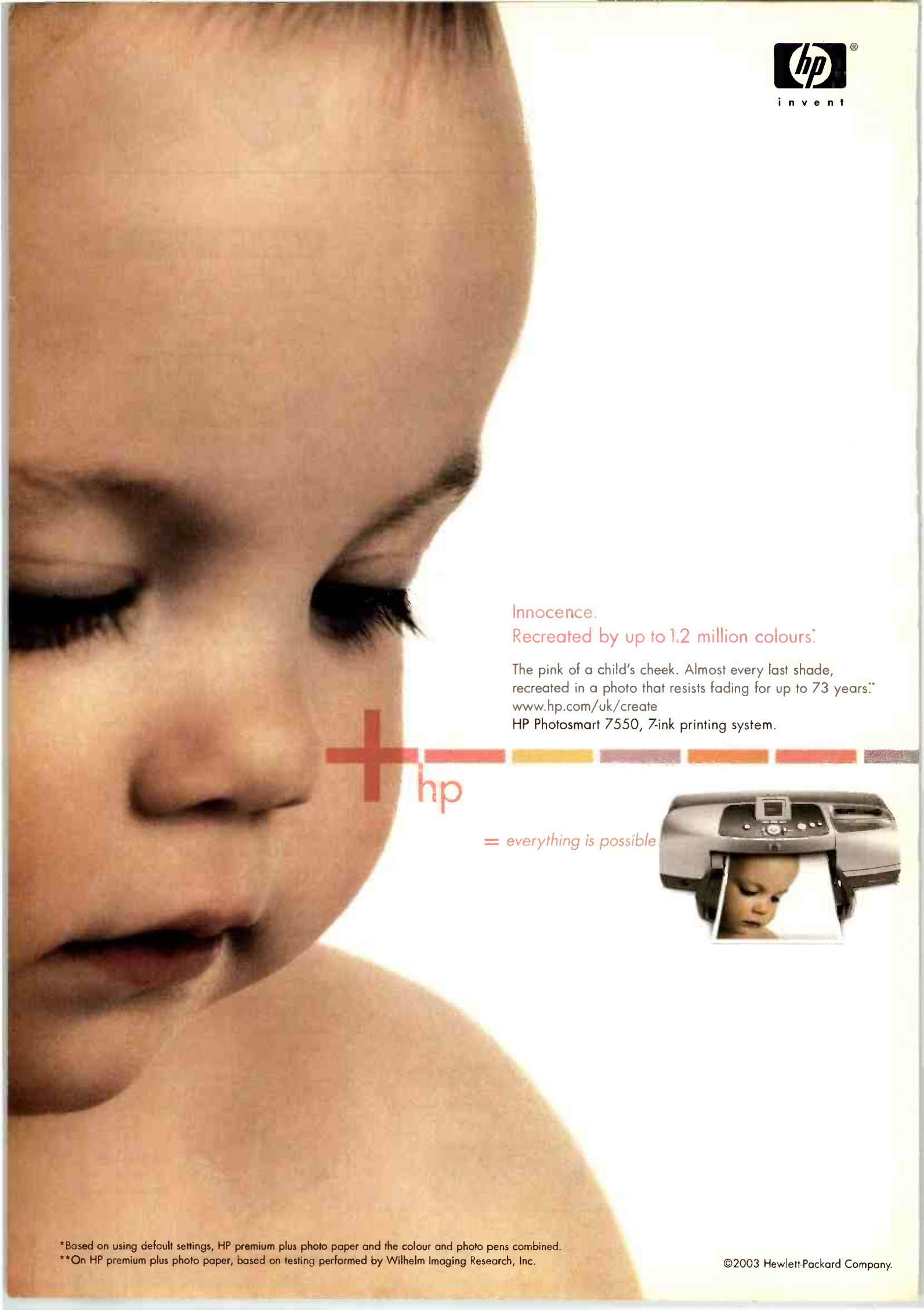

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Long live Linux, hello Longhorn

From Windows 2005 to open source court cases, OSs dominate the news, says Dylan Armbrust

This month sees a bit of a coup for *PCW*. In this issue we have loads of exclusives, including a review of the Pocket PC 2003 OS, as well as one of the UK's first extensive previews of what we speculatively call Windows 2005, but what Microsoft currently calls Longhorn. I say speculatively because no-one really knows for certain what it will be called, but we do know that it will be released in 2005. But one thing that is certain is that Windows 2005 looks set to change the face of operating systems yet again with a load of new features, particularly in the digital rights and filing areas. From the look of the Alpha code we've received, Microsoft is widening its OS upgrade beyond simple interface changes and service pack level tweaks. Check out our in-depth five-page review starting on page 47 to find out what Microsoft has in store for us in the years ahead.

Microsoft's Windows 2005 isn't the only OS in the news this month. SCO has hit the headlines with its aggressive lawsuit against IBM, claiming copyright infringement over some of its Unix code that it says has been incorporated into Linux. As you'll read in News (page 28), the lawsuit has caused a great hue and cry in the Linux community and has also potentially put the frighteners on companies currently using, or considering using, the Linux platform in their business.

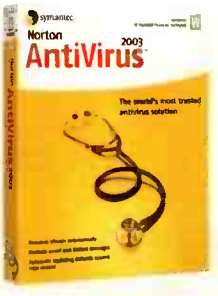
It's still too early to say whether or not SCO's case will make it to court, let alone succeed, but the reverberations of its actions have been felt worldwide. Many industry watchers claim that the case holds no merit, and we here at *PCW* genuinely hopes this is true. It certainly doesn't take a PhD in Economics to show that innovation can come from competition, and if SCO succeeds, the open-source ethos of Linux could be stopped in its tracks, which would be a shame. While Microsoft has been, and still continues to be, the dominant player in desktop operating systems, Linux has been making great inroads. Indeed, we regularly carry versions of Linux on our cover DVD, as well as providing regular coverage throughout the magazine. If SCO's case ultimately wins the day, we could see the end of what was shaping up to be a great competitive battle – something this industry desperately needs.

Another debate currently taxing people's minds is whether PC technology has genuinely progressed since its mainstream debut 20 years ago. Some say no, no, no, while others claim it's all go, go, go. To stir things up a bit, we've invited our own hardware guru and regular columnist, Gordon Laing, to take on outsider Alex Kefford in the battle over whether the industry really has developed itself, or merely tweaked old technology to work in today's environment. Check out the great innovation or imitation debate on page 94, and be sure to cast your vote and give us your thoughts through our website at www.pcw.co.uk/debate.

One thing that certainly has started to come of age is the compact PC. The beige case behemoths of the past are slowly being replaced by some pretty stylish space-saving systems. Indeed, the idea of convergence, where all our PC, communication and entertainment needs are met through one device, is slowly coming to fruition, and it's about time too.

Convergence has been the watchword in the PC world, including from the likes of Bill Gates (see news page 20) for well over a decade, but until recently it's not been technologically possible. However, this is changing and, as you'll see from our review of the MSI Mega PC (page 66), as well as our Compact PC group test (page 99), real alternatives are emerging for those wanting versatility, power and style all in a neat package.

Reflections on a decade
Hands on Windows tips revisited – see page 176



Anti-virus software
Protect your PC – we test 10 of the best packages on page 135

'Gordon Laing and Alex Kefford go head to head in the great innovation or imitation debate. Cast your vote on our website'

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This month's broadband bargains:

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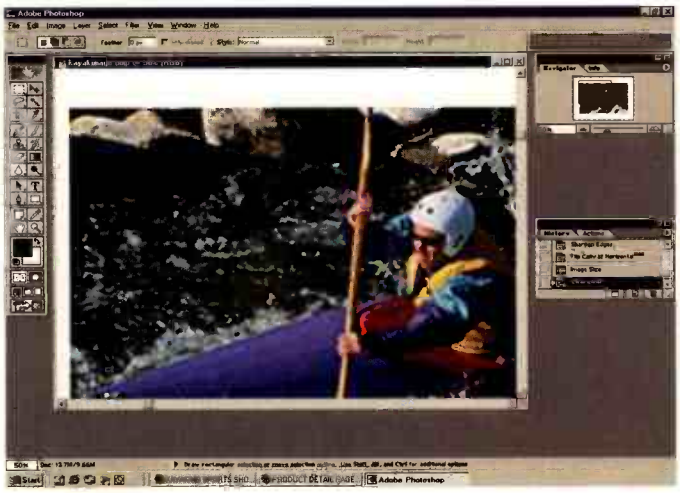
3COM Dual Link USB and ethernet ADSL modem ***£45***

Draytek 2600We ***£158*** 4 port 802.11b wireless ADSL router with VPN plus free wireless card

Results explained

Explained below is a list of the benchmarks we use to test the products we review



Adobe Photoshop 6.01 is part of Sysmark 2002

3Dmark 2001 tests DirectX performance

Sysmark 2002

Sysmark 2002 is an application-based benchmark made up of 14 applications. These are divided into two categories: office productivity and Internet content creation. A predefined script, with data, is run on each application at an execution speed that includes one-second pauses between operations to simulate human activity. Applications are also run concurrently to reflect the way most people use PCs today.

The time taken for each application to complete an operation is recorded. Sysmark calculates the geometric mean of the application times for each category, and converts these into a score for each category.

These scores are based on a comparison between the test system and a reference PC featuring a 1GHz Pentium III processor, an Intel 815EEA chipset motherboard, 256MB of PC133 SD-Ram, a 64MB Creative Geforce Annihilator 2 graphics card, a 30GB UltraDMA100 IBM hard disk and Windows XP. A score of 100 indicates that the test system has a performance equal to the reference PC, 200 indicates twice the performance and so on. An overall Sysmark score – the weighted geometric mean of the two category scores – is then calculated.

We run the benchmark at a resolution of 1,024 x 768 in 16bit colour. It is run three times, rebooting between each category. The applications are as follows:

Office productivity

Microsoft Word 2002, Microsoft Excel 2002, Microsoft Powerpoint 2002, Microsoft Outlook 2002, Microsoft Access 2002, Netscape Communicator 6.0, Dragon Naturally Speaking Preferred v.5,Winzip 8.0 and McAfee Virusscan 5.13.

Internet content creation

Adobe Photoshop 6.01, Adobe Premiere 6.0 Microsoft Windows Media Encoder 7.1, Macromedia Dreamweaver 4, Macromedia Flash 5.

Sysmark 2002 is a commercial benchmark, available from Bapco at around £130 (www.bapco.com).

3Dmark 2001

This algorithmic DirectX test runs three specially coded games, based on the Max Payne engine, at low and high detail. A fourth test only runs on cards that are fully compliant with DirectX 8. This results in higher scores being achieved by these cards than others.

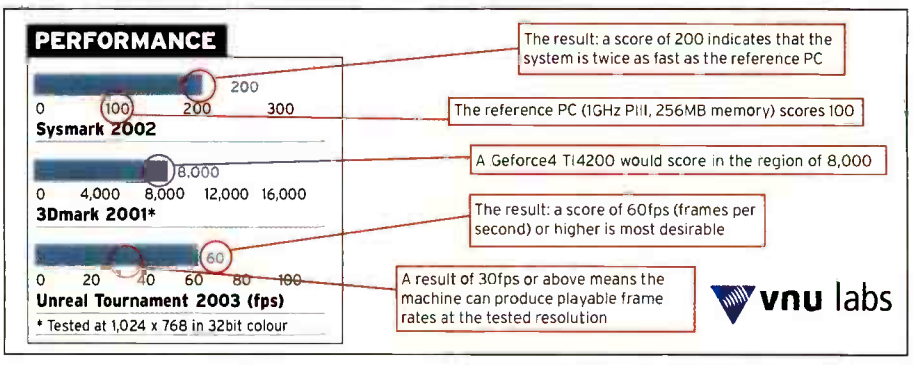
The benchmark is run at its default settings of 1,024 x 768 in 32bit colour. When testing graphics cards, it is also run with Full Scene Anti-Aliasing (FSAA) and at 1,280 x 1,024, both in 32bit colour and textures, set to loop three times.

The result is calculated through a combination of the average frame rates for the first three games in both high and low detail, with greater emphasis put in the high detail. The result of the fourth test is then added to this – it has less of a bearing on the overall score.

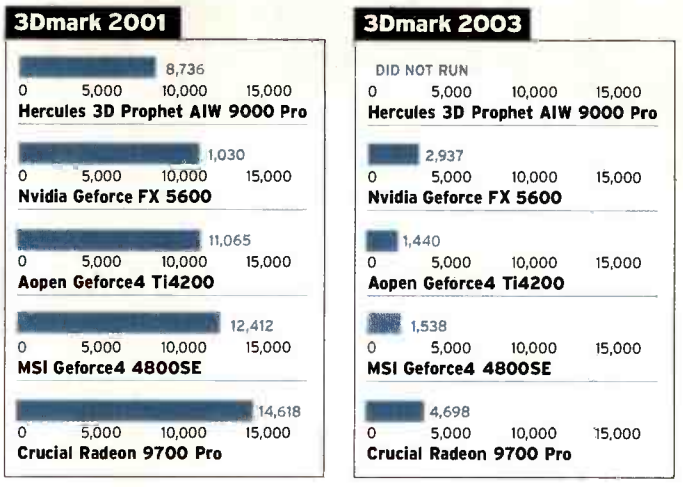
The scores in the box below are provided as a reference to give you an idea of how graphics chips perform under this test.

3Dmark 2003

Run at its default settings of 1,024 x 768 and 32bit colour depth, this update to 3Dmark 2001 will only fully run on DirectX 9 compliant cards. As there are currently precious few of these in the market, this will not be replacing 3Dmark 2001 as our standard graphics test. However, it will be tested on all capable devices and, where possible, scores will be quoted.



Unreal Tournament 2003 is used to test real world DirectX performance



A card's scores in 3Dmark 2001 differ greatly from those in 3Dmark 2003

3Dmark 2003 consists of four tests. The first examines DirectX 7 performance; the following two are DirectX 8 and the final test is DirectX 9. While in theory this means that any DirectX 7 card could run at least part of the test and therefore achieve a score, none have the raw power to run at the speeds 3Dmark 2003 demands.

The result is calculated in the same way as in 3Dmark 2001; an average of the frame rates from the first three tests. The results from the fourth test are included, but has a lesser bearing on the final score.

See the graphs above right to get an idea of how a card performs on 3Dmark 2001 against 3Dmark 2003.

Unreal Tournament 2003

We also test 3D gaming performance with the Unreal Tournament 2003 benchmark. The benchmark is featured in the demo version of the game (available for download at **www.unrealtournament.com**), but not in the full version. Once the demo is installed, the benchmark can be found in the System folder of the UT2003 Demo file.

The test is run with all the default settings and at 1,024 x 768 resolution. Once the benchmark has run, two results appear: a flyby and a botmatch result. We use the botmatch figure, as it is a better representation of frames that will be achieved when playing the game.

Battery test

To get a feeling for the length of time a notebook battery will last, we run a specific test. Based on a looping Excel Visual Basic application, the test opens worksheets, generates random numbers and pivot tables, then zooms, and adjusts the brightness and contrast of an image. The application also includes 2D animation and periodically halts to simulate natural human pauses. The running time is then recorded to disk every 30 seconds until the battery power finally diminishes.

PCmark 2002

This test measures the performance of the hard disk subsystem. Both Read and Write operations are performed, cached and uncached. The tests access the disk in the same way as normal applications and are not optimised to produce maximum throughput. High throughput numbers will be produced because no other tasks are running while the data is being transferred. Since Windows reserves a block of memory as the cache for file operations, the benchmark flushes the file buffer before each test to minimise the use of cached data in the tests. Each drive is defragged before testing.

For more information on PCmark and 3Dmark, visit **www.futuremark.com**.

Test beds

When testing graphics cards, motherboards, hard disks and optical drives, we use two test PCs. The first uses an Intel Pentium 4 3GHz Northwood C with an 800MHz front-side bus (FSB), the second has an AMD Athlon XP3000+ using a 333MHz FSB. Each has two 256MB PC3200 modules of Crucial memory, a 120GB Western Digital hard drive with 8MB cache and a Crucial Radeon 9700 Pro graphics card. Graphics and hard disk tests are primarily performed on the Intel system. A fresh image of the hard disk is applied to the PC before any tests begin and the same image is then used each time for consistency.

3Dmark 2003 is so demanding it will only work on the latest cards

The Mother Nature test in 3Dmark 2003 will only run on DirectX 9 cards

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ACDSee 2.43

ACDSee Classic is a popular high-resolution image viewer that can display more than 15 different image formats extremely fast. It is also a powerful image browser that presents thumbnails quickly and supports personalised file descriptions. You also get tools for image cropping, lossless jpeg rotation and batch file conversions.

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Invisible Secrets 2.1

Whether you're paranoid, cautious, or have something to hide, Invisible Secrets takes a novel approach to keeping your files private, by encrypting them and then disguising them as completely different types of document, such as pictures, sound or web files. On this month's disc you'll find a full copy of version 2.1 plus a trial of the latest version 4.

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Smartstore.biz Startup 3.1

Ecommerce novices can develop and publish a professional online store quickly and simply with this package. After entering the product and store details, Smartstore.biz creates pure HTML code. So you don't need to set up CGI, PHP or ASP scripts, and you won't run into problems with your ISP or host as server-side applications are unnecessary. Online registration is required.

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All four of these products are Windows XP compatible.

On the DVD-Rom

Mandrake Linux 9.1

This version of Linux has redesigned graphical desktops and configuration utilities. The clean and friendly Mandrake touch is evident throughout. Mandrake Linux 9.1 (Bamboo) is one of the most powerful Linux systems, with advanced features such as Apache 2, NTFS partition resizing, ACPI power management, 'Zeroconf' network support, Wifi support and much more. Mandrake Linux 9.1 features a simple-to-use graphical installer, a brand-new 'Mandrake Galaxy' theme, smoothed anti-aliased fonts, and the new KDE 3.1 and Gnome 2.2 desktop environments.

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Plus

In our regular Essentials section you'll find over 70 great utilities and add-ins. We've scores of product group test reviews and workshops from past *PCW*s in Acrobat pdf format; as well as some of the latest playable game demos – this month: Nascar Racing 2003, Tony Hawk's Pro Skater 4, Star Trek Elite Force 2, Galactic Civilisations, Player Manager 2003, and Eternal War: Shadows of Light.

USING THE COVER DISC

The *PCW* cover disc uses a web-browser style interface, but you'll need to have MS Internet Explorer 5 or later to take full advantage (using the dedicated *PCW* browser option). If you use Netscape, Opera, or an older version of IE, you can still browse the disc using your own browser, and install programs by clicking the INSTALL buttons. However, you will be presented with the usual download/run dialogue box (see the Support section in the disc menu). NOTE: programs can be found in the \software\ folder on the disc.

Starting the disc

The CD-Rom (or DVD) should auto-start. If it doesn't, double-click the CD-Rom/DVD icon in My Computer, or run pcw.exe on the root of the disc.

Problems?

Please note that we cannot give support on individual programs contained on this disc. If you have problems running the disc or any of its content, please note these guidelines:

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PCW August 2003 cover disc
ABT, 306 St Mary's Lane
Upminster, Essex RM14 3HL
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PROBLEMS INSTALLING/RUNNING THE SOFTWARE > Check the support page on the disc, or check the manufacturer's site.

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EDITED BY CLIVE AKASS

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Focus on

It's as if someone whacked Santa Claus

...one developer on reactions to a $1b claim that Linux uses stolen code. See page 28

PCW numbers

Some stories in the News section cite PCW numbers. To find out more on these stories, or to read a fuller version, just go to www.pcw.co.uk and put the number in the box pictured here.

Gates wins as Linux wars

Microsoft chief Bill Gates must have been thanking his lucky stars last month, after buying himself victory in the long-running browser wars for a paltry £455m – and watching his only significant competition on the verge of tearing itself apart in a bitter copyright battle.

His tactics in squeezing out the Netscape browser by tying his Internet Explorer into Windows figured prominently in last year's anti-trust case in which Microsoft was found guilty of monopoly abuse. Now he has agreed to pay $750m (£455m) to AOL Time Warner, current owners of Netscape, to end its legal claim. He has also agreed not to favour other independent developers with an early release of details of future operating software. Even as the deal was announced there was a claim that Microsoft is up to its old tricks, hiding parts of the Windows programming interface from outside developers. Microsoft was forced to reveal some of these secret hooks last August as part of the anti-trust settlement.

Lucky him... Gates announcing a new PC spec in May (see page 20)

Software house Whirling Dervishes released a product called the Namespace Extension Library (NSELib) which it said uses hooks, previously available only to Microsoft insiders, that allow developers to create apps that reside within Explorer.

Company founder Henk Devos said Microsoft had denied the existence of the hooks (see PCW number 1141296), but it is open-source products, rather than rival Windows developers, that present the major threat to Gates. Now Unix house SCO has thrown the immediate future of open-source Linux into doubt by claiming ownership of part of the kernel – a claim Microsoft was happy to endorse (see page 28).

Still, Microsoft does not have everything going its way. It has had to introduce concessions in its unpopular Software Assurance scheme. This was designed to ensure Microsoft gets continuing revenues from code maintenance rather than having to rely on uncertain upgrade income (see PCW number 1141329).

The scheme would have cost the UK government alone an estimated £60m a year before a deal was negotiated. Microsoft and the best lawyers in world cannot alter the fact that costs of that magnitude are sure to boost competition; and that, SCO notwithstanding, open source will only get better and stronger with time. **Clive Akass**

Cisco UK's base unit is blind to Dell's US Wifi card

A *PCW* reader has found to his cost that the Wifi logo is no guarantee that different makes of wireless network products will work together as claimed.

Andy Borland is stuck with a Dell Truemobile 1180 adaptor he can't use, as his Cisco Aironet 340 base station can't see it. Both are Wifi certified and so are supposed to interoperate.

Borland was already using the 340 on his home network when he bought the 1180 for his Dell Axis X5 PDA's Compact Flash slot, but was baffled when they did not work together. After three weeks of calling Dell and searching forums, he concluded that the card supported only the 11 channels allowed in the US, not the 13 available in Britain.

This has now been confirmed by Dell; but Borland says no Dell support staff appeared to know that there were differences in the permitted bands.

So why not just switch the channel used by the 340? It turns out that the base station is too clever for its own good. Cisco, in a vain bid to avoid confusion, uses a system called World Mode that sets the device automatically to a channel valid for the area it is in. The 340 set itself to channel 12, which Cisco says is the best choice for Europe, but not the US.

A Cisco statement said: 'It is not possible to change this channel selection within the software provided with the base station.' This could also stop visiting Americans using the 340. Cisco admitted: 'We did not envisage this.'

The 340 has been on sale for three years and later models let you set the channels manually.

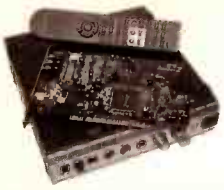
A Dell statement pointed out that the extra two channels make no difference to the number of non-overlapping ones. There are only three of these because, while the channels are spaced at 5MHz intervals, the signal is spread over 22MHz.

But if you are within range of more than three access points, which is becoming increasingly common, you may have to opt for minimum contention, and more channels give you more flexibility. One figure cited is that you can pick four channels with a five per cent overlap out of 11, and five out of the UK's 13.

Dell says it is entitled to describe the Truemobile 1180 as Wifi compatible because neither the IEEE standards body, nor the Wifi Alliance, which certifies compliance, attempts 'to control or authorise or certify which channels are implemented. These are strictly up to the product developer'.

It is true that, on current user densities, the loss of two channels will make little difference to most UK users. But when problems do occur, as Borland found out, it can be very annoying indeed. It seems the Wifi compatibility guarantee should include the words 'only in the US'.

High-speed Wifi for business
Which devices are best? See page 156



Sound cards
Affordable upgrades for your PC. See page 60

Vesa returns to square roots

If you have problems sorting out your QUXGA from your QVGA, or your SVGA from your XGA, then fear not, as the display industry's standards body has come up with a new naming standard for display formats.

But in trying to simplify the situation, the Video Electronics Standards Association (Vesa) has decided to create a different kind of confusion. It has given the new standard an amusingly tangential name, the Co-ordinated Video Timing (CVT) code, which takes the form yMz and should keep them guessing down at Dixons on a Saturday afternoon

The 'y' stands for the number of megapixels, bringing displays into line with the way digital cameras are classified. But, as many digicam users have found, the megapixel count tells you nothing about the format: one megapixel could be anything from a square to a 100 x 10,000 slot.

This is where the 'Mz' comes in. It is a code representing the ratio of the horizontal to the vertical pixel count, aka the aspect ratio. The megapixel count y is a decimal number; and z is a hexadecimal number. Got that? Now register that M3 is equivalent to an aspect ratio of 4:3; M4 is 5:4; M9 is 16:9; and MA (ie hex for decimal 10) is 1,920:1,200.

If you call the horizontal and vertical pixel counts H and V respectively, and the aspect ratio A, then A = H/V, and, of course, the megapixel count $y = H \times V/10^6$.

The horizontal pixel count is thus given by $H = 1000\sqrt{(y/A)}$ and the vertical count is: $V = 1000\sqrt{(Ay)}$.

So you can see that a CVT code of 0.48M3 is equivalent to an SVGA resolution of 800 x 600.

On the other hand, you can keep reading *PCW*, which will ignore the CVT code and quote the horizontal and vertical counts directly. These encapsulate the aspect ratio and require no calculation whatsoever.

● Vesa designed the Vesa bus which at one point rivalled the PCI bus. The Vesa bus lost.

Here's a neat idea... a 128MB USB drive packed into a wristwatch. The USB lead is actually built into the strap (see below).

The are two models, in silver and grey, each costing £69.99 from www.memixdirect.com. There's a £10 discount if you buy two.

Call stories

Plantronics is promoting this headset by citing figures showing that seven in 10 calls are missed as people are away from their desks. The £249 ex VAT CS60 uses the Dect protocol to allow you to answer the phone while wandering the corridors.

The company is also about to ship its £68 ex VAT M3000 Bluetooth phone which can use in the street. So if you buy both you need never be off the phone.

www.plantronics.co.uk

Sendo sues

Sendo is suing mobile operator Orange, claiming the SPV smartphone infringes its patent. As we went to press, it was seeking an injunction to stop further SPV sales.

Sendo is also suing Microsoft in the US over alleged uncompetitive practices and misuse of information. It was once lead partner on Microsoft's smartphone development but sensationally withdrew its own Z100 smartphone after Orange's high-profile launch of the SPV.

Balloons raise hopes for 2Mbits/sec Internet access in rural areas

A new scheme promises to deliver 2Mbits/sec web access to rural areas – by balloon. The low-cost Integrated broadband radio access (Libra) system outdoes ADSL and standard cable links, by allowing users to download and upload at the same speed, 2Mbits/sec. Land-based upstream speeds are generally, at most, half downstream rates.

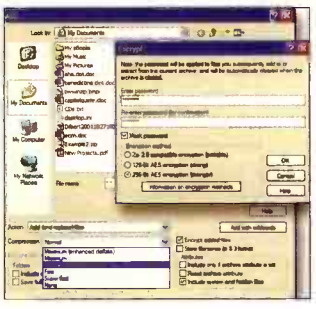
The balloon would be tethered 1.5km up in a system reminiscent of wartime barrage balloons designed to impede bombers. The tether would incorporate a fibre-optic cable, avoiding the need for a powerful ground-based transmitter that might cause health fears. The idea comes from a company called Skylinc, which claims that just 18 balloons could provide cover across the whole of the UK. Users need a dish the size of a TV aerial.

Skylinc engineer Matt Hobby says the system can withstand severe weather conditions, although it would have to be grounded in a hurricane. 'The technology has moved on a lot since the war and balloons can now stay up 99 per cent of the time. The tether has about the same failure rate as an aircraft engine.'

One balloon could would cover an area 50 miles across – about 2,000 square miles. Skylinc has run a trial in Yorkshire and has been awarded government funding. It plans to offer a service for businesses within a year, but it will not yet say where.

Skylinc says the wholesale price would be about £300 a month for an uncontended 2Mbit symmetrical link. Hobby says customers are likely to include service providers who would use the system to plug gaps in their land-based coverage. An entry level 500K ADSL link typically has a contention ratio of 50:1, so on the face of it this could lead to some competitive pricing for end users.

I heard the government was at the end of its tether over rural broadband, but I didn't take it literally...



>> Winzip 9.0

Winzip has issued a beta of version 9.0 of its Zip utility, which now supports 128bit and 256bit AES encryption (see screenshot above). Details are at www.winzip.com

>> Low-cost IR

Infra-red port adaptors are now affordable, after years during which the industry seemed determined to price the technology to death. Lindy offers a USB-linked IR port rated at 4Mbits/sec for £29.50 inc VAT. www.lindy.co.uk

>> Frugal drive

New technology has enabled Hitachi to launch a 7,200rpm mobile hard drive using no more power than 5,400rpm models, the company claims. The 7K60 packs 60GB, more than any other 7,200rpm mobile drive. www.hgst.com

>> Security chip

HP has launched a new d530 range of business PCs containing a chip on the motherboard supporting encryption and boosting data security. The Infineon chip, which allows policies to be set for individual users, will eventually be used in HP's entire business PC range. PCW number 1141115

>> Sharp move

Sharp Microelectronics Europe has launched a 32bit smart card with 1MB of Flash memory for tasks such as banking, e-ticketing, and access control. The memory can hold data such as biometric details.

Nets to kill off adaptors?

A new global standard for a DC power supply could be the beginning of the end for all those cumbersome peripheral power adaptors. The IEEE 802.3af standard means that you will be able to power or charge your phone and other peripherals from an Ethernet port.

Power over Ethernet (PoE) has been around for a while, using proprietary technology, but it has been used mostly to simplify cabling to devices such as wireless access points. The new standard will let designers put the facility into a wide variety of devices.

This is not the universal smart power supply *PCW* has long called for, with which a device would simply ask for the power it wants. But it is getting close to what is needed in that it delivers DC power enough for most mobile devices.

PoE delivers 15w at 48v – roughly the voltage on phone lines, and higher than that at which most devices operate, but it allows the use of thin cables with minimum loss. The power is not, however, enough to run most notebooks. Neither is this the first standard DC supply:

Combining power and data lines can cause overload problems when linking devices, which is why there are separate power supplies on USB hubs that allow several peripherals to hang off one port. Lindy's new USB 2.0 Autoshare switches (left) may look like hubs, but they have precisely the reverse function, allowing multiple PCs to share a USB peripheral such as a printer. A four-port version costs £29.99 and a two-port is £17.65 – both inc VAT www.lindy.co.uk

each PC has one in its USB port, but this gives only 2.5w at 5v, which is why many USB peripherals still need a separate power supply. Firewire (1394) delivers a more useful 7w at 12v but is not so common.

And as Ciaran Connell, marketing and strategy manager at Motorola's analogue products division, points out: 'The RJ45 Ethernet connection is just about the only one that is standard the world over.'

The power is delivered from an Ethernet switch which first senses whether an attached device is 802.3af-compliant; if it is not, no power is delivered, providing compatibility with legacy devices. Almost all devices will require a DC voltage converter, but Connell says this is low-cost and well understood technology and is small enough to be built in.

Motorola has signed a deal with PoE specialist Powerdsine to develop a custom chip to implement the technology which should help make it cheap and ubiquitous. Connell said it could eventually be available in hotel rooms and airliners.

2Mbit links may boost broadband sharing

Telewest has set a base price of £50 a month on its 2Mbits/sec Blueyonder home link – or £55 a month if you do not subscribe to its phone service. The service is likely to attract teleworkers who are subsidised by their company, the self-employed who can claim tax relief on the link, and flat-sharers.

It may lead to an increase in neighbours sharing a link as it works out cheaper than four 500K lines and gives them all a peak downstream speed of 2Mbits. But they would have to share a 250K upstream link, and sharing outside premises is against Telewest's rules.

Meanwhile Oftel has announced that two million people in Britain now have broadband links, though the figure begs the question: what does broadband mean?

It includes entry-level 128K services offered by the likes of NTL. These are always on, a big advantage over dial-up, but critics say they should not be considered broadband.

Broadband use has grown 200 per cent over the past year thanks to falling prices, marketing campaigns and DIY installs, according to the Office of National Statistics.

With around 35,000 new connections a week, David Edmonds, director general of Oftel, said that it had only taken seven months for the second million users to sign up for broadband services.

Zigbee is slow but low cost

Okay, take a deep breath... yet another IEEE 802.x wireless standard has been approved. It's called Zigbee, or IEEE 802.15.4, and some believe it could challenge Bluetooth.

It uses the 2.4GHz band, like Bluetooth, and 11b and 11g Wifi, but is designed for short-range 250Kbits/sec links – less than half as fast as Bluetooth. So what is the big deal?

Zigbee is aimed at devices like sensors and control nodes that operate on one battery for weeks. It is supposed to cost just $5 a device, the original target price for Bluetooth.

Zigbee is also designed for mesh networks in which data finds a path through an ad hoc population of devices.

Dilemma over Wifi combos

Users face a dilemma following the 12 June finalisation of the 802.11g Wifi standard: buy now, or wait for the price of 11g and 11a combo products to drop? Vendors are insisting that 11a, which offers more channels and is less prone to interference, will be of interest only to enterprises because of its limited range. This may boost 11g sales in the short term but it ignores the fact that if Wifi use increases as expected, we will need all the channels we can get: free channels are already hard to find in some areas.

There's also the vexing question of mixed-mode operation: our latest tests (see page 151) show that an 11b client in an 11g cell cuts 11g speeds by between 30 and 50 per cent. This is when the 11b client is not even being used – and even without this hit, our tests show 11g is far slower than its rated 54Mbits/sec. This will not matter if you use Wifi only to access a home broadband link but it could be significant on crowded networks and hotspots.

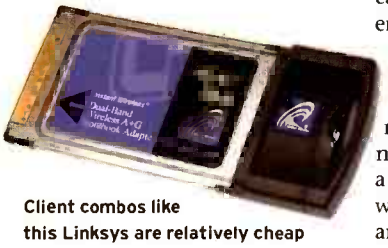
Vendors that jumped the gun on 11g promise firmware upgrades to the new standard – check your supplier's site. Linksys says the new version will improve mixed-mode performance. Watch this space on that one.

Most Wifi currently in use is 11b, which uses the same 2.4GHz band as 11g; 11a, which uses the less crowded 5GHz band, is not affected by 11b clients and its low range can be seen as an advantage in terms of security and interference problems.

This is not to say that 11a is better than 11g: they are neck and neck on speed and each has its advantages and snags. But how much are you prepared to pay for the flexibility of having both? Bear in mind that 11a and 11g require separate radio modules, making a combined product intrinsically more expensive. All 11g products incorporate 11b; and current a/g combo cards require a PC Card Type II slot which is not available on all mobile devices.

Combo access points are currently up to twice the price of 11g ones. This Linksys 11a/11g access point with a four-port switch is around £235 inc VAT; a similar US Robotics 11g-only box costs £99 inc VAT. Client price deltas are less: an a/g card costs about £71, a g-only is about £55

In an ideal world you would have access points in every room and use ultra-short-range wireless links, drawing minimum power from mobile batteries and allowing maximum user density. Wireless would complement rather than replace wired links; 11a fits this scenario well, especially with the transmit-power control (TPC) that Europe is insisting on. So does Zigbee (see opposite), Bluetooth and emerging UWB (Ultra Wide Band) – (see page 30).



Client combos like this Linksys are relatively cheap

In practice, many people use Wifi as a substitute for cables and multiple access points are expensive (though prices are likely to drop, perhaps as the 'smarts' get concentrated in a single root box). So 11g looks good because one access point can cover a floor or even an entire building.

Even so, you may benefit from an a/g combo. If your neighbours all use Wifi, you may find that 11a works better near the access point and 11g at a greater range. Smart devices will be able to sense which is best and switch modes accordingly.

Wireless hotspots are hot news

Hotspots offering public Wifi web access are hot, if a series of announcements last month is anything to go by. Toshiba introduced a deal under which you can launch one for £400, with the company providing support. Details are at www.hotspot.toshiba.co.uk. The Cloud (www.inspiredbroadcast.net) is offering free access for six weeks to its 200 hotspots across Britain. Buffalo has set up a free hotspot at the Kingsway Hall Hotel in London's Covent Garden.

Myzones (www.myzones.com) offers managed Wifi-enabled home broadband links for £29.99 a month. Curiously, founder Clive Mayhew-Begg is pushing these as a way of sharing costs with neighbours, which is not allowed by most providers.

Quality 'trickier than security'

Setting a standard for assuring Quality of Service (QoS) on Wifi networks proved trickier than making them secure, according to the Wifi Alliance. QoS in this context means the ability to guarantee bandwidth to data streams such as streaming video that require timely delivery.

Alliance spokesman Brian Grimm said QoS is not likely to be implemented until next year. An interim security standard, called WPA, addresses the fears of businesses that are shying away from wireless. Currently, home users buy four times more Wifi units than corporates.

A new IEEE 802.11i security standard will be finalised this year, and this will be subsumed next year into a WPA 2.0. Devices bought today will not be upgradable to WPA 2.0, which will be hard-wired, Grimm said.

Blue alert

Companies are in danger of focusing on Wifi security and forgetting about Bluetooth, according to wireless specialist Red-M. Director of technology Christopher Weiss said many laptops and handhelds have built-in Bluetooth that could provide an open door to intruders when the device is linked into a company network.

He claimed that his company's Red Alert, which checks the airwaves for suspicious activity, is the only one of its kind to watch for Bluetooth.

Red-M was launched around Bluetooth and Weiss admits that it has had to embrace Wifi. 'I would not characterise it as a turnabout. Our expertise is in wireless and we simply extended our focus because our customers asked for Wifi.'

Outdoor Wifi

D-Link has launched two 802.11b products specifically for outdoor use. The access point and bridge/router, both branded Airpremier, are designed for hotspots or to connect buildings.

They are watertight, with lightning protection and power-over-Ethernet support (see opposite) to ease installation.

PCW number 1141104

>> Pass card

A new pre-paid card works like a phonecard to provide Internet access from any UK PC at what are claimed to be the lowest available dial-up rates.

The £10 Myinternetpass card, carrying a freephone number, user name and password, comes in two forms: one giving unmetered access for 30 days, the other 2,000 minutes over three months.

Phillip Glyn, managing director at Myinternetpass, said: 'The benefits are obvious – it's simple to use, there is no need to sign up to a contract and it offers the best value-for-money web access in the UK.'

The cards are available from major retailers or from www.myinternetpass.com.

>> SMS alert

A new Yahoo service will send an SMS message to notify you when you have received an email. The message includes the email subject and the sender's name.

You can limit notification to specified senders and subjects and the cost goes onto your mobile phone bill.

>> Audio tools

Unrelated Inventions has launched Audiotools for Windows, which allows you to record audio from a sound card or MP3 stream, process it using a number of techniques, and save it in a variety of formats including wav, MP3 (using Fraunhoffer, Gogo or Lame encoder), OGG, VQF and WMA.

It costs $20 (£12.30) from www.unrelatedinventions.com, where a shareware version limited to 10 minutes of recording is available.

>> Firewall offer

Agnitum has released Outpost Personal Firewall Pro 2.0, a firewall for Windows that hides your PC from hackers, and quarantines worms and viruses. It costs $39.95 from www.agnitum.com.

>> 13p backup

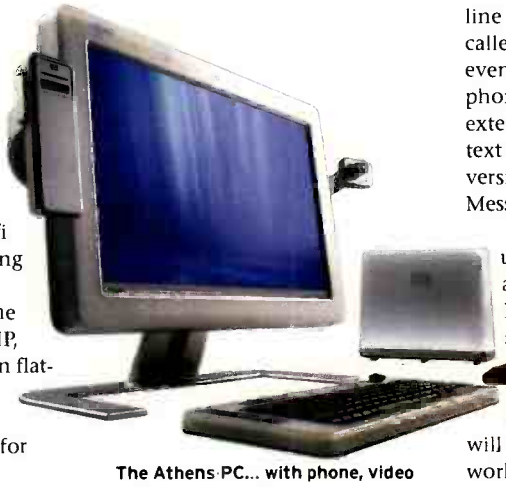
A online backup service at www.backup360.co.uk provides automated backups of your PC files for from 13p a day.

PCs go quiet on the phone

Microsoft has unveiled the prototype of a next-generation PC, codenamed Athens, designed to switch on and off instantly like a light – and to run as silently. It also offers hi-fi audio and telephony using a wireless headset.

The specification for the design, developed with HP, includes a high-resolution flat-panel display with an aspect ratio of 16:10 that the company says is best for working with multiple documents. Microsoft also says the machine will have a set of 'intuitive and consistent controls' to make it easier to use.

These telephony features highlight what is likely to become a major use of future PCs. At their simplest, these will turn the PC into a super-telephone, a potential that is remarkably barely used today outside call centres – though the ability to dial directly from an address book is built into most PCs.



The Athens PC... with phone, video camera, 16:10 TFT panel, wireless keyboard and sleek system box

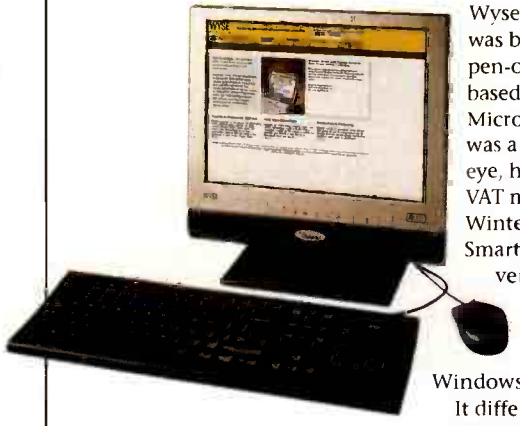
Telephony software can link into other software, so that, for instance, the CLI facility identifying the number on the line can be used to bring the caller's details to your screen even before you pick up the phone. These facilities will extend into video, voice and text messaging using future versions of Microsoft's Instant Messenger software.

Microsoft chief Bill Gates, unveiling Athens at the annual Windows Hardware Engineering Conference, said the design showed: 'unprecedented levels of synergy between hardware and software' that will improve the way people work, communicate, learn and are entertained'.

It would also, of course, put Microsoft at the lucrative hub of world communications.

Gates also showed a new set of controls called the Xeel, consisting of a wheel and two buttons, intended to give small untethered appliances the consistent navigation that the mouse offers on the desktop.

Wyse fat client uses Rom-based XP



Fat chance... the 3829TX runs its browser locally

Wyse Technology, which was bringing out mobile pen-operated Windows-based terminals long before Microsoft's Smart Display was a gleam in Bill Gates' eye, has released a £1,169 ex VAT model called the Winterm 3829TX. Like the Smart Display, it uses a version of Windows CE and acts as a front end for applications running on a remote Windows XP PC via a Wifi link.

It differs in that it can also use a GPRS link, for use on the move, and supports Citrix ICA software that allows it to use non-XP hosts.

Stephen Yeo, Wyse marketing director, said the 3829TX would appeal to organisations that want the ease of maintenance of server-based applications and are concerned about leaving sensitive data on mobiles.

Wyse has also launched a 'fat client' called the Winterm 9650XE, which has a cut-down version of XP called XPE (for Embedded) in 256MB of Flash memory, which can also hold the software of your choice; it also has 256MB of Ram.

The 3829TX runs Windows Explorer locally, together with software such as drivers, but other applications are all run on a remote server. Yeo explained: 'This makes it easier for companies to control viruses and updates, and to keep data secure. But browsers are very server intensive. They use a lot of resources and are far better run on the client.' Prices start at £799 ex VAT. www.wyse.com

Wyse has also launched a management tool called Alcatraz to enable central remote control of PCs of mixed generations from Windows 95 to Windows XP. A simple mouse-driven interface enables profiles to be set and applied to groups of users, defining details such as which applications or drives can be used regardless of which version of the operating system is in use.

Marketing director Stephen Yeo said the system could save companies money by allowing upgrades to be deferred. 'Many standardise on one platform simply to avoid the problems of having a mixed environment.' Alcatraz costs between £50 and £75 a seat.

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Optical Drive Upgrades

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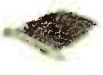
CD ROM to SONY DVD-RW	£118 EX VAT	£138.65 INC.



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Sound and Speaker upgrades available - see over

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- FREE Microsoft Works Suite 2003
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- 48x CD Re-Writer & 16x DVD-ROM & Drive (Combo)
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- SONY DVD Multi Burner (R/W all standard formats)*
- 48x CD Re-Writer & 16x DVD-ROM Drive (Combo)
- Sound Blaster Audigy 2 Dolby Surround with FireWire
- Creative Labs Inspire 6700 6.1 Surround Speakers
- Internet Ready V.92 56Kbps data/fax/voice modem
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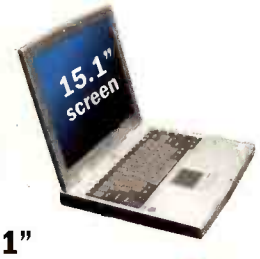

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- Combo 8x DVD & 24x CDRW
- Internet Ready Internal 56kbps Fax Modem
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- Microsoft Windows XP Home
- Built in Smart Card reader (supports MMC/SD/SM/MS)
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Other features include

- PCMCIA 1x Type II slots - FireWire • 4x USB 2.0 • 1x VGA port (15 pin) • S/P DIF Digital output
- Parallel • PS/2 • Infra Red wireless com ports IrDA • 4MBps FIR • Wireless Antenna
- Smart Li-Ion Battery • Wireless LAN Card (optional) • Built in Trackpad with 2 buttons
- Built in antenna for mini PCI Wireless Com • 3D Stereo Speaker & mic • Headphone Jack
- Ext. Mic Input • 86 Key Keyboard with numeric keypad • 4 Hot keys • Kensington Lock facility
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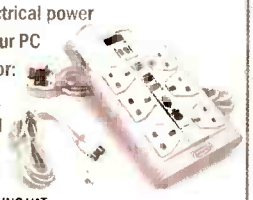

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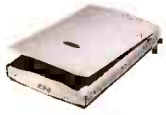

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Linux under threat

The operating system faces its biggest challenge yet in the form of a $1b legal action by Unix house SCO. The move has been greeted with fury and confusion. What is SCO up to?

A $1b legal action against IBM has thrown the Linux world into turmoil and could put a brake on corporate adoption of the open-source operating system. SCO claims IBM has used some of its Unix code in Linux products – and has warned other big users that they too could face legal action. Any user could be liable, in theory, because SCO claims its code has been incorporated into the Linux kernel.

Linux may be damaged even if SCO's claims are rejected by courts, because the prospect of a lengthy and unpredictable action could cause corporates to play safe and stay with Unix or Microsoft. The majority view, as we went to press, seemed to be that SCO had no case; but the company had yet to give details of code it claimed as its own.

SCO quickly became very, very unpopular. It was hit by a Denial of Service attack, Linux users sent emails inviting it to sue them, and newsgroup postings by Linux devotees verged on the vicious. The US magazine *EETimes* quoted one developer as saying: 'It's as if somebody whacked Santa Claus.'

The dispute has roots in the early days of computing. The first Unix code was developed at AT&T's Bell Labs in 1969, and taken up by universities which added their own refinements. At the time, Unix attracted something of the idealism that is now associated with Linux.

Two features contributed to its success. It was written in C, which meant it could be compiled easily for different hardware platforms; and, rather than being a single executable, it was a collection of programs that could be 'pipelined' to perform tasks. This meant features could easily be added on an ad hoc basis and it later facilitated the co-operative development of Linux, which is essentially an open-source implementation of Unix. But

the loose structure was also a weakness, in that Unix rapidly fragmented into a number of commercial and academic 'distributions'. There was no guarantee that what would run on one version of Unix would run on another. Rivalries degenerated into what became known as the Unix wars.

By the time Linus Torvalds launched Linux, Unix dominated mission-critical enterprise systems, but its position was under constant attack by Microsoft, which was trying to extend its hegemony up from the desktop. Linux put the boot on the other foot: Microsoft found itself having to defend its home territory against open-source Unix.

No evidence

In 1995 SCO gained some sort of hold on Unix from Novell, which had bought the software from a spin-off of AT&T. Quite what SCO bought is disputed. Novell issued a statement saying it did not transfer ownership of 'copyrights and patents' to SCO and could find no evidence that code had been copied into Linux.

Novell chief Jack Messman wrote in an open letter to SCO: 'We believe it unlikely that SCO can demonstrate that it has any ownership interest whatsoever in those copyrights. Apparently you share this view, since over the last few months you have repeatedly asked Novell to transfer the copyrights to SCO, requests that Novell has rejected.'

He said that unless the company could provide evidence it would 'be apparent to all that SCO's true intent is to sow fear, uncertainty and doubt about Linux in order to extort payments from Linux distributors and users.'

Indeed SCO's behaviour has been curious, to say the least. At Comdex last year it stood shoulder to shoulder with Linux stalwarts Suse, Turbolinux and Connective to announce the formation of a United Linux alliance dedicated to protect Linux from the fragmentation that bedevilled Unix. Six months later it was describing Linux as an 'unauthorised derivative' of Unix that infringed its copyrights.

To cap it all SCO threatened to revoke IBM's licence to use AIX, the latter's own flavour of Unix – something that would shut down half the world's enterprises if carried to its logical conclusion. IBM said there was no way SCO could do it.

Dan Kusnetsky, vice president of analysts IDC, described SCO's moves as 'acts of desperation by a company whose revenue stream doesn't satisfy [its board] and [which] is casting around for money – any money.' He said the court action would not alter the fact that companies were beginning to see Linux as a mainstream choice, but it might 'slow down the decision cycle.'

SCO, which says it expects to make $4m (£1.6m) on $21m second-quarter revenues, would face huge legal costs if it lost a lengthy action – costs that would be small change to IBM. SCO vice president Chris Sontag told VNUnet's Peter Williams that the company could survive whatever the outcome – and he denied that any other company was financing the action.

Certain winner

There is no suggestion that Microsoft was involved, though the company is the sole certain winner in the dispute. Anything that slows the adoption of open-source software, particularly Linux, has to be good for Microsoft – particularly at a time when governments and other large organisations are looking at open-source more closely, following new licensing deals that commit them to paying the company millions (even tens of millions) a year, more or less indefinitely.

Microsoft is not above stirring the pot. At the height of initial anti-SCO fury, it announced that it was licensing SCO's Unix patents and source code.

Brad Smith, general counsel and senior vice president at Microsoft, said this would help ensure compatibility between the two platforms and was representative of Microsoft's 'ongoing commitment to respecting intellectual property'.

● See also page 16 and Ed Henning, The Last Word. And check for updates on our website, where you can read Peter Williams' interview with Chris Sontag – just enter 1140828 in the *PCW* number box provided.

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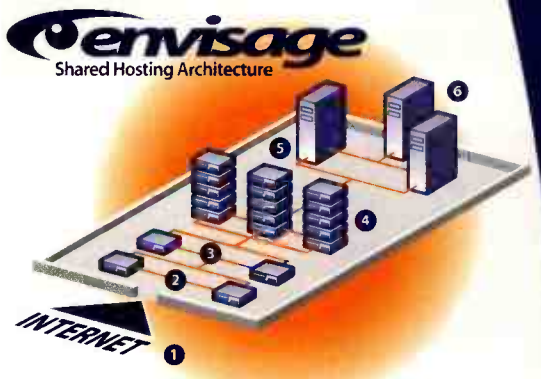

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Look who's talking...

More on lipreading computers, 500Mbits/sec UWB links, quad-speed 802.11a Wifi, MMX goes mobile, Moore's Law lives... Gordon Laing investigates what Intel has in the pipeline

The Intel Developers' Forum (IDF) is a global series of conferences where engineers throughout the industry learn about Intel's plans and prepare for future standards in a series of highly technical seminars and keynote speeches. Unlike most trade shows which have become dominated by hype, IDF offers a rare opportunity to discuss issues with developers working on future technologies long before the marketing teams have applied their official spin.

The latest IDF conference, held in Berlin over the spring, illustrated the wide range of technologies Intel is involved in, besides simply accelerating the clock speeds of PC processors.

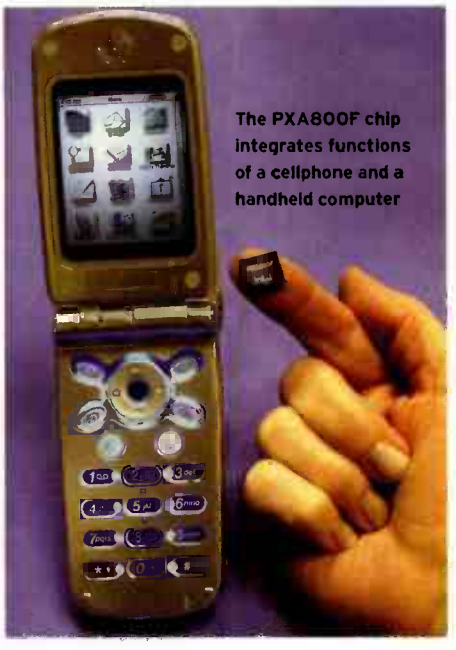
Intel used IDF to release development software under an open-source licence which will allow future computers to read people's lips (see last month's News). Justin Rattner, director of Intel's Microprocessor Research Labs, explained that voice recognition software now works in quiet environments or where people are using headsets. The next challenge involves accurate recognition under more usual noisy environments.

Intel's trick is to emulate the human trait of watching people's lips as they talk under noisy conditions. Face detection algorithms from Intel's Audio Visual Speech Recognition (AVSR) software use markers such as the position of eyes to lock onto the mouth and follow its movements. By combining visual lip data with conventional audio input, Intel believes voice recognition accuracy could be improved by over 55 per cent in noisy conditions; indeed Rattner claimed the lipreading alone was 50 per cent accurate.

Such technology is between three and seven years away though. Omid Moghadam from Intel's Microprocessor Research Labs explained to *PCW* that to be a realistic proposition for a user interface, recognition software should only have a 5-10 per cent processor overhead. As demonstrated at IDF the development software was running 1.4 times slower than real time, even given the complete resources of the fastest Pentium 4. Intel is likely to develop new processor architecture or enhanced instruction sets to achieve the target overheads.

Intel is also researching the use of multiple microphones to improve the accuracy of speech recognition. Arrays with four or eight microphones positioned around a screen could focus on a person's speech despite head movements. Larger arrays in meeting rooms might be able to track individual speakers and deliver accurate minutes. Microphone array technology is likely to arrive before AVSR.

Behind both the lipreading and mic arrays lie sophisticated statistical algorithms that could also be used to learn how people move. Subtle changes in a person's gait might alert doctors to impending heart trouble, or be used to spot suspicious activities in public places.



The PXA800F chip integrates functions of a cellphone and a handheld computer

500Mbits/sec UWB

Making the most of IDF often involves cornering various Intel executives for ad-hoc briefings. Spotting such an opportunity with Kevin Kahn, Intel fellow and director of communications and interconnect technology, we learnt about Intel's long-term view of various wireless technologies.

One highly anticipated wireless technology is Ultra Wide Band (UWB), which will be used for high-speed short-range links. Kahn said one likely development of UWB will be a wireless version of USB offering speeds up to 500Mbits/sec over distances up to 5m. This would make it suitable for transferring large amounts of data between PCs and digital cameras or MP3 players. If this sounds like the Bluetooth you've always wanted, you may not be far wrong – Kahn suggested wireless USB could be seen as a third-generation Bluetooth. Either way we're unlikely to see any commercial implementation of UWB until late 2005.

Wireless Lan was a hot topic at IDF. Looking ahead, Kahn explained the next big ramp for 802.11 beyond g and would happen in the 2007 and 2008 timeframe with what he believes the IEEE may call 802.11n.

Early predictions are that it will deliver three to five times the current fastest 802.11, with speeds between 150 and 250Mbits/sec. Between now and then we're likely to achieve similar performance using data-doubled versions of 802.11a running from 2x up to 5x.

Mobile Xscales

It wouldn't be an Intel event without new processors, but the stars of this show were its Xscale mobile range. In particular the new PXA800F (pictured) designed for mobile phones illustrated ever-increasing levels of integration, combining a 312MHz Xscale CPU with a cellular processor and 4MB of Flash memory on a single die. We were shown a PXA800F reference platform running Java and 3D benchmarks three to five times faster than a Nokia 7650 handset, and at higher resolutions and greater bit depths too.

Hans Geyer, general manager for Intel's PCA Components Group, announced Wireless MMX instructions would soon feature on Xscale chips and code was already with developers. As with desktop processors, Wireless MMX brings accelerated multimedia performance to mobile environments, such as allowing 60 per cent faster mpeg frame rates or double the video resolution. More importantly to mobile platforms though, Wireless MMX could match today's video resolutions and frame rates, but using 40 per cent less power, which is great news for battery life.

As IDF drew to a close we spoke with Sunlin Chou, general manager of Intel's Technology and Manufacturing Group. Chou joked that the thickness of human hairs was no longer a practical way of comparing against Intel's ever-shrinking transistors – indeed Intel's latest 90nm process produces transistors 50nm wide, half the width of an influenza virus.

Intel is on track to roll out new manufacturing generations every two years and Chou predicted Moore's famous Law and silicon processes would hold for at least another decade. As Intel discovers with increasingly cunning manufacturing techniques, there's plenty of life in the semiconductor yet.

www.intel.com/idf

Happy birthday Pentium

For 10 years PC users had waited for a processor powerful enough to run a graphical interface. For much of the 1980s they had had to contend with Dos commands and the jibes of Apple users with their friendly, if sluggish, Macs. Windows was launched in 1985 when the 32bit 386 chip looked as if it might have the legs to run it. But Windows 1.0 flopped and it was not until the 486 married Windows 3.0 in 1990 that the Dos era drew to a close. But applications added their own increasing demands to those of Windows, so that even the accelerating 486 could not keep up. The hype began about a new 586 chip that would fulfil every user's dreams.

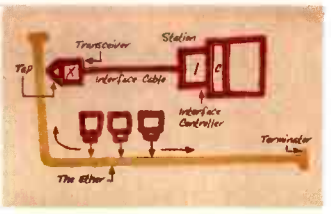
The new chip was launched 10 years ago last month and named the Pentium, after Intel discovered it could not trademark a number. The chip clocked at most 66MHz and it was a complete letdown, slower on some counts than the fastest 486.

Within a year the Pentium was clocking 100MHz and pulling well away from the 486. But still software demanded more. Not until the turn of the century did hardware truly catch up.

Which may be why there was something wistful about Intel's Pentium birthday celebrations in London. A decade ago it had no need to persuade people of the need to upgrade. It has a harder sell these days.

Photo: Mike Horton, Propergander

This is the first computer built by UK pioneer Clive Sinclair, using seven light-emitting diodes for output. The 1978 device is on show at the new Exhibition of Home Computers at Swindon's Museum of Computing. Holding it is Mike King, who loaned it to the museum. www.digitalhistory.orgl.uk



Ethernet reaches the grand age of 30

Last month also saw the thirtieth birthday of Ethernet, devised by Robert Metcalf at the same Xerox Palo Alto labs that invented the mouse-driven graphical interface.

He came up with three rules to allow computers to share data across a single line: wait for a break in traffic before sending; give each computer equal rights; and when two try to send at the same time, each should pause and retry at a random interval.

Xerox, as with the GUI, did not patent the idea and it became essentially an open standard.

Metcalf, whose original Ethernet sketch is pictured above, went on to found 3Com, making a fortune not from Ethernet itself but from the adaptors implementing it.

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Specification subject to change. *Varies with model.

>> SD-CF adaptor

Widget is selling a £17.50 adaptor that will allow SD (Secure Digital) memory cards to be read and used by devices with Compact Flash (CF) slots. Widget says the SD card protrudes slightly from the slot and so cannot be used on devices with slot covers.
www.widget.co.uk

>> Ancestral aid

The latest version of Encore's £39.99 Heritage Family Tree Deluxe includes a tool to allow family members to collaborate over the web on researching their forebears. It also includes a three-month subscription to Ancestry.com, one of the biggest family-record archives, priced at £39.99.
www.individualsoftware.com

>> PC dater

A new site at www.donateapc.org.uk acts as a free 'matchmaking service' for people with surplus computer equipment and UK charities that might be able to use it. Donors can post details of items on the site, allowing charities to pick what they need.

>> Disk toolbox

Subrosasoft has released Diskguardian 2.0, a $69.95 (£43) hard-drive toolbox that alerts you of imminent failures and performs volume repairs, backup and restore, benchmarking, and surface scanning.
www.subrosasoft.com

>> FAB site

A new Federation of Master Builders website (www.findabuilder.co.uk) is packed with information on home improvements, case studies and design ideas – and it will also point you to approved builders in your area.

>> Risky business

Visual Risks has released version 2 of its graphical risk-management tool Visual Risk Analyser, which is based on Microsoft's Visio charting package. New features include a traffic light system to indicate risk levels. The single-user price is £4,000.
www.visualrisks.net

Sounds like a good phone

Polycom's VTX 1000 is the ultimate desktop phone, with a price tag to match. The three-pointed-star shape of the $1,799 VTX 1000 will be familiar to people in companies that do a lot of audio-conferencing: it can be a one-to-one or a many-to-many phone, allowing remote groups to converse as if they are in the same room.

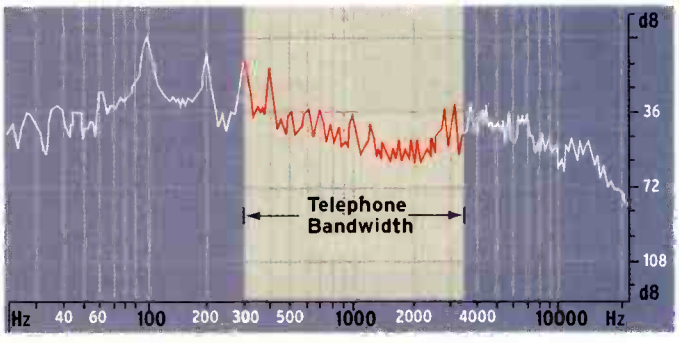
Executive phone... the VTX 1000 with auxiliary mics and speaker

What makes the VTX 1000 so special is that it has a Trimedia chip that processes the sound digitally so that, provided it is talking to a similar device, it increases the audio bandwidth passed down a standard phone line by a factor of nearly two (see diagram below). Polycom claims this is particularly helpful to people who have to converse in foreign languages on international conference calls.

It also uses five mics, one on each arm and two plugged in. Signals from each of these are processed to cancel out noise, and the signal from the one nearest to the person speaking is selected automatically to reduce extraneous noise even further.

The device, which of course can double as a personal phone, also includes automatic volume control so that you can talk from anywhere in a sizeable room and still sound as if you are next to the phone. This is likely to appeal to executives (or anyone else who can afford the VTX 1000) who like to pace up and down as they rant – though using the phone in this way can seem eerily like talking to a robot.

Polycom says the technology could migrate to cheaper devices in time and could also be applied to facilitating speech input for computers.
www.polycom.com



Small talk... the narrow bandwidth of the standard telephone covers only part of the spectrum used by the the human voice

Visio charting flows back to pre-Microsoft roots

Microsoft has released a beta of the latest version of its drawing package, Visio, with an enhanced web integration and a new range of shapes.

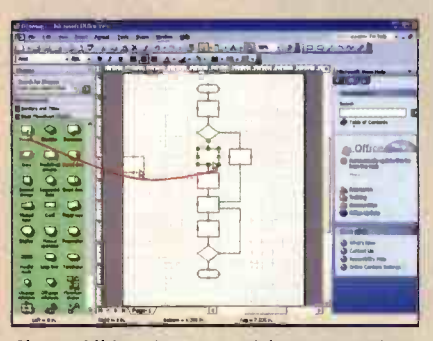
Visio began life as a computer-aided design (Cad) package that pioneered the use of smart shapes to help non-specialists build up complex drawings of anything from office plans to engineering designs. Shapes can be dragged and dropped to the required position, and pulled into the correct size.

It can also be used for drawing up the likes of logic and business-flow diagrams – a function that was given greater emphasis after Microsoft bought the company in 1999, and incorporated Visio into some versions of Office. At least one Microsoft-era version even dropped one of Visio's most useful tricks: a step-and-repeat function that allowed you to draw an object, such as a rafter, and duplicate it at specified intervals.

Oddly, Microsoft says the new Visio 2003, which will come in Professional and Standard editions, will return to its roots as a 'pure diagramming tool'. Visio tasks can be automated using Visual Basic for Applications, and the new version will allow it to use .Net and XML services.

Visio general manager Richard Wolf says the product has the potential to go beyond documenting 'analysing and communicating business processes'. He said: 'We want Visio to enable users to create a workflow by moving shapes around and connecting them, and have that workflow actually translated and implemented by the back-end systems.'

You can sign up for a beta of Visio 2003 at www.microsoft.com/office/preview/visio.



Shape of things to come... Visio uses a system of smart shapes to build up diagrams

Beware of the net voyeur

The proliferation of video surveillance cameras in Britain's streets and shops seems destined to spread to homes – where they could prove just as controversial.

The setup of home-watch systems will be facilitated by the advent of relatively cheap IP cameras that can be linked directly into a wired or wireless network – unlike standard webcams that have to be plugged into a computer. And many more homes now have local networks thanks to the growing popularity of Wifi.

Like street cameras, that can deter or help solve crime, IP cameras have their positive side. You can use a simple browser to check up on your kids whether they are simply upstairs or miles away – distance is no object. Some webcams are equipped with motion sensors that will send you an image if someone breaks into your home. But, also like street cameras, they can also be seen as oppressive and intrusive.

Linksys WVC11b... lets you choose a web address

And they are sure to breed a new type of hacker: the Peeping Tom. One security expert recently gave an indication of the dangers when he told how he traced the IP address of a hacker who tried to get into his PC – and found himself face to face with the culprit, who had his webcam switched on.

But your trickiest problem could turn out to be getting past your network's own firewall to use the camera. The Linksys WVC11b camera (above) gets round this problem by coming with a subscription to Cisco's dynamic DNS service, which lets you choose your own address and sorts out the camera's for you.

Veo's £139.99 Observer IP camera, which will ship to the UK shortly, lets you pan and tilt it remotely and includes audio so you can hear what is going on. It is being sold through Eire-based Partners in Europe (+353 61 70 20 30). See our 'Think different' feature (p89) for details of this and Incontrol's Quadcam.

Taiwan-based Planet produces a wireless model, the ICA-101W, with motion detection. It costs around £300 – check distributor Mayflex (0800 757 565) for details of your nearest dealer.

Just don't call Joybook a notebook...

When is a notebook not a notebook? When it is a Joybook, according to Benq. A Joybook may look like a notebook and do all the things a notebook does, but it is actually a digital hub, a 'true portable entertainment product'.

This means that it offers software for recording, editing and playing music and audio, and that it can play music with the computer switched off. The top-of-the-range Joybook 8000 has a combined DVD player and CD-RW burner; options differ with other models.

You may note a similarity to the packaging of Apple products, which are also promoted as entertainment platforms. The 2GHz P4-M-powered Joybook 8000 costs £1,699; if you buy one before July (check deadlines with your dealer) you will get a USB Wifi adaptor and a rather neat USB-based 64MB MP3 player for free. Otherwise these cost £60 and £79.99 respectively.

Portable entertainment: the Joybook

Benq has also launched two elegant looking flat panels, the 17in £530 FP 791 and the £399 FP 591, with an integrated four-format (CF, SD, MMC and SM) card reader that allows you to view digital pictures directly on screen. An optional £70.95 TV adaptor could point to a trend, because if the monitor is TV-enabled internally it counts as a TV set and is liable to higher import taxes. www.benq-eu.com

Fujitsu-Siemens gets moving with Centrino

Fujitsu-Siemens is building its range of ultra-portables around Intel's Centrino platform, which offers Wifi support products. It expects its new £1,119 ex VAT Lifebook S6120 notebook, which packs a 13.3in 1,024 x 768 screen, to be its biggest seller in 2003.

Prices for its stablemate Lifebook E4010 range, with a choice of 14in or 15in screens, start at £1,209 ex VAT. The E4010 is seen as a desktop replacement. The company is also tempting corporate users with offerings like remote backup, GPRS links and GPS.

It has also launched a new version of its Stylistic ST Series Tablet PC using a transflective screen that is said to be usable even in bright daylight. It is powered by a 933MHz Mobile Intel PIII processor.

>> Smart disk

A hard disk with a smartcard reader that protects files on lost or stolen laptops is to be launched commercially later this year after being used in some government departments.

The Guardisk from Thales E-security also encrypts and decrypts all data on a disk on the fly. It replaces the standard 2.5in laptop drive and is unlocked by smartcards that respond to a wireless signal from the Guardisk, so no slot is required. Pricing will be 'less than £500 per user'. www.thales-esecurity.com

>> XP shutdown

Auto Shutdown XP Pro is the first application on the market to exploit Microsoft's .Net framework's performance counters, says the developer Gill Information Technology. It will shut down an XP PC when, for instance, processor usage reaches a threshold for a pre-determined time. Shutdowns can also be scheduled. Prices start at $49.99 (£31) for a single user, or $39.99 (£25) to schools and charities. www.gillit.com

>> Local chat

Netchat, a peer-to-peer messaging system that lets you chat securely in real time on your local network without the need for a server, has been released by Barefoot. It costs $29.95 (£18.46) from www.barefootinc.com.

>> Green power

FSP has released a range of green power supplies with a standby current of less than one watt. A 300watt Green Power FSP 300-60GRE is now available at €52 (£37 inc VAT). www.fspgroup.co.uk

>> Stylus store

Proporta says it now stocks replacement styluses for all major makes of handhelds. www.proporta.com

>> Operatic Linux

Opera has released a Linux version 7.11 of its Opera browser, putting it on a par with the Windows version. New features include a built-in email client. www.opera.com

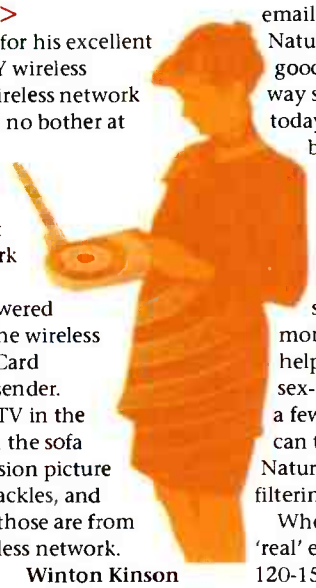
Send your letters to:
The Editor, PCW, VNU Business Publications,
32-34 Broadwick Street, London W1A 2HG

Send your emails to:
letters@pcw.co.uk

Letters

Wireless wreck >

Thanks to Gordon Laing for his excellent article (May 2003) on DIY wireless networking. My home wireless network was up and running with no bother at all, and I could see a summer of broadband surfing in the garden.



But I'm sad to report that my home wireless network has now had to be decommissioned and powered down. Why? Well both the wireless access point and the PC Card interfere with our video sender. My wife can't watch the TV in the bedroom if I'm sitting on the sofa reading email. The television picture flickers and the sound crackles, and then the sparks fly – but those are from Mrs K, not from the wireless network.

Winton Kinson

Dylan Armbrust replies > You're absolutely right. As we mentioned in the feature this could be a potential problem for some users, and that's where a site survey can help. Next month we'll be going into more depth on the issue of congestion, channel compatibility and conflicts, and the way to get around them.

Give me back my pen >

I read with interest your Spams and scams feature (July 2003) and couldn't help relating to the spam overload that seems to have overtaken our great electronic society. I work for a business that requires me (counter to my protestations) to post my email address on our company website. Naturally, doing so is in the name of good customer service, but with the way spammers are running rampant today, it wouldn't surprise me if people begin some kind of counter email revolution. By this I mean revolt against email itself.

Every day I get at least 10 or more requests to assist in laundering money (the Nigerian scam), over 20 offering me great mortgage rates (all in US dollars helpfully), about 20 or more porn or sex-related offers (Viagra anyone?), and a few more besides. And from what I can tell, it's only getting worse. Naturally, I've tried blocking and filtering, but this doesn't do much good.

When all of this dross is added to my 'real' email I'm looking at receiving over 120-150 emails a day, all of which require me to at least look at them – you can see how much time is wasted on spam alone. Some days I want to return to the good old days of pen, paper and a stamp, and be shot of this 'fantastic' way of communicating. In my opinion, this tool has now become a tragedy for us all.

Simon Knell

Dylan Armbrust replies > We at *PCW* can certainly sympathise with you on your plight. We, too, receive hundreds of spam and scam mails a day. Our own Nik Rawlinson has been following and campaigning for some kind of spam relief for us. Thankfully, our government (and the EU) is at least beginning to take note of the scale of the problem – and the cost to business too. We're also hopeful that filtering programs will get better too. We'd like to know if any other readers feel like rebelling against the 'plight of email'. Write in and tell us your thoughts.

WIN!

The author of the Letter of the Month will win a Canon Smartbase MPC200 multifunction device.

Aimed at the home and small office user, the MPC200 offers direct photo and regular printing capabilities, plus copying and scanning. Worth £199, this model, which has a footprint of 396 x 413mm, offers up to 14ppm mono printing and prints and copies in colour at 10ppm. Meanwhile, the scanner has a maximum resolution of 600 x 1,200dpi.

For more information on Canon products, go to www.canon.co.uk or call 0800 616 417.

Canon

Seeing into the future >

Several articles in the July issue of *PCW* provide tantalising glimpses of a multimedia future to which many of your readers might aspire. A future where we are able to select and buy content on a per episode/article/track basis then, with the click of a mouse, download to a home

Letter of the month

Down with Outlook email filtering >

I am surprised and saddened that the Spams and scams feature in the July 2003 issue of *PCW* managed to find space for a step-by-step guide to setting up Outlook Express' filters. These are woefully inadequate when it comes to spam protection, yet you didn't mention the fact that the Mozilla Mail, and some other clients too, now have Bayesian spam filtering.

Bayesian filtering learns as you mark messages as spam and, after a couple of months of use, my trained filter is now very effective – I get over 100 spams a day, of which it recognises 95 per cent, and I only have about one false positive every two weeks.

Installing and using Mozilla or a derivative is, in my view, the single biggest step anyone can take to deal with an existing spam problem on their email account. It doesn't require negotiating with an ISP, paying anyone money or spending time setting up and maintaining filters.

Gervaise Markham

Nigel Whitfield > You're quite right that there are many email programs that offer much more robust email filtering than Outlook Express, and we did mention the OSX Mail program, for one. However, we showed how to set up rudimentary filtering using Outlook because, quite simply, that's the program many people are told to use by their ISPs and they're reluctant to migrate. In an ideal world, we'd show how to set everything up in several email clients, but unfortunately space restrictions meant we had to concentrate on the most popular program, regardless of the merits of the alternatives. We hope to be able to provide a more in-depth look at some of those in a future issue.

system (via landline or airwave) and have 'fair-use' – where we are free to arrange, store and play the purchased content, wherever and whenever we choose. As the Irishman famously observed: 'If that's where I wanted to go, I wouldn't start from here!' Although such a future is now technically feasible, hardware, software and content providers seem intent on locking us into proprietary systems and/or extracting monopoly rents, thereby restricting our freedoms. It is particularly frustrating to me that, individually, the only way of expressing our desires is the negative one of refusing to purchase. What I would like to see is a more positive way of bringing *PCW* readers' views to bear on the future of technology. Is this a role for reader surveys? Or do we just have to sit around and await the development of limited proprietary systems?

Derek Seddon

Dylan Armbrust replies > I think that we will have to sit around and await the development of proprietary systems. Not because we at *PCW* want this, but that we know our power to influence is, sadly, rather limited on the global scene, especially when it comes to the shape of future technology. We wish that IT companies would share with us their future direction and products, but they don't tend to be keen to release that information to journalists.

Waste of space >

I take issue with Barry Fox's idea of always buying a bigger hard disk than you need (Straight Talking, June 2003).

Economics suggests that, since the price per megabyte of hard disk space is constantly falling, buying a large hard disk so that half its space can sit unused in your PC for 18 months is throwing money down the drain. This is especially true today because the largest hard disks always command a high price premium. By the time you really need the space, the money you saved by buying a smaller size will buy you twice the capacity of the hard disk you were tempted to buy, plus a piece of software to seamlessly transfer the entire contents of disk A to disk B. I think it's worth bearing in mind.

David Pritchard

Barry Fox replies > Fitting and formatting a second hard drive, getting the master, slave or cable select jumper settings right, responding to on-screen installation prompts and using Dos-based programs such as Ghost to clone the contents, is not a trivial task. It may be a doddle for experts but I'm happy to admit that, although I've done it many times, I still get nervous. I know a lot can go wrong, like formatting the wrong drive and copying the empty disk to the full disk, and ending up with two empty disks. Having spare disk space inside a PC for a few months will be the easier option for most people, after all, PCs are supposed to make life easier, aren't they?

Cost of recycling >

Ed Henning is dead right about the disgraceful amount of waste produced these days (The last word, June 2003).

Although it's only a start, here in Ireland retailers are forced to charge consumers 15c for each plastic bag issued, and that has apparently had the desired effect.

Tony Groves

Medieval evils >

Just thought I'd say how much I agree with Ed Henning (The last word, June 2003). I didn't expect to see something like this in *PCW*, but there it was, so thank you. I will 'recycle' your excellent point about neo-medieval hygiene, if I may.

James Willis

Lightning does strike >

I was pleased to see your feature on protecting your PC in last month's issue (The power to protect, July 2003), as it made me remember PCs' physical vulnerabilities that I and, I'm sure, many others have encountered. While the average UK resident may not be subject to the vagaries of a lively thunderstorm, I can attest from my own experience that they can be a tremendous nuisance, in terms of time and money, than most of us imagine.

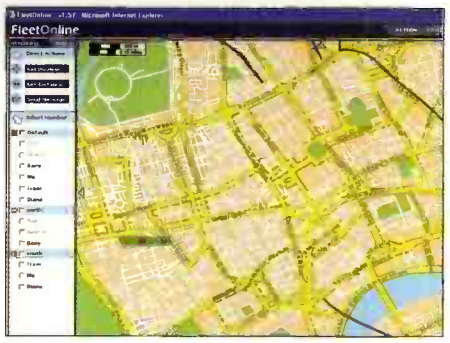
I have had the sad experience of having two modems and one motherboard being fried as the result of a local lighting strike. Aside from the bright flashes and thunderous clapping one experiences, the worst part of a thunderstorm comes after it passes (and the dog has come out from under the bed) and you try to turn on your PC and communicate with the outside world, only to find it, or a part of it, is essentially dead.

I'll admit I was slow on the uptake when it came to unplugging my PC during the storms, eventually purchasing a surge-protected power bar, but I can't emphasise enough to your readers just how vulnerable our expensive kit is.

After reading your article you've now prompted me to go out and get a decent UPS (uninterruptible power supply) too. Thanks for the reminder.

Anthony Drew

Dylan Armbrust replies > We're glad we could be of help in jogging your memory, and thanks for sharing your experiences (although sorry to see you lost so much kit). It's a good reminder for us all to not take for granted the physical aspects of PC protection. Whether it is from the elements, human or natural effects, we do need to take care.



There's no escape: 'tracking your partner' is a contentious issue in today's society

Don't infringe privacy >

I was startled, but not surprised, to read two of your news stories in the July issue, that just showed how close we're getting to a self-run 'Big Brother' society. The first story, headlined 'How to spy on your kids' (page 28) made me think we're not safe any more, and I don't mean from the government but from ourselves. The same goes for the 'Track your partner' story (page 29), using a mobile phone.

It seems we can't escape from CCTV anywhere, or from our workplace phone, web and email monitoring (all perfectly legal), and now we've got ready-made tools for spying on loved ones. The crazy part is that it's just reported in magazines like yours without any thought about the implications of it all. You seem to gladly accept and encourage the slow erosion of our right to privacy.

What will you report next – the best mind-reading sub-cutaneous chip implants for your family?

F Smythe

Clive Akass replies > We do leave our readers to draw their own conclusions on what are very complex matters. Just after *PCW* hit the shelves a man was jailed for ensnaring young girls in webchat rooms, highlighting the dilemma parents face over spyware. My own view is that we should not allow our own fears to stifle children: statistically they face most risk from their own families.

Almost all new technology has a downside. I delayed getting a mobile phone because I knew it would never give me any peace. IP cameras will be a boon for people wishing to guard their homes, as this month's news points out (p33), but you can bet your life they won't be the only people trying to peer through them.

Clarification:

The NEC Tablet PC reviewed on page 57 of the July 2003 issue was the Versa T400, and not the Travelmate T400 as stated in the magazine. We apologise for any confusion this may have caused.

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Don't shoot the Instant Messenger

Guy Kewney turns a worm party into a discussion about the social effects of technology such as AIM

guyk@pcw.co.uk

I was at a Worm Party, not long ago. A friend had written a book about them – not Internet Worms, either, but the slimy sort. Actually, microscopic worms; the sort whose DNA has been fully sequenced. It was a party, of course, designed to sell more books; publishers were there, and religious leaders and mavericks and authorities; philosophers, a Nobel Prize winner or so and, disappointingly, not one supermodel. And into the room, as I balanced a glass of wine skilfully on my nachos and cheese dip, came a pleasant young man, who writes on politics for one of the bigger national dailies.

'I write about technology – personal computing, mostly,' I responded to his question. He drew himself back as nervously as if I had returned from a visit to Hong Kong, sneezing and having trouble swallowing. 'Ah, hardware,' he said anxiously. 'Er, do you write about, you know, the social effects of computers?'

Actually, I do. A couple of years back, when I made the move from being a staff writer for a magazine to being a freelance, I discovered a fascinating thing; the devastation of losing your colleagues, which usually happens when you change jobs, was missing. I ran into them every morning when I started work, and said goodbye at the end of the day when I turned to *Buffy the Vampire Slayer* or the *Test Match Summary* or dinner or all the other things you do at night.

'I'm going to adopt a posture of lofty superiority and treat you like a car mechanic'

The reason my friends were all there was that we all chatted on Messenger. For those who aren't familiar with instant messaging (a rare breed nowadays), it's a very handy communication tool that lets you send text, lots of smilies and even have a voice or video conversation if you so wish, all in real time. It's a dandy package and I thoroughly recommend its use.

When I worked in the office, many days found one or two of us out at press conferences, trips to product demonstrations or seminars, and often overseas. Sometimes people had to work from home, too. It didn't matter; you logged onto Yahoo when you sat down at the keyboard, and checked the 'buddy' list to see who else was online.

Often, in fact, you'd sit in the office and suddenly hear a colleague start giggling. You'd instantly check the chatroom to see what was going on. Often, it would be something Rupert had said to Jane. Rupert actually sat right next to Jane; but he'd chosen the silent medium of a line of text.

Leaving the office permanently normally causes real shock. It isn't just the fact that you aren't earning your living the way you were, or that you're chasing debtors rather than avoiding creditors; it isn't even the loss of the normal route to the office. It's the fact that your best friends in this life are, normally, your colleagues and your neighbours – the people you meet every day. Move house, move office, and they're all gone.

Not any more. I found I was logging into the chat room as usual. I knew whose children had colic, who was trying to organise a beer lunch, who was worrying about the new car, who was depressed – exactly the same as before. If I was in a bad mood, people avoided me exactly as they would have done if I'd been scowling at them at the water-cooler. When I was 'up' people wanted to chat, exactly as when you have an inspired wit during a dull day.

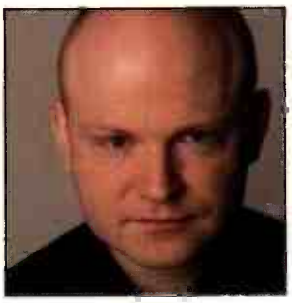
'How sad,' remarked one of my 'politically aware' audience. 'You had to resort to a machine for company.'

Another agreed. 'It's almost reached the point where computers might pass the Turing test,' she said. 'You can't tell whether you're talking to a machine or a real person!'

I had been going to try to explain my view of the profound social effects of search engines on the way we recall interesting stuff. I had been on the point of trying out a thought that has bothered me for some time, about *why* we get upset when people listen to a barely audible Walkman when the wheels of the train are so loud you can only just hear your own voice. I was even toying with the idea of asking their erudite opinions about the political effects of a people-owned communications network using wireless hotspots, rather than a corporate-owned structure.

In the end, I decided best not to. Anybody who can honestly mistake my conversations with friends, talking to me through the medium of a display instead of a phone or face-to-face, with 'interacting with a computer' is probably not quite as au fait with what is going on, socially, as they flatter themselves they are.

What they really mean when they say: 'Surely, social effects are where the interest lies?' is not that they are interested in the social effects of technology. What they really mean is: 'I won't understand any of that technical stuff, so I'm going to adopt a posture of lofty superiority and treat you like a car mechanic. Go round to the servants' entrance, and deal with the housekeeper.'



Making a big noise about quiet PCs

Gordon Laing asks if the hum of a PC can affect your health and what is being done about this problem

gordonl@pcw.co.uk

Three years ago, 40 experienced female clerical workers were randomly assigned to one of two offices: the first quiet, the second with background noise typical of the modern workplace. Three hours later the environmental psychologists conducting the experiment discovered the workers in the noisier office were more stressed, less motivated, and less likely to make ergonomic adjustments to their desks and chairs. The paper, published in October 2000's *Journal of Applied Psychology* concluded low-intensity office noise was bad.

Any office employee will tell you noisy workplaces result in lower concentration and reduced productivity. Subconsciously suppressing background noise during an entire working day, coupled with the inability to escape from its incessant hum might increase stress levels, but could the whirr of PCs really be bad for our health?

Whether you believe this to be hogwash or otherwise, there's no denying the enormous interest in quieter PCs. As more computers appear in homes, their noise is becoming a serious issue – the latest IT conquest for the living room is almost entirely dependent on silent or at least very quiet PC systems. An increasing number of buyers are requesting quiet options and a whole new market of considerate components has sprung up.

So why is there so little information or regulation on equipment noise? Unlike other emissions which enjoy a raft of certification and labelling, it's nigh-on impossible to find anything relating to noise. PC adverts list every specification imaginable, apart from the one thing which is more likely to annoy you long-term.

Even on the rare occasions when noise is mentioned, the device is often just described as being 'whisper-quiet', which is like abandoning the measure of gigabytes and simply saying a hard disk is 'plenty big'. Admittedly some manufacturers quote a decibel figure, but unless you know how far away the measurement was taken and with what weighting, it's virtually meaningless. Measuring noise can be difficult, but people want quiet systems and some means of knowing what they're buying.

So how tough a problem is measuring and labelling noise? Those with an insatiable appetite for information should check out **www.silent.se**, home of Tomas Risberg's appropriately named Silent PC Website. Risberg explains the pitfalls of measuring noise, makes a case for certain techniques and describes the ISO standards in place.

Yes, there's already an ISO standard (9296) which applies exclusively to the noise levels of IT equipment, and another (7779) which describes how measurements should be taken. Noise certification also exists, from the likes of TCO. So if standards and certifications exist, along with consumer demand, how come we don't see badges on PC systems boasting low emissions?

The first answer is cost, as measurements conforming to ISO 7779 understandably involve more than just pointing a cheap sound pressure level meter at a box. Making proper measurements under controlled conditions is expensive. Second, and ultimately more problematic, is consistency. It's easy to certify monitors and justify the cost because they're mass-produced. One certification could apply to a model produced many thousands of times over a long period.

PCs, on the other hand, are commonly custom-built. Rarely a month goes by without new configurations using faster processors or graphics cards, while varying supplies could also see different hard disks or other components fitted. Consequently it's virtually impossible to certify an entire PC system for noise unless it's a mass-produced box whose specification remains constant when sold over a long period.

> 'I bet they'd have traded a few megahertz for the benefit of lower-noise components'

To be fair, some of the largest PC companies, such as Dell, HP and IBM, do state audible emissions, but often hide them away under environmental specification sections. The most prominent statement of system noise I've seen is for Via's Epia motherboards where noise emission ratings are listed second from the top of the spec sheet. But Via can't control what power supply and drives are hooked up to its motherboards.

A description of overall noise emissions should be high on the list of commonly advertised PC specs. Several people I know who've recently bought a PC checked the usual list of specs, only to be shocked by the racket it made when powered up. I bet they'd have traded a few megahertz for the benefit of lower-noise components had they known or been given the choice.

Ultimately it boils down to consumer demand and how much we value low noise compared to other aspects of an entire system. We're in a catch-22 of constantly wanting higher performance at lower prices, while finding the resulting noise increasingly intolerable.

For lower noise levels, we're going to have to accept a compromise of lower performance or higher prices, but either way I'd like to be presented with comparative figures and a low-noise option rather than a nasty surprise when I first power up a new PC. The jury may still out on whether PC noise is bad for your health, but there's no denying it can be a royal pain in the neck.

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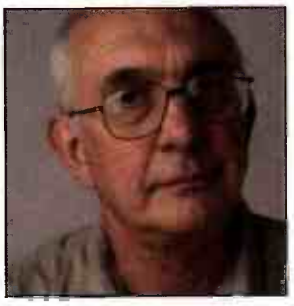

A little common sense, please

Clocks do it, phones do it, even pocket PDAs do it, so why on Earth can't PC makers do it? asks Barry Fox

barryf@pcw.co.uk

Is it really beyond the wit of mankind to put a warning message on screen when the little backup battery that is buried inside every PC motherboard starts to go flat?

I ask because yet again I have been caught out, and spent days looking for a fault that only sometimes stopped my XP Dell dead in its tracks.

The little battery or button cell is there to trickle power into the chips that store the PC's vital setup settings, along with the internal clock time and date. The battery should last for several years, but this depends on how often the PC is left unplugged and how hard the battery has to work. When it goes flat the PC loses the time and date and forgets what hard drive it has. So the PC has to auto-detect the drive, or be put through the Bios setup routine. It may then work for a while before losing its memory again.

Over the years I've seen PCs lose their date and time before losing the vital setup settings. This time I got intermittent refusal to boot, but with time and date still accurate. Because I had recently changed hard drives and DVD burners I blamed my changes and swapped everything back and forth a few times before I twigged.

All it needed Mr Dell, was an itsy bitsy error message on screen at bootup: 'Early Warning: Your Backup Button Cell Needs Replacing Soon.'

This and a few other incidents got me thinking. Do any of the suits who make and sell PC stuff ever use their own kit without a tame IT expert on hand? Do they ever try and buy what they sell?

'Do any of the suits who make and sell PC stuff ever use their own kit without an IT expert on hand?'

Pinnacle's new Instant CD/DVD burning software is so packed with features, it needs a 300-page manual to explain them. But the customer has to spend an age and a fortune printing it from the CD-Rom.

Powerquest's Drive Image for backup and Partition Magic for hard disk can both give a similar error message: 'Pmagic9X/Driveimage9X has caused an error in Pmagic9X/Driveimage9X.exe. PMagicX/Driveimage9X will now close.'

Which is a lot like saying: 'The engine in your car has caused a problem with your car's engine. You and your car will now stop. If you don't like it, buy another make of car.'

OK then – I'll use Norton.

How many times have you started a lengthy routine, like backup, defragging or disk copying, then gone out for the evening, expecting to return home later and find it all finished? When, instead, there is a message on screen that asks a question, such as: '89% not fragmented, do you want to continue?'; 'Overwrite previous backup file?'; 'Read-only file, click OK to copy'.

Of course those questions have to be asked, but surely the software could launch with the option: 'If you understand the risks, click here to proceed without interruption'.

Anyone who uses an inkjet printer and buys their own paper will know that there is a huge range of different types: glossy, premium, matte, glossy film and so on. All this paper has two things in common: it is expensive, and it gives good results only if used the right way round.

Todd Hamblin, Lexmark's director of marketing and strategy, stated recently that around 10 per cent of European households now have a digital camera and Lexmark's aim is to: 'make photo printing easy'. A good start would surely be to print a mark on one side of the paper, advising: 'Print on other side'. 'That's a very good idea; we'd not thought of it,' admitted Hamblin when this was suggested to him.

Toshiba is launching a combined hard disk and DVD-Ram video recorder. You use the hard disk for everyday recording and then archive to Ram disc. Fine in theory – yet none of Toshiba's DVD players can play the Ram recordings that the combo recorder archives.

Panasonic has bet the bank on DVD-Ram, calling it a: 'key strategic product' that is 'targeting 50 per cent share'. I borrowed a drive and went out to try and buy some blank discs. Most shops had plenty of DVD-RW and DVD+RW blanks, but no Rams. The Oxford Street branch of Dixons had two dusty three-packs for £35, which makes them £11.66 each – around four times the price of RWs.

After excuses about: 'The huge success of sales for our DVD-Ram Recorders', Panasonic owned up. 'We can understand your point that currently Ram media does appear to be in short supply. We will do all we can to improve this position in the weeks and months ahead.'

So why does it need a hack journalist to tell the largest consumer electronics company in the world that people need to be able to buy blank discs for its recorders?

Perhaps it's for the same reason that both Panasonic and Sony are still launching new digital snapshot cameras that have only an LCD viewfinder. No-one in those companies can ever have tried to use their own camera on a sunny day, when the LCD image is completely invisible, with the battery rapidly going flat. All it needs is a little optical finder sight and an On/Off switch for the LCD.

This is not rocket science, it's just common sense. Maybe there should be an industry accord on customer service that compels these executives to purchase and use their company's products, and experience the frustration most of us have endured for years. Who knows, it might even help sell more PCs at a time when the market is flattening.

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Stake a claim on your name

Nik Rawlinson discovers that, without insurance, your domain name could be snapped up by someone else

nikr@pcw.co.uk

If you drive you have insurance. It's socially responsible, and it's a legal requirement, so while you may hunt around for the best deal you don't even question the need for it. But should you be obliged to have insurance if you own a domain name, as well? Several companies seem to think so, and the risk is that if you don't go for it, it could be easier than ever to lose your domain through no fault of your own.

One such company is Internetters, which has recently licensed the Snapnames Snapback service. Ken Sorrie, an Internetters director, likens it to an 'insurance policy' for .com, .org and .net domains, and in theory it's a sound idea. By registering your online properties with them, at $69 (£43) a year, you'll have an array of registrars – currently in the region of 20 to 25 – watching over it day and night. If any one of them spots that you've forgotten to renew your name, or your hosting provider has omitted to do it on your behalf, they'll race to recover the errant name before anyone else can whip it away from under your nose. The theory is that, with so many big players on your side, the ordinary Joe or Joanne in the street will have no chance of snapping it up, and as with all insurance policies it really doesn't matter how much it costs you if you end up making a claim. Think of it as a virtual safety net.

'It could be easier than ever to lose your domain name through no fault of your own'

As with all good ideas, though, there's a catch, because you can take out a policy on any domain you want, even if you don't own it, which means... yup, anyone else can do the same to your own precious name. Worse still, it's run on a first-come first-served basis, so if someone else reserves your domain before you get in there yourself, you'd better hope that neither you nor you host forgets to renew it before their Snapback policy expires.

If while reading this you're thinking: 'It'll never happen to me', just cast your mind back a couple of years to when the world woke up on Christmas morning 1999 to find Hotmail was broken. As has been widely reported since, it seems that someone at Microsoft 'forgot' to renew the registration of its passport.com domain, and all trace of it was wiped from the net's root servers. Of course, the Passport service is at the heart of a whole host of Microsoft-related services, including Hotmail and MSN Messenger, and while being unable to trace the Passport servers, some of the most popular services shut up shop until links to the outside world were restored.

Hotmail's 20 million users were only reunited with their 55 million addresses thanks to the generosity of a Linux user, Michael Chaney, who paid the renewal fee on Microsoft's behalf and was rewarded to the tune of $500 and a copy of Visual Studio 6 for his efforts.

Of course a lot of water has passed under that particular bridge since 1999 and the online world is a very different place indeed. Had it happened last Christmas, and had Chaney then applied a Snapback to the passport.com domain rather than renewing it on Microsoft's behalf, he would probably have been hauled through the courts and forced to hand it back – Microsoft and Passport are well known, after all. In the meantime, the Redmond software giant would have lost thousands of dollars of revenue from the adverts it would otherwise have been serving on Hotmail and the other Passport-related sites.

You have to wonder whether Chaney might also have been sued to cover those losses – and on his site **www.doublewide.net** he estimates those losses to be around $7,800 for each day the service was offline, as well as an unquantifiable amount of potential lost revenue as a result of the bad PR and embarrassment this oversight undoubtedly caused.

This is the kind of logic Internetters is applying to the management its own .com domain, which, at the time of writing this column, was still available to anyone who wanted to take out a Snapback policy on it. Besides feeling rather confident that registering it for the next 10 years will have put off any pretenders to its rights, its registration of various Internetter-related trademarks and its confidence in the UDRP (Uniform Domain-Name Dispute-Resolution Policy) would see it win back the domain.

Of course, the fact that a Snapback policy could be rendered useless by a copyright lawsuit perhaps explains why no interest has yet been shown in Microsoft.com, IBM.com or Intel.com either, although strangely Apple.com has been taken. If that's not by Apple itself we're guessing someone mistakenly sees the company as a soft touch. This hardly seems fair, as some of the big online players clearly have faith in the system, with Amazon.com, Ford Motor Company and even Tupperware listed as customers on the Snapnames site.

So, should you choose to try and Snapback a well-known URL, bear that in mind. As the Chinese (and James Bond) once said: 'Before you set out on revenge, you first dig two graves.'

Oh, and in case you were wondering, **Jamesbond.com** is still up for grabs, but **007.com** has gone.

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I like Windows. Sorry if this offends Linux and OS X lovers, but it simply is the best OS currently available, something that is shown by (as well as helped by) the fact that over 90 per cent of PCs currently have it installed. Granted, it may not provide everyone with all the options and flexibility that they want from an OS, but in terms of universal ease of use, accessibility and compatibility, you can't beat it.

Even so, you may be wondering why on earth we are previewing a version of Windows that won't be available until some time in 2005. Well, as it seems unlikely that we will see any major upgrade to the Windows platform before then, we were keen to show you what lies in wait for us; as you'll see in the next five pages, there's a lot to get excited about.

First, Longhorn will be a component-based operating system. This is not only surprising (considering Microsoft's track record of keeping everything to itself), but it also opens up entirely new possibilities for the OS. The most exciting aspect is that manufacturers could create modifications to the OS, such as their own Media Centre Edition or a purely Internet-based version.

But these upgrades and additions are things that we would expect from an OS released this year, not in just under two years. Obviously, there will be even more additions to the OS by the time it is released, and there is very little doubt in our minds that when it does hit the ground it will be one hell of a release. We simply should not have to wait until 2005 for matters as basic as improved media compatibility and management, so here's hoping there's at least a stopgap service pack.

After some real animosity towards Windows XP, it took me nearly a year to start to appreciate it for what it is: a stable, well-featured OS that is not the be all and end all, but lets you do what you want with the minimum of fuss. Longhorn is likely to supply the same shivers on release, but we're confident that it will be what we've always wanted – and hopefully a little bit more.

On a separate note, as there's so much going on this month, we simply haven't had the room to fit everything in. Check out **www.pcw.co.uk** for the rest of this month's reviews, including ATI's 256MB Radeon 9800 (its first to use DDRII memory) and Gainward's souped-up Geforce FX 5600.

Mark Walsh

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OPERATING SYSTEM

PREVIEW

Windows 2005 (Longhorn) Alpha

In the first extensive UK review, we dig deep into the early code

Supposedly named after a saloon bar at the foot of the Whistler mountains, Longhorn will be the next desktop release of Windows. Whistler, for those with good memories, was the code name for Windows XP so, as you might expect, this bears more than a slight resemblance to its forerunner. Indeed, the code we reviewed included an entry for 'what's new in Windows XP' in the help and support dialogue box. Dig deeper, though, and you might start to wonder whether the only common ground is the Start button and task bar, as we reveal, in the UK's first extensive review of the operating system we will all be running come 2005.

The Sidebar can be anchored to the left, right or top or under the Start menu

Easy installation

Microsoft has worked hard to stem the spiralling install times of its operating systems. You'd be well advised to set aside an hour to load XP onto your system, but in our tests, a fresh install of Longhorn was ready to run in just 20 minutes. It requires 3GB of hard disk space to install and, of course, activation. The hard work of convincing the world that this is not a ploy to capture and sell user data or, worse, to use it to monitor our online activities, has been completed, and Microsoft would be ill advised not to capitalise on its success in this area.

At just over 600MB, the code we tested fits onto one CD, so Microsoft has clearly applied some impressive compression to this release. This alpha is copied wholesale onto the hard drive and from that point on you're effectively running a cut-down Longhorn already. Installing from a native environment is naturally far more efficient than the piecemeal approach taken by previous editions and we hope that Microsoft retains this method of installation in the finished product.

Installing Longhorn is a lights-out operation – set it running and you can follow the most important on-screen instruction right away; the one that tells you to leave your PC alone for 20 minutes and come back when it's finished. After that, a couple of mouse clicks and a single reboot is all that is required. Should you choose not to leave the installation to run on its own, you can sit back and watch a slideshow expounding the benefits of this latest Windows release.

Finally, the log-on screen has a clock, and partially reverts back to the interface used in pre-XP versions of Windows. Instead of a graphical display of registered users it is necessary to Ctrl & Alt & Del and log in manually with both the user name and password through an NT-style dialogue box. Systems managers the world over will heave a sigh of relief at this.

The interface

The first thing you notice about the Longhorn interface is the task pane, called the Sidebar, which runs down the right-hand side of the screen. It can be anchored to the left, right or top of the screen, and can even sit under the Start menu. Office XP users will be familiar with this concept – in the world's top-selling office suite it is the place where you return time and time again to carry out common tasks. In Longhorn, though, it is not merely an activity centre – it is an information portal too.

The Sidebar is effectively an XML-based aggregator and, although its content is fairly simple at the moment and mostly centred on Windows-related tasks, in theory it could in the future act as a news ticker or weather tracker just as effectively as it can emulate a computer navigation tool. Finally, it seems Microsoft may be cottoning on to the idea of RSS (rich site summary) feeds in this release. Perhaps this explains why it has not yet made any moves to integrate aggregation facilities into Outlook or Explorer, in spite of the fact that many third-party developers seem to be trying to do just that.

In its default configuration, the Sidebar takes up around 15 per cent of the available screen space on a 1,024 x 768 monitor, but it can be expanded or contracted to between 10 and 60 per cent of the desktop or minimised to the system tray. When minimised it manifests itself as either an expandable icon, or a series of buttons that will reinstate individual tiles of the pane in a larger format than their original state. This is particularly useful where the task manager is concerned. This keeps track of your three, five or seven most recently used applications, depending on preference, rather like the lower left section of XP's Start menu. In this way the 'classic' Longhorn Start menu (of which more in a moment) is considerably simplified; as it won't dynamically rewrite itself each time an application is executed, it should be more comprehensible to novice users.

The Sidebar features a host of other options and shortcuts, all of which can be turned off, minimised, resized or moved up and down the Sidebar's pecking order. First off, the quick-launch taskbar, formerly positioned next to the Start menu, has now been rehoused here. One major advantage is that the name of the program appears alongside its icon, but this taskpane does take up more room on the desktop.

In a similar way to Office XP and 2003's sidebar, Longhorn offers immediate access to Windows' search engine, be it for online resources or files available on your PC or network. Resembling a shrunken version of the XP Search menu, it lets

you simply type in words or plain English phrases and Windows will search through all available resources.

There is a slideshow option in the sidebar. This rather frivolous inclusion displays images from whichever directory you choose, taking the My Pictures folder as its default. An analogue clock is also available, which can replace the digital version in the bottom right-hand corner. System tray icons such as Windows Messenger, activation notifications and even Kazaa can be listed in a separate box.

Some of the features that are not shown in the screenshots in this review include a separate option detailing user information, though as yet nothing other than the user name appears in this pane. It also includes a pane with Media Player controls and a 'Basket', clipboard application. Adjusting the properties of any Sidebar pane is done simply through an icon on the outermost top corner of each section.

The default Start menu is in the style of Windows XP, and is supplemented by shortcuts for My Contacts, Picture and Video Library, and Hardware and Devices. As you may notice from the screenshots, many of the sidebar's features are repeated in the default Start menu. This may cause the majority of sidebar fans to switch to the Longhorn 'classic' style menu, which closely resembles pre-XP releases (see the picture on the previous page). We suspect that may cause Microsoft to rework the default, XP-style, Start menu interface prior to launch to avoid such repetition.

Active applications appear in the centre of the task bar and expand outwards, rather than lining up from the left. This is a matter of personal preference, but we think it looks rather awkward when only a few are running, and much prefer the original configuration which has been with us since the days of Windows 95.

Multiple instances of the same application will still contract into one task bar position which, when clicked, pops up a menu, allowing you to pick the one you want to access. Right-clicking the group gives you the option to tile its members horizontally or vertically, which is great for comparing websites or documents side by side.

The artist within

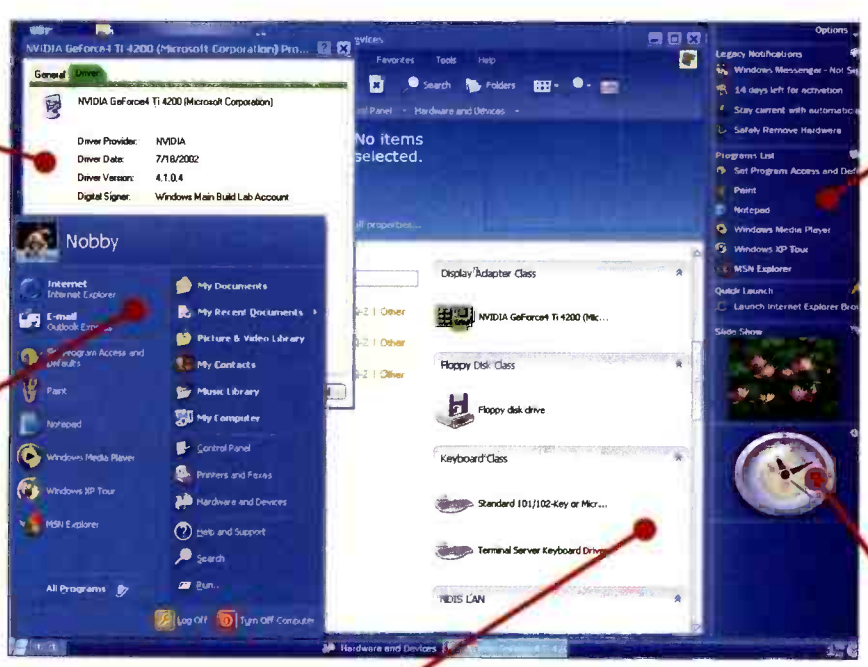
The interface goes beyond this layout ideology, though, as Microsoft has effectively rewritten the Windows screen-drawing engine. The Desktop Composition Engine (DCE) has been written from the ground up to support wide aspect ratio displays. This is a nod in the direction of media use, which implies that Microsoft sees this release as either a melding of both the Media Centre Edition and regular desktop flavours of Windows, or a replacement of the former.

The DCE, effectively an API (Application Program Interface) codenamed Avalon, radically alters the way in which the operating system draws on-screen data. In current versions of Windows, all applications submit their visual output to a single handler within the Windows core, which then assesses what would and wouldn't be visible within the finished product. Then it assembles the visible sections to form the completed image on just one desktop layer. Naturally it has to do this several times a second to keep the image up to date, which explains why you sometimes notice problems when moving around Windows on a visually intensive interface, and why the default for window behaviour on older Windows platforms was for the content to disappear and only the outline to follow your mouse.

Avalon, though, sees the desktop as a number of layers, just like a Photoshop image. It can therefore distribute active programs onto their own dedicated layer to form a stack of windows. As such, even unseen items will exist in this stack regardless of whether or not they are visible on screen.

This allows for some impressive handling and lets you apply to your application windows the kind of features you'd only find on a skinning site, such as alpha blends. As you might expect, this will be handled by DirectX. The pay-off is that you're likely to need some pretty meaty hardware.

Indications are that its default interface will be the Aero style



seen here, although we'd guess a Plus pack will follow some weeks or months after release, as has been the case with Windows releases of yore.

Windows can be scaled without becoming blocky or rasterised – think vectors – which is a boon for visually impaired users and, in the style of minimised application icons on the dock in Mac OS X, they can be reduced while remaining 'live', and accurately reflect their contents.

Scratch the surface

Perhaps the two most revolutionary changes in this operating system are below the surface. The first, codenamed Palladium, controls rights management. The second, WinFS, handles the whole underlying file structure of the operating system.

Palladium is Microsoft's contribution to the goal of trustworthy computing, and it gives the originators of digital content the ability to control how those products can be used. HP is looking to integrate similar functionality into existing versions of Windows and Linux, using its own third-party add-on, but here we see it built into the very fabric of the OS. By collaborating with compatible hardware from the likes of Intel and AMD, every file can be invisibly tagged and set to work on only specified machines, or stop working altogether after a set amount of time. This allows DVD distributors to produce self-destructing discs, or corporates to write documents that can't be read outside their own network.

Going beyond that, though, the Trustworthy Computing Initiative can also be used for verification and identification, and, if adopted by online banks or retailers, it should add considerable security to their services.

Longhorn is the first truly component-based desktop operating system. By this we mean that the base installation is not necessarily a fixed configuration on top of which manufacturers install their own modifications. By componentising the OS in this way, Microsoft has given hardware and software vendors the ability to physically replace key sections of the base code to produce truly customised releases. As such it is possible that Longhorn could form the basis of a very powerful media PC, denting the market for either Windows Media Center Edition (see *PCW*, July 2003 page 55) or the Linux-based alternatives (see the Hi-Grade system in this month's PC group test on p103).

Organising your work

WinFS, meanwhile, is Windows Future Storage. As a database-driven, centralised repository of information, it will change the way we think about our files and how they are organised. In all existing operating systems our work is saved in the context of the application in which it was created. Our emails, for example, are stored in an email application. Our spreadsheets use a completely different file format and are most likely saved loose on the hard drive.

Turning this on its head, WinFS creates a central information repository into which all files – regardless of type or originating application – are saved, allowing you to make system-wide searches that will gather information from the whole database. For example, a search for 'subscriptions to *PCW* in January', would show a result list containing spreadsheets of existing subscribers, emails from new subscribers and letters sent to or from subscribers, among other resources.

At heart this is SQL-based, and indications are that WinFS will work only on top of the NTFS file structure. In a move that apes decades-old Unix conventions, WinFS looks set to do away with drive letters, reducing your drives to simple resources used for storing data. How users will feel about not necessarily knowing where their data is held remains to be seen, but, if nothing else, it will certainly force us to think along the Microsoft corporate lines.

To date, we have tested two Longhorn builds; 4008 and 4015. Only the latter used the WinFS architecture. It therefore enables the sidebar pane option for searching across all data regardless of location; locally or on connected resources.

Longhorn promises to be more attractive than any previous Windows release. The on-screen graphics are currently only placeholders but the finished version promises full-motion video

You are no longer restricted to using Microsoft's default thumbnail sizes, as a zoom control will enlarge or contract them to your taste

Hyperlinks let you quickly skip to specific areas of your drive with a single click, or narrow file searches

This tile displays a dynamic slideshow of your own images. In this example the image is drawn from the My Pictures folder

The taskbar works in much the same way it always has, but applications now centre themselves rather than lining up from the left

Less emphasis will also be placed on folders and file locations thanks to this improved search technology, but Microsoft has nonetheless improved navigation. A breadcrumb trail now follows your progress through several parts of the file system. As you will see from the screenshot below, this works rather like the 'back' dropdown menu on a browser, and therefore allows you to quickly jump to an earlier location without successive clicks of the back button.

Open and close

Whereas Microsoft introduced the idea of optionally arranging the file dialogue by letter or type in XP, this function was hidden in a menu of the file window dialogue. In Longhorn it has been brought to the fore, with indexed hyperlinks in three sections for jumping to files that meet specific criteria, based on name, dimension or location. If you know you're looking for a file that starts with the letter A in a folder called 'pcw' you could therefore restrict your searches to all folders starting with P with one mouse click.

A similar dialogue is used for saving files, and Windows will keep track of where you have recently placed files so it can present quick links to those folders at the top of the Save dialogue.

Media

With Apple making great strides in establishing itself as the de facto choice for anyone serious about digital leisure through its Ipod and Ilife suite, Microsoft clearly sees this as a key battleground. It is therefore fighting its corner with improvements to the way it files our digital media. Image searches can now take advantage of meta data, set either by the camera or user, so if you remember you took a particular image with your Kodak, not your Nikon, you can specify that this should be one of the terms with which the search results comply.

Likewise, music files, now stored in the Music Library, can be organised by genre and by artist and album. This brings the kind of functionality we have seen for some time in Musicmatch, Winamp and other media players into the core of the operating system.

It is also possible to record direct from a DV camcorder to a DVD disc, regardless of the destination media type and without the footage ever touching the hard drive. Of course, you'd be advised to edit your shots first and, while the Longhorn release reviewed here doesn't include any specific video-editing application, we find it hard to believe a new release of Movie Maker won't be bundled. Whether there are any plans to integrate DVD menu creation functionality we can't say at this time, but watch *PCW* for updates as and when we uncover more details. Pictures and videos are now stored in a Library that is accessible from the Start menu, making all such data far easier to access.

The Picture Viewer has been considerably improved over the XP edition. As before, it will rotate, zoom and display images as a slideshow, as well as printing the ones you deem suitable. New features in Longhorn now build on this to provide the ability to correct exposures, remove red-eye, crop the image, select all faces and even close down the view and load the image in an alternate editing application, chosen from a pop-up menu on the button. Furthermore, the picture's meta data can be accessed and edited through the viewer itself.

Bang for buck

Our review installation was noticeably slim on new content. While we had a fully functional operating system, we didn't have all the associated paraphernalia we've come to expect in a Windows install. However, this kind of 'window dressing' tends to be the final thing that is added to the package. There are a few pointers that reveal how Microsoft is thinking though.

At the top of the Start menu is a clear entry for 'set program access and defaults', which opens a pane of the Control Panel Add/Remove Programs dialogue for specifying default applications for web browsing, email, media playback and Java control. This is of course down to the outcome of the US Department of Justice Anti-Trust

It is easy to retrace your steps when navigating folders using this web-style breadcrumb trail, as you would see in Yahoo

Moving notifications out of the system tray and into their own tile on the taskpane, sees an end to annoying pop-ups and gives you system status updates at a glance

Music is now stored in a library rather than a folder, giving you more versatile search tools and quick links to new ways of organising your collection

The Aero interface is a more refined version of what we have seen in XP, but is likely to change before release

trial, and is far more obvious than the same feature in previous releases or service pack upgrades. It contains options for Microsoft, non-Microsoft, computer manufacturer or Custom settings. Interestingly, in our early release the non-Microsoft browser option was Internet Explorer, while the non-Microsoft email client was Outlook.

Performance

Performance on our Athlon 1800+ test system with 128MB of memory was incredibly slow, though this is to be expected for such early alpha code. Opening up basic programs such as Paint and Solitaire took over 15 seconds, and reboot times were almost twice as long as those on Windows XP.

Further, Windows Explorer runs incredibly slowly on this release. However, by the time Longhorn reaches the market, even Pentium 4s will be considered outmoded, so we have no way of determining what the performance of the finished product on the recommended platform will be.

So when?

Longhorn was initially rumoured to be arriving in 2002 but, as has happened with previous OS releases from Microsoft, has since been pushed back several times. Nobody knows for sure the exact date when we're likely to be junking our XP installations in favour of this new release – or even what it will be called. All we can say for sure is that it won't be called Longhorn (Windows 2005 is speculation on our part), it will be a desktop-only product, and the chances are we'll be seeing it in the shops some time in 2005. If you're wondering, reports from the US indicate that the much-hyped product being developed under the codename Blackcomb will be the next server-based version of Windows, and will not run on desktop machines.

As you'll have seen over the past five pages, Longhorn is a far more substantial upgrade than anyone ever suspected. Also, thanks to several delays in bringing the product to market, it now incorporates technology originally intended for use only in Blackcomb. A case in point is WinFS, which has flip-flopped between the two releases depending on anticipated shipping dates.

So Longhorn is a big deal for Microsoft. It claimed it was betting the ranch on XP but in reality its advice to corporates was to stick with 2000 until they felt ready to make the switch. The strategy with Longhorn is more likely to be one of pushing for a global upgrade as soon as possible, and as such it is perhaps the most important version of Windows ever.

Speaking at Winhec in May, Phil Poole, Microsoft's senior vice-president of the Windows Platform Group, talked of 'life immersion' – melding products so seamlessly into the user's life that they had no choice but to upgrade.

'We haven't immersed the technology into their lives as well as we could and we haven't asked them to immerse their lives into the technology as well as could be done either,' he said. That, then, is Microsoft's task for the next two years – to convince us that our business and personal lives will so depend on this upgrade that we will not be able to live without it. You can expect this to be just the start of a sustained Longhorn awareness campaign.

Nik Rawlinson and Mark Walsh

DETAILS

PRICE TBA
CONTACT Microsoft
www.microsoft.com/uk
VERDICT

With an estimated 18 months before Longhorn becomes a retail product, a lot is bound to change, and so it should. A lot of what we have seen here should really be incorporated into an XP service pack well before 2005. However, much of what's here is likely to be far surpassed by the final release. From this early code, we can see the realisation of Microsoft's dream that we should all be able to create, access and manage our data, regardless of format or location through a Windows interface.

Improved builds and the development of hardware more capable of showing off the OS to its fullest potential will inevitably demonstrate the true power of what is clearly a milestone product.

The picture viewer is a staple of all recent Windows releases, but Longhorn sees its first major upgrade in some time

Many of the tools in the rewritten picture viewer are familiar from Windows XP, and include rotation, magnification and slideshow options on top of the regular forward and back navigation buttons

New tools allow you correct red-eye, crop and select all the faces in your image. If you need more powerful editing tools, a dedicated button will close the viewer and load the image in the application of your choice

ULTRA-PORTABLE NOTEBOOK

Sony PCG-TR1MP

EXCLUSIVE

A stunning exterior housing lots of handy components

Notebooks don't come any smaller or better looking than this, but these are by no means this notebook's best features. Heaven knows how Sony has managed to fit so many components into something this size, but it has.

The grey and silver exterior houses a stunning silvery-white interior, while magnets instead of catches are used to hold the lid shut.

On the top of the screen is a Motion Eye camera that can be swivelled 180 degrees vertically so you can take shots either in front or behind. There's a handy capture button on the right-hand side for quick shots, next to some useful volume buttons and a Hotkey Client shortcut.

A CD-RW/DVD drive sits at the front – it's unusual positioning but actually proves easier to use. The inclusion of this at all is impressive considering the notebook's size, as is the 30GB hard disk.

On the front of the chassis is an on/off switch for the integrated 802.11b wireless, and there's a Magic Gate compatible Memory Stick (MS) slot on the right that also supports the new MS Pro format, which can reach up to 4GB. Also included is a VGA out, should you wish to output to a projector. A USB2 port and a mini Firewire are under a flap below the MS port, as is a DC out for charging cameras etc.

The keyboard is small and therefore not particularly easy to type on. However, the keys are as large and as well spaced as can be expected on a device this small, so it's all credit to Sony that you can type on it at all. The TR1's right side has modem and Ethernet ports, a single Type II PC Card slot, with another USB2 port next to the headphone and mic sockets.

The battery can be removed from the back and a new, larger one inserted – it sticks out about an inch from the back, but gives you extra battery life. However, considering this little beauty kept going for just under three hours in our battery test (nearly twice as long as most other Centrino notebooks), we can't see many people needing the extra oomph.

Playing a DVD was a dream, as the screen is one of the best we have ever seen. The TR1 uses Sony's new Onyx Black technology, which is only available on this model and its latest 16in behemoth, the FR215S.

Onyx screens have a higher contrast ratio than other Sony screens, as well as being brighter and crisper. The results are tremendous, and the viewing angle is practically 180 degrees in both directions. We were slightly disappointed at how quiet the speaker was though, despite its high quality. However, we can't think of a better way to while away a long train journey than watching a couple of films on this.

Running on a 900MHz Pentium M processor, this Centrino machine is not for gaming or heavy processing, but is more appropriate for bog standard tasks such as word processing.

The Sysmark result was a pretty poor 98 overall, and the 3Dmark score was little to speak of at 1,781.

Overall, despite its slight performance results, the TR1 is one of the best-looking notebooks we've ever seen, and has the best battery life and screen of anything like it that's currently available.

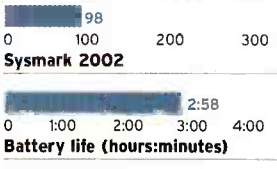
Mark Walsh

DETAILS

PRICE £1,800 (£1,532 ex VAT)
CONTACT Sony
www.vaio.sony-europe.com
SPECIFICATIONS
900MHz Intel Pentium M processor • 256MB Ram • 30GB hard disk • DVD-CD-RW combo drive • Intel 855M integrated graphics • 10.6in 1,280 x 768 TFT screen • 802.11b, Bluetooth • VGA camera • Windows XP Home • 1.4kg • 270.4 x 188.4 x 35.8 (w x d x h)
PROS Looks; battery life; screen
CONS Performance
VERDICT
If you've got £1,800 in your pocket and don't need high performance, this is the best ultra-portable money can buy

PERFORMANCE	★★★☆☆
FEATURES	★★★★★
VALUE FOR MONEY	★★★★½
OVERALL	★★★★☆

PERFORMANCE



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XP 3000+ PC

Multivision Ionix 52 PC

Multiple movie options at the right price

If you unlock the Multivision Ionix 52 PC's case, the side holding the MSI 7N2 motherboard lies down flat, giving you easy access to all the components. Inside sits an Athlon XP 3000+ processor running at a true 2.1GHz on a 400MHz FSB (front-side bus).

Multivision has used an Nforce2 chipset with 512MB of PC3200 memory running in dual-channel mode, but performance isn't as good as we would hope. The Sysmark score of 214 is around 50 points less than the 3000+ chip we saw in April 2003's issue.

It comes with a 120GB Hitachi hard drive, which represents excellent value for money and, although our review system arrived with an NEC ND-1100A plus format DVD writer, it will ship with the upgraded ND-1300A, which supports both plus and minus DVD formats.

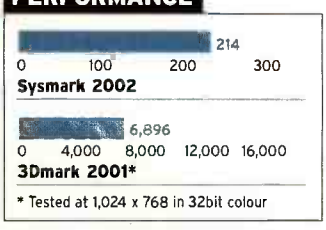
The Nvidia Geforce FX5200 scored as expected in 3Dmark 2001. This graphics card includes Personal Cinema, which includes a remote control similar to ATI's Remote Wonder and a breakout box. NEC's Mitsubishi Diamond Pro 750SB monitor is a superb accompaniment.

A PCI Firewire card and modem is installed leaving three spare PCI slots and an ACR, so there is plenty of scope for upgrades. The integrated audio has mini jack connections but unfortunately no digital output.

This is a very good PC for under £1,000. However, we would have liked a second optical drive, and can't quite get over that deficit in Sysmark.

Leo Waldock

PERFORMANCE



* Tested at 1,024 x 768 in 32bit colour

DETAILS

PRICE £938.83 (£799 ex VAT)
CONTACT Multivision
0870 066 0885
www.multivision.co.uk
SPECIFICATIONS
Windows XP Home • 2.1GHz Athlon XP3000+ • 512MB DDR memory • Hitachi 120GB hard disk • NEC DVD writer • Nvidia FX5200 graphics card • NEC Mitsubishi Diamond Pro 750SB monitor • Inspire 5300 speakers • Ability Office • Warranty 1yr on-site, 4yrs RTB
PROS Very good value, plenty of movie options; hard drive space
CONS Performance; audio weak
VERDICT
Should appeal to both first-time buyers and upgraders

PERFORMANCE	★★★★☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

XP 3200+ PC

Time Mercury 3200

Value for money with great performance

Last month Evesham and Multivision went head to head with two PCs based on AMD's new 2.2GHz Athlon XP 3200+ processor, which features in this Time Mercury 3200.

The Time's core specifications are almost identical to last month's Evesham, with 512MB of DDR-Ram system memory and an ATI Radeon 9800 Pro graphics card in the AGP slot. The Mercury 3200 has a slightly larger hard disk drive at 160GB compared with the Evesham's 120GB drive, but lacks a sound card.

With similar specifications we were expecting similar results in our tests, but the Time lagged slightly behind the Evesham. Nevertheless, the Mercury's overall score of 252 in Sysmark is very good and it notched up an impressive 14,006 points in 3Dmark and 71fps (frames per second) in Unreal Tournament.

A 16-speed DVD-Rom drive and DVD writer open out of the front of the system case. There is also a floppy disk drive and 6-in-1 memory card reader mounted into the front panel. The card reader has a single USB port and four more USB ports are at the rear, with two Firewire ports, and sockets including both VGA and DVI.

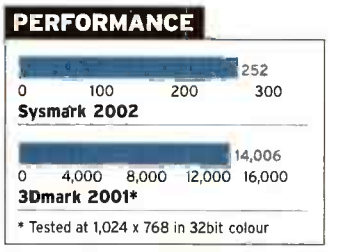
Inside, only one of the three Dimm slots is occupied, and five PCI slots – of which three are usable in this configuration – offer decent upgrade potential.

A 19in LG Flatron CRT monitor is bundled with a set of Videologic ZXR-550 speakers.

It is slower than the Evesham, but at £520 less the Time offers excellent value for money.

Emilie Martin

PERFORMANCE



* Tested at 1,024 x 768 in 32bit colour

DETAILS

PRICE £1,299 (£1,105.53 ex VAT)
CONTACT Time 01282 777 555
www.timecomputers.com
SPECIFICATIONS
Windows XP Pro • Athlon XP 3200+ 2.21GHz • 512MB DDR memory • 160GB hard disk • 16x DVD-Rom drive, 12x 8x 32x CD-RW/2x 1x 12x DVD-RW/2x DVD-Ram combo drive • ATI Radeon 9800 Pro graphics card • 19in LG Flatron F900P monitor • Videologic ZXR-550 speakers • 6-in-1 memory card reader • 3yrs RTB
PROS Price; performance; DVD writer
CONS Onboard sound
VERDICT
Great performance, specs and price – a great buy

PERFORMANCE	★★★★☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

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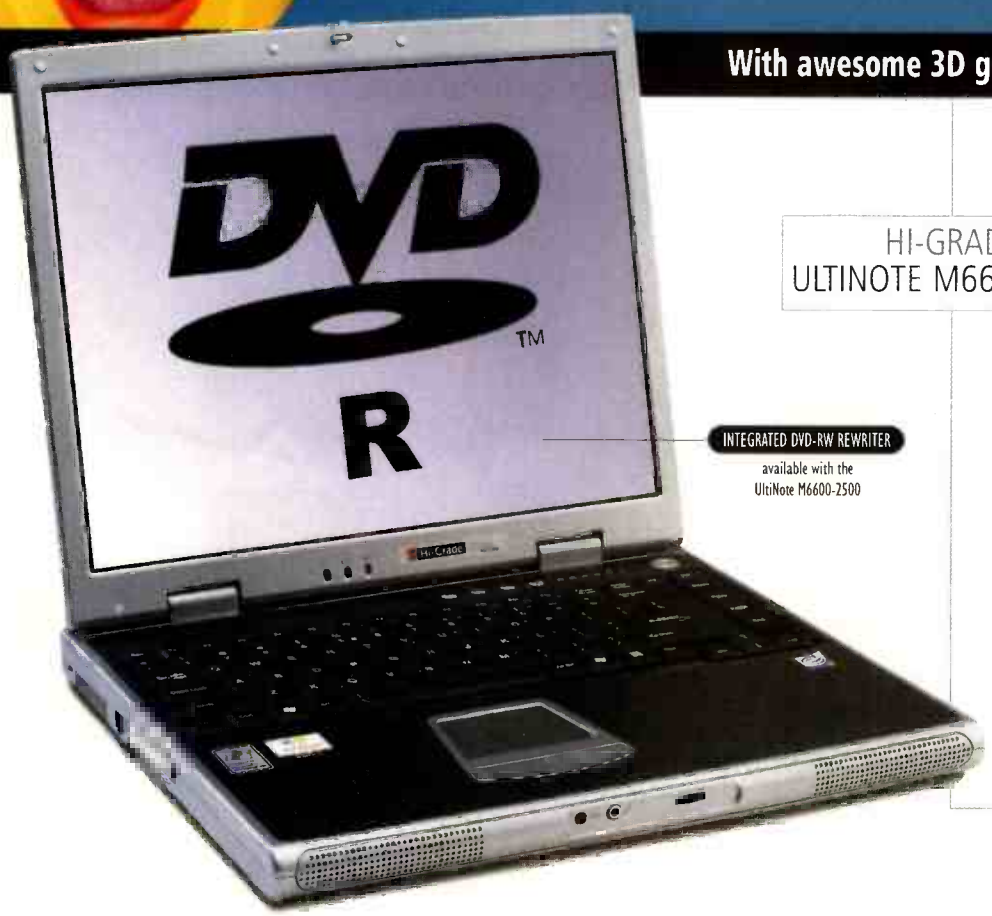

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Hi-Grade PCs use genuine Microsoft® Windows®.
www.microsoft.com/piracy/howtotell

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PENTIUM 4 NOTEBOOK

Rock Xeno-SP

A well-designed desktop replacement

Armed with a new battery-saving technology for desktop Pentium 4s, the Rock Xeno-SP aims to combine performance and portability, based around a 2.66GHz Pentium 4 CPU backed up by 512MB of DDR memory

The well-established Sis 650 graphics chipset suffices for just about everything, apart from games. Our test results bore this out with a respectable score of 205 in Sysmark, but 3Dmark performance was much lower at 1,009. On the storage front there's a 40GB hard drive and a CD-RW/DVD drive.

The Xeno also includes a new Rock technology, Smartpower, which offers the power-saving options of Mobile Pentium 4s by adding extra features to the Bios. Unfortunately this did not make any difference in our tests, giving just over an hour of use.

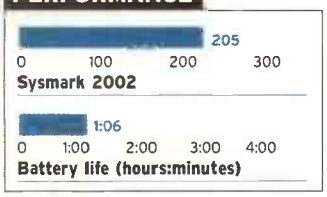
The keyboard is well laid out, but the keys don't have much travel or weight. It is, however, set nearer the user than normal, offering a comfortable typing position.

The sides and front of the notebook have been designed with regular use in mind. The only port at the back is the modem; everything else can be accessed easily without moving the notebook. There are three USB sockets, as well as Firewire, Ethernet, Video out, PS/2 and VGA out. Headphone and microphone sockets are at the front, along with volume control, while four buttons offer application shortcuts.

This notebook performs adequately as a desktop replacement, but will not suit those looking for gaming power or long battery life.

Tim Smith

PERFORMANCE



DETAILS

PRICE £1,056.33 (£899 ex VAT)
CONTACT Rock 08709 909 090
www.rockdirect.com
SPECIFICATIONS
Intel Pentium 4 2.66GHz • 512MB memory • 40GB hard disk • CD-RW-DVD drive • 14.1in TFT • Windows XP Home • 2.85kg • 30.5 x 27 x 4cm (w x d x h) • 3yr collect and return
PROS Accessible ports; good keyboard position
CONS Battery life; graphics
VERDICT
This notebook is well designed, but is let down by poor battery life and graphics performance

PERFORMANCE	★★★★☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

TABLET PC

Motion M1300

The first Centrino tablet on the market

Tucked inside the Motion M1300 is an ultra-low-voltage 900MHz Pentium M processor, Intel 855 chipset and 802.11b mini PCI wireless adaptor. This means that the M1300 can not only display its Centrino case badge with pride, but can also boast of being the first Centrino tablet to grace the pages of *PCW*.

The M1300 is not as compact or light as HP Compaq (*PCW* January 2003), or NEC's offerings (*PCW* July 2003), but it is a highly portable unit at 1.5kg. It doesn't look bad either, with a matt-finish silver case and a bright, clear 12.1in TFT LCD screen.

On the right-hand side of the bezel is a silver navigation button, which you can use to scroll and make selections. There are also four smaller buttons which, when used in combination, select a number of functions. You can call up the dashboard featuring display and speaker controls, launch Windows Journal or adjust display orientation, but these did prove a little confusing to use.

A Type II PC Card slot sits on the right-hand edge of the tablet but all the other ports and sockets are hidden away on the bottom edge. These include modem and Lan ports, VGA output socket, two USB2 ports, mini Firewire and mic and headphone mini jack sockets.

These ports are replicated on the docking station, which will set you back another £190.35 inc VAT. This has an extra front-mounted USB2 port so you can plug the bundled USB keyboard.

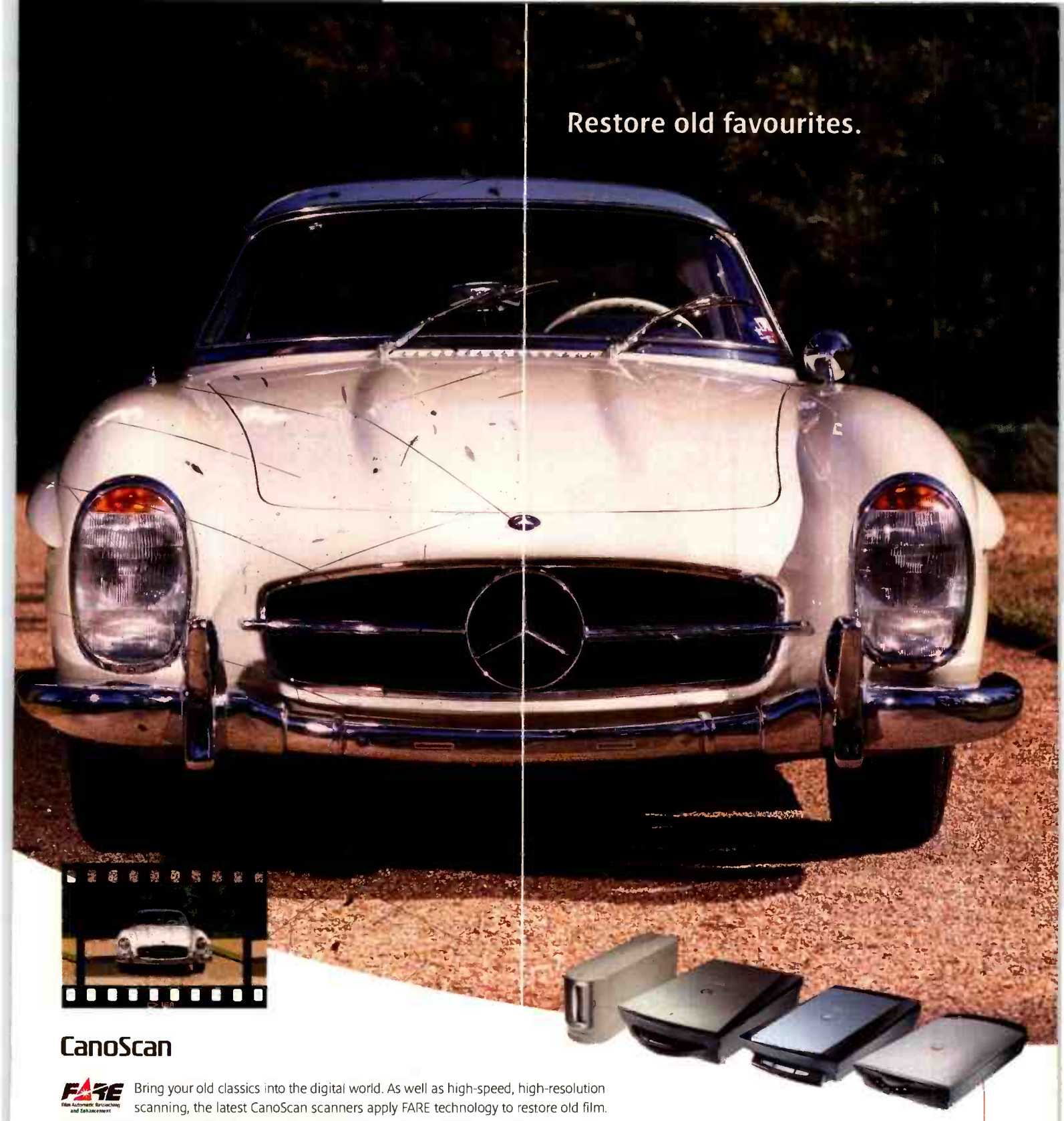
The external Aopen DVD-Rom/CD-RW combo drive will cost £273.78 inc VAT , making this quite expensive. However, it seemed capable of lasting for long periods when unplugged from the mains, though at the time of going to press we were not able to test this. The built-in wireless access and large display make this tablet quite tempting.

Emilie Martin

DETAILS

PRICE £1,848.28 (£1,573 ex VAT)
CONTACT Motion Computing
www.motioncomputing.co.uk
SPECIFICATIONS
Windows XP Tablet PC • Intel Pentium M 900MHz processor • 512MB of DDR memory • 40GB hard disk • Onboard Intel 855 graphics with 8MB shared system memory • 12.1in TFT LCD • 802.11b wireless • 1.5kg • 295 x 21 x 235 mm (w x d x h)
PROS Large display area; wireless connectivity
CONS Docking station not included
VERDICT
With extended battery life and wireless connectivity this will liberate you from your desk, but the pricetag is a turn-off

FEATURES	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆



CanoScan

FARE Film Automatic Retouching and Enhancement

Bring your old classics into the digital world. As well as high-speed, high-resolution scanning, the latest CanoScan scanners apply FARE technology to restore old film. Unique to Canon, FARE (Film Automatic Retouching and Enhancement) is an advanced process which uses infrared as well as conventional white light to automatically pick out and remove dust and scratches. Perfect for image archiving, photo printing and web use.

CanoScan FS4000US
Dedicated film scanner
- Scans 35mm slides/negatives and APS film
- 4000 dpi resolution

CanoScan 9900F
Professional flatbed scanner
- Scans medium format & up to 24 x 35mm negatives/8 slides
- 3200 x 6400 dpi resolution
- USB 2.0 Hi-Speed, Firewire

CanoScan 8000F
High volume, flatbed scanner
- Scans up to 12 x 35mm negatives/4 slides
- 2400 x 4800 dpi resolution
- USB 2.0 Hi-Speed

CanoScan 5000F
Versatile flatbed scanner
- Scans 3 x 35mm negatives/2 slides
- 2400 x 4800 dpi resolution
- USB 2.0 Hi-Speed

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Canon

www.canon.co.uk

DUST AND SCRATCH EFFECTS HAVE BEEN DIGITALLY ENHANCED FOR ILLUSTRATION.

3.2GHZ PENTIUM 4 PC

Evesham Evolution 3.2

A top quality system but the price is high

The Evolution 3.2 runs on a 3.2GHz Pentium 4 using the Northwood C core; its front-side bus (FSB) therefore runs at 800MHz.

We've seen a higher Sysmark 2002 score from a 3GHz P4 on the same Intel D875PBZ motherboard, the results of which are in this month's motherboard group test. The 512MB of PC3200 memory is installed in two 256MB modules for dual-channel performance.

Evesham has used the tall black tower case that it favours for high-end PCs, with the Audigy 2 drive bay, CD-RW and dual-format Sony DVD writer hidden behind a hinged cover on the front of the case.

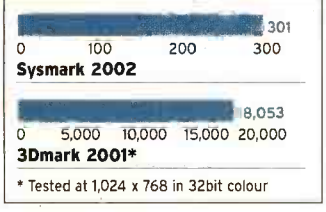
The rest of the components are top of the line, with a pair of 80GB Seagate Barracuda V Serial ATA hard disks in a Raid 0 array running on the Intel ICH5R southbridge, an Audigy 2 Platinum sound card and an Nvidia FX5900 Ultra 256MB graphics card. Even the PCI modem is interesting as it can be switched from 56K to ADSL operation.

The FX5900 Ultra graphics card scored 18,053 in 3Dmark 2001 and is quieter than the FX5800. The TFT display, a 19in Viewsonic VP191b with native resolution of 1,280 x 1,024, is fully adjustable for height and tilt with a pivot to change from landscape to portrait mode.

The only real low point is the price. None of the high-quality components can be faulted, but at nearly £2,350 this is very much a niche buy.

Leo Waldock

PERFORMANCE



* Tested at 1,024 x 768 in 32bit colour

DETAILS

PRICE £2,348.83 (£1,999 ex VAT)
CONTACT Evesham
0870 160 9500 **www.evesham.com**
SPECIFICATIONS
Windows XP Pro • Pentium 4 3.2GHz • 512MB DDR memory • Two Seagate Serial ATA 80GB hard disks • Sony DRU500A DVD writer • MSI 52x CD-RW • Nvidia Geforce FX5900 Ultra 256MB graphics card • Viewsonic VP191b 19in TFT monitor • Creative Inspire 6700 speakers • Ability Office 2002 • Pinnacle Studio 8SE • Warranty 2yrs onsite, 3rd yr RTB
PROS Graphics; speed; DVD writer
CONS It's a lot to spend on a PC
VERDICT
A niche product, but it has a lot to offer the power user

PERFORMANCE	★★★★★
FEATURES	★★★★½
VALUE FOR MONEY	★★★½☆
OVERALL	★★★★½

BUDGET NOTEBOOK

Advent 7030

A wireless notebook for less than £1,000

When Intel launched Centrino we weren't too impressed by it, but the Advent 7030 notebook, along with Sony's TR1-MP (see page 47), has helped to redeem the technology in our eyes. Using one of the slowest processors in the Centrino family, it runs at only 1.3GHz, and the Sysmark score of 135 isn't going to break any records. Having said that, it has plenty of performance to drive office applications and browse the web, and that's what Centrino is all about.

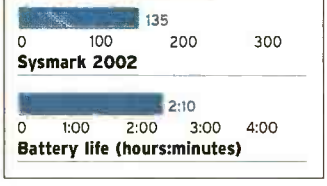
The Intel 855GM graphics certainly aren't up to gaming standards either, but once again that's not the point. Centrino is all about wireless connectivity and battery life, and the Advent does well on that front. It has the requisite Intel 802.11b mini PCI card, as well as Via 10/100 wired Ethernet, infra-red and a 56K modem, and the battery lasts two hours and 10 minutes, which is a good result in our arduous test.

Of course you need to be able to find a hotspot to join a wireless network, but that's beyond Advent's control.

The rest is good but not amazing. One PC Card slot, three USB2 ports and one mini Firewire port all help the cause, as do the combo drive and the card reader on the front. The hard disk is slightly small at 30GB. The 14.1in screen is bright enough and has a decent viewable angle, but it's nothing special. Similarly, the keyboard is OK, but it flexes when you press firmly and, sin of sins, the Return key is inboard of the page up/page down keys.

Leo Waldock

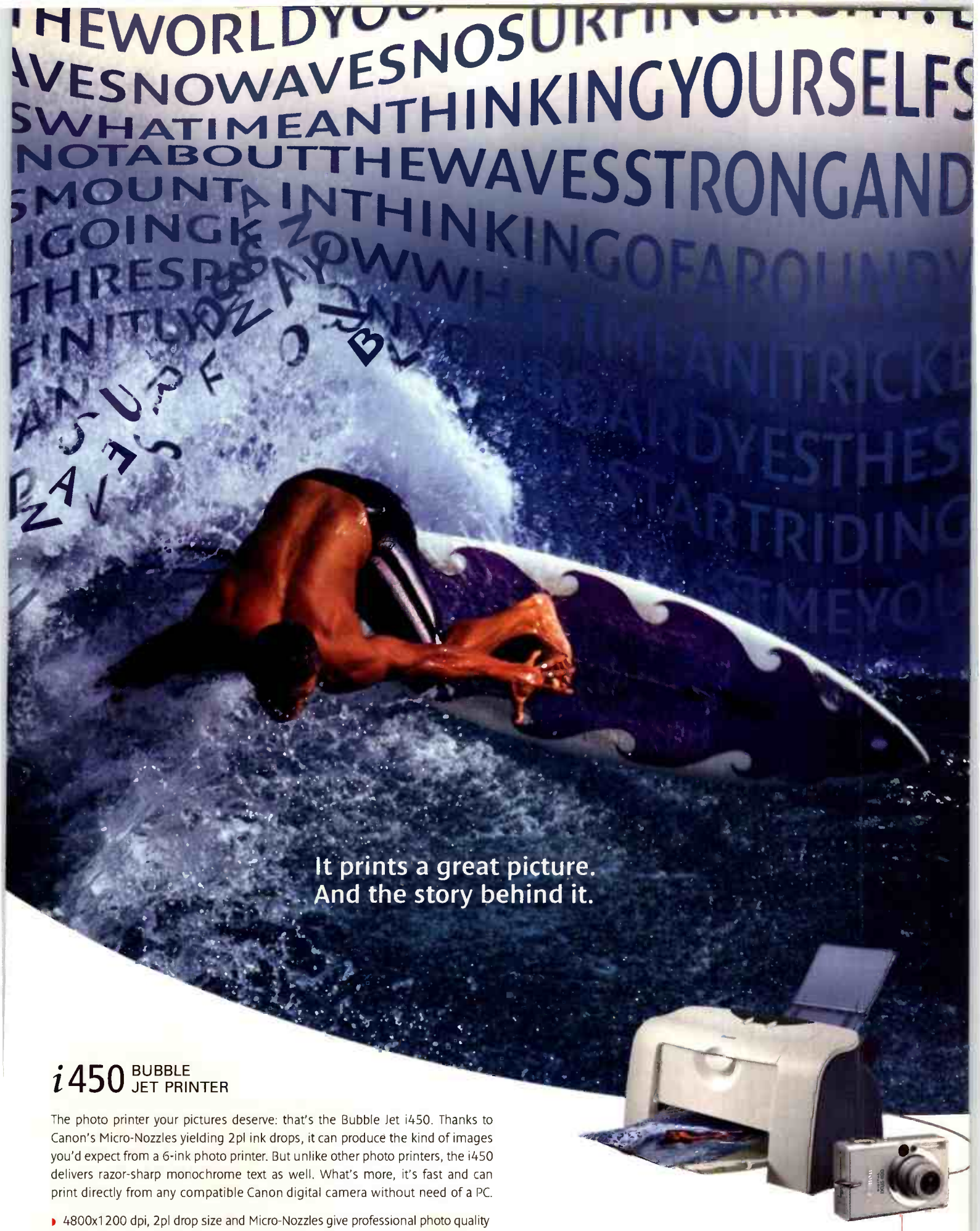
PERFORMANCE



DETAILS

PRICE £999.99 (£851.06 ex VAT)
CONTACT PC World
08705 464 464
www.pcworld.co.uk
SPECIFICATIONS
Windows XP Home • 1.3GHz Intel Centrino • 256MB DDR memory • Hitachi 30GB hard disk • Sony combo drive 8x DVD 16x CD-R • Intel i855GM graphics chipset • Intel 855GM graphics chip • Microsoft Works 7 • 2.65kg • 318 x 35 x 275mm (w x h x d) • Warranty 1yr C&R
PROS Low price; very good battery life; networking capabilities
CONS Keyboard and screen aren't the best; hard drive is small
VERDICT
Not perfect, but for the price it's a winner and will get you working wirelessly on a tight budget

PERFORMANCE	★★★½☆
FEATURES	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½



*i*450 BUBBLE JET PRINTER

The photo printer your pictures deserve: that's the Bubble Jet i450. Thanks to Canon's Micro-Nozzles yielding 2pl ink drops, it can produce the kind of images you'd expect from a 6-ink photo printer. But unlike other photo printers, the i450 delivers razor-sharp monochrome text as well. What's more, it's fast and can print directly from any compatible Canon digital camera without need of a PC.

- 4800x1200 dpi, 2pl drop size and Micro-Nozzles give professional photo quality
- Advanced MicroFine Droplet Technology™
- Borderless photo printing up to A4 size
- Outstanding speed up to 18 ppm mono and 12 ppm in colour
- USB interface, Windows and Mac compatible

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SOUND CARDS

Sounding off

Your needs will dictate your choice of card, so here are 12 to choose from

Creative's Audigy 2 is built around the same chip as the Platinum EX

The 24bit Creative Audigy Platinum EX produces excellent sound

Thankfully, the days of PC audio being looked upon as second rate are long gone. Today's sound cards offer superb audio quality to rival that of professional equipment found in recording studios. The growth of surround sound for DVD movies and gaming has really set the PC audio world on fire, and we've seen some excellent sound cards released onto the market over the past couple of years. This improved audio quality has naturally also benefited musicians, because 24bit audio recording, which was once the sole preserve of very well-equipped recording studios, is now offered on sub-£100 sound cards. With all this in mind we decided to take a look at the 12 best cards currently on the market, including two USB devices, so read on to find out more.

Creative

Creative's **Audigy Platinum EX** is the top-of-the-range card in Creative's current batch of products. The company always retains the Platinum badge for its most desirable kit and in the case of the EX it's quite justified. This time around the company has decided not to use its traditional Live Bay unit but instead has opted for an external box. This is a commendable decision in our book because we were never keen on having a bird's nest of wires hanging out the front of our PC. The external unit connects to the PCI card via a 4ft extension cable so you can now place it close to your audio kit and cut down on clutter.

The box itself is stuffed full of connectors, including optical and coaxial digital ins and outs, analogue outputs for 6.1 sound as well as a microphone input and headphone socket.

The expanse of connectors on the breakout box means Creative has been able to pretty much do away with the daughter card that was familiar to Audigy 1 users. We say almost because there is still a daughter card supplied in the box but it's for a joystick port and, as most Gamepads now connect via USB and the breakout box contains full-sized Midi ports, there's really no need to use it.

Sound quality from the EX is excellent, which is not surprising as it's a 24bit card boasting a THX certificate. The presence of the new Audigy 2 chip means that the card can now handle onboard 6.1 decoding for Dolby Digital EX on top of the Audigy 1's 5.1 Dolby Digital support. Naturally it's also compatible with Creative's EAX surround-sound formats for gamers.

The pumped-up Audigy 2 chip also means some extra goodies for musicians. The card can now cope with 16 effects sends going to its four effects processors. However there is a down side. If you are recording at 24bit resolution and send the audio to one of the effects processors, it is downsampled to 16bit for processing and then upsampled again. This means there isn't a true 24bit effects signal path.

On the whole this truly is a great sound card, but it won't be suitable for everyone. If you're simply looking for something to give you surround sound in games then there are plenty of cheaper cards on the market. But if you're after a card that is great for games, great for music and can handle just about any audio task you throw at it, then it's worth splashing out the extra cash.

The **Audigy 2**, on the other hand, is the basic offering from Creative based on the same core sound chip. As we've seen with the EX this is really a monster chip capable of some serious audio processing, but for surround sound it's already been overtaken by the likes of M-Audio's Revolution 7.1 and Terratec's Aureon 7.1 cards. This somewhat takes the shine off the standard Audigy 2 offering as the card can handle 6.1 sound but not 7.1 audio. It's only a slight difference, but Creative has always prided itself on being ahead of the pack so it must be somewhat miffed to see its pride and joy overtaken so soon. Until now, though, this hasn't really been an issue, as there were no 7.1 speakers available. Creative therefore had the upper hand by being able to

match its 6.1 output with its high-quality 6.1 speakers, the Inspire 6700s. As you will see on page 70 though, Pure Digital has released some great value and good-quality Videologic 7.1 speakers that can upmix both 5.1, and 6.1, but it still means that the 7.1 cards have the upper hand.

Regardless, audio quality from the card is excellent thanks to its 24bit 196KHz capabilities, but the problem with the standard Audigy 2 remains that other cards now offer more features for less money.

Hercules

Like many of the latest cards, the Hercules **Fortissimo III** offers 7.1 surround-sound playback. When it was released, we weren't convinced that investing 7.1 was worthwhile, but with speakers readily available as of July, there's now little reason not to upgrade.

The Fortissimo III's drivers installed without any fuss, which left us with the task of connecting the speakers. Sensibly Hercules has colour coded the various connections so it's difficult to go wrong when hooking up your speakers. In fact there's a pretty minimal number of connectors as, apart from the analogue mini jacks, you only get a single digital optical out.

The card also comes with a joystick daughter card so you can still use older gamepads or make use of the joystick connector as a Midi port.

After you've installed the drivers you'll find the mixer applet nestled in your Windows task bar. It's very well designed, being cleanly laid out and easy to follow. It's also got an excellent surround-sound mixer that allows you to easily set the individual levels going to each speaker in your setup.

In use the Fortissimo sounds good, but not fantastic. This is because it is a 16bit card limited to 44.1 playback, as opposed to the 24bit cards that are now becoming the norm. When you bear in mind the card's price, however, it does offer a lot of bang for your buck and it's really a card for gamers where its slightly harsher sound is less of an issue.

The Hercules Fortissimo III card is very much geared towards gamers and it does an excellent job at a very wallet-friendly price. Musicians, however, would be better served elsewhere.

M-Audio

Like Terratec, M-Audio started out making high-end kit for professional musicians and that pedigree shows with its **Revolution 7.1**. Using the same chip as Terratec Aureon Space 7.1, it's a 24bit card offering sample playback rates of up to 196KHz on all its outputs and sounds fantastic.

The card was a cinch to install. We merely had to load up the drivers and reboot for Windows XP to recognise it without any hiccups. The card's inputs and outputs are colour coded so you should be able to connect up your speakers without too much head scratching. M-Audio has done a particularly good job on the mixer applet that nestles in your system tray. Its simple design and logical layout makes it easy to configure the various surround-sound options and the routing of the various inputs and outputs.

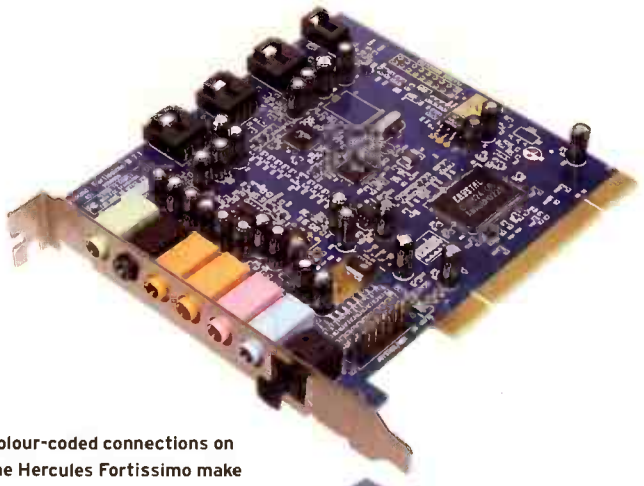
Another thing we liked is that the card comes with ASIO drivers for low-latency performance in music applications such as Cubase SX. You can even assign different channels to different outputs for external mixing.

But it's not just musicians that are well catered for. The card also supports all the major standards for surround-sound audio in games, such as A3D, EAX 2.0 and 3.0 as well as Sensaura 3D.

This is a fine card with good drives support and excellent sound quality. However, there are a couple of downsides. There's no joystick port provided so if you want to be able to use external Midi kit you're going to have to invest in a Midi interface. It's also a bit of a shame that M-Audio hasn't added a digital input to go alongside the coax output that's already present.

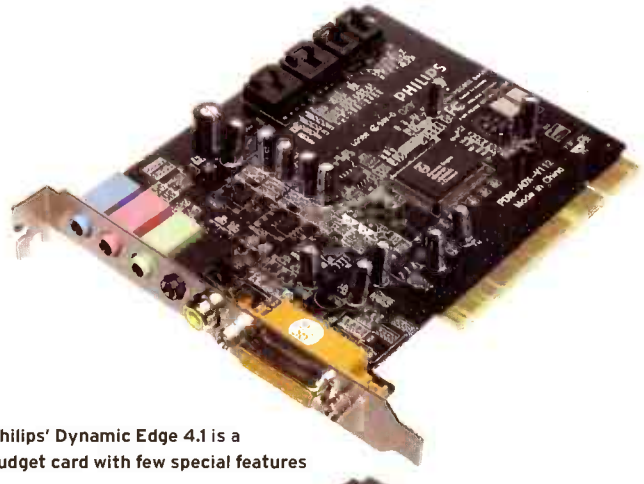
Philips

Philips' decision to move into PC audio came on the back of its acquisition of VSLI, the company that co-developed the not overly well supported Thunderbird 128 chip with Qsound.

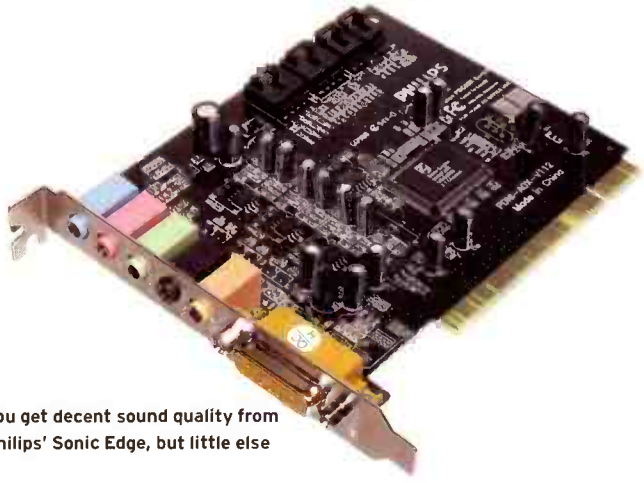


Colour-coded connections on the Hercules Fortissimo make it easy to install

The mixer applet on the M-Audio Revolution 7.1 is simple to configure



Philips' Dynamic Edge 4.1 is a budget card with few special features



You get decent sound quality from Philips' Sonic Edge, but little else

The **Dynamic Edge 4.1** card is essentially a budget offering – which you can easily tell from its sub-£30 asking price – and offers 4.1 analogue surround decoding for games in the form of EAX and A3D.

The product comes with Philips' Dynamic Edge Plus software, or more accurately a 45-day free trial of the application. This is merely a control panel for the card that you would expect to get free from any other manufacturer, so it's shame on Philips for trying to charge extra for it. This Plus version does include lots of extra niceties such as spacialiser effects and an exciter to add oomph to audio playback.

When the trial runs out, the software reverts to standard mode leaving you with simple 3D and reverb effects which offer much less control than in the Plus package.

The sound quality from the card is decent for an offering with such a low price, but it's nothing exceptional by today's standards. Apart from the two mini jacks for front and rear audio there's a coax S/PDIF out and a joystick port that can also be used for Midi playback. At least all the connectors are colour coded so you can easily tell what's what.

Overall, this is an average low-cost card. Unfortunately, there's not much in the way of extras to set it apart from the cheap no-brand cards you'll find at your local computer fair.

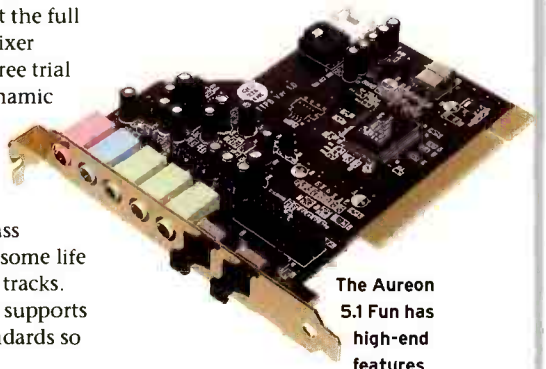
The only difference really between the Philips **Sonic Edge** and the Dynamic Edge is that the Sonic offers full 5.1 audio playback. This is obviously more suitable if you want to be able to enjoy surround-sound audio from DVD movies without having to suffer the indignity of a ghosted centre channel.

Thankfully all the connectors around the back are colour coded so you'll have no problem telling which speaker plug should go in which socket. As with many 5.1 cards the digital out is in the form of a mini jack that doubles as the centre and sub-woofer channels when the card is in full 5.1 mode. If you want to use it as a digital out you have to switch it in software using the mixer applet.

Speaking of which, with the Sonic Edge you get the full Dynamic Edge Plus mixer applet instead of the free trial included with the Dynamic Edge 4.1 that you have to pay for after a period. The effects are reasonably good with an exciter and bass enhancer that do add some life to dull sounding MP3 tracks.

For gamers the card supports the EAX and A3D standards so

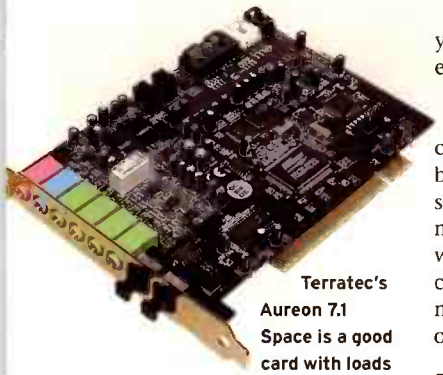
Pure Digital's 16bit Sonic Xplosion 5.1 DVD sounds fairly average



The Aureon 5.1 Fun has high-end features

Details

MANUFACTURER	CREATIVE	CREATIVE	CREATIVE	HERCULES	M-AUDIO
PRODUCT	**AUDIGY 2**	**AUDIGY PLATINUM EX**	**EXTIGY**	**FORTISSIMO III**	**REVOLUTION 7.1**
Price inc VAT (ex VAT)	£99 (£84.25)	£199 (£169.36)	£149.99 (£127.65)	£49.99 (£42.54)	£88.11 (£74.99)
Sales phone number	None	None	None	020 7556 7089	0871 717 7100
URL	http://uk.europe.creative.com	http://uk.europe.creative.com	http://uk.europe.creative.com	http://europe.hercules.com	www.midiman.co.uk
Sound chip	Audigy 2	Audigy 2	Extigy Plus Zoran ZR38601PQC for Dolby Digital decoding	Crystal CS4624	Envy 24HT
Max analogue playback quality	24bit, 192KHz	24bit, 192KHz	16bit, 48KHz	16bit, 48KHz	24bit, 192KHz
Surround sound channels	6.1	6.1	5.1	7.1	7.1
STANDARDS SUPPORTED					
DS3D	✔	✔	✔	✔	✔
EAX 1.0	✔	✔	✔	✔	✔
EAX 2.0	✔	✔	✔	✔	✔
EAX Advanced HD	✔	✔	Limited support	✗	✗
Sensaura	✗	✗	✗	✔	✔
A3D	✗	✗	✗	✔	✔
ASIO drivers	✔ (but not at 24bit/96KHz)	✔	✗ (available from a third party)	✗	✔
VERDICT					
Pros	Good sound quality	DVD-audio playback; great external box	Great range of connectivity options	Low cost; supports 7.1	Sound quality, 7.1 audio support
Cons	Expensive compared to competitors	6.1 only	Needs external PSU	Not a 24bit card	No Midi output for musicians
Verdict	Other cards now offer more features for less money	Excellent range of features	Good for laptops but expensive	A good low-cost option for gamers	A great quality card for gamers
SCORES					
Features	★★★½☆	★★★★★	★★★★½	★★★★½	★★★★½
Performance	★★★½☆	★★★★½	★★★★½	★★★½☆	★★★★½
Value for money	★★★½☆	★★★★★	★★★½☆	★★★★½	★★★★★
Overall	★★★½☆	★★★★★	★★★★½	★★★★½	★★★★½



Terratec's Aureon 7.1 Space is a good card with loads of outputs

The Terratec DMX 6fire 24/96 is a card for musicians

you will get decent surround effects in compatible games.

There isn't a great deal to set this card apart from the competition. It's merely a budget card offering decent sound quality and not much more in terms of bells and whistles. Let's hope Philips can come up with something more exciting for its next range of cards.

Pure Digital

The **Sonic Xplosion 5.1 DVD** is really a rebranded Terratec Six Pack. You can easily tell this because it's printed all over the back of the card's circuit board.

The card can decode 5.1 surround-sound sources on the card itself and pump these out of the six individual outputs that are housed on mini jack sockets. Just like all the other Terratec cards these outputs aren't colour coded so you have to squint to make out the icons stamped on the card's plate. Once you've sorted out your connections you can load up the bundled WinDVD player to check out the decoding of 5.1 movie soundtracks.

Pure Digital has also included a joystick daughterboard so you can still use older gamepads with the card or just use it as a Midi port with some of the music software supplied on the CD. Naturally the card also supports gaming surround-sound standards such as A3D and EAX.

The Sonic Xplosion sounds pretty average in use. It's really a 16bit card so obviously audio playback is not as airy and spacious as you expect from its full-blown 24bit brethren, but it's fine for games and movies.

If you don't need the DVD software bundled then you can opt for the standard Sonic Xplosion pack that is £20 cheaper. This seems a much better deal to us.

Terratec

The **Aureon 5.1 Fun** is the entry-level card from Terratec so you would expect it to be lacking somewhat in terms of features, but it isn't. This is a proper 5.1 card that can decode Dolby Digital onboard. You also get support for a multitude of gaming standards such as A3D, EAX and Sensaura 3D.

Installation was as simple as could be. We just had to pop the card in the PC and the CD-Rom in the drive and wait for Windows to automatically detect the card and load the drivers from the disc. The only upset was that the mixer applet wasn't loaded with the drivers; instead we had to manually install it from the CD.

When it comes to connecting up the speaker cables things are a bit trickier. The analogue

M-AUDIO SONICA THEATRE	PHILIPS DYNAMIC EDGE 4.1	PHILIPS SONIC EDGE 5.1	PURE DIGITAL SONIC XPLOSION DVD	TERRATEC AUREON 5.1 FUN	TERRATEC AUREON 7.1 SPACE	TERRATEC DMX 6FIRE 24/96
£88.11 (£74.99)	£29.99 (£25.52)	£39.99 (£34.03)	£59.99 (£51.05)	£29.99 (£25.52)	£89.99 (£76.59)	£169.99 (£144.67)
0871 717 7100	020 7949 0069	020 7949 0069	01923 277 488	None	None	None
www.midiman.co.uk	www.philips.co.uk	www.philips.co.uk	www.puredigital.com	www.terratec.net	www.terratec.net	www.terratec.net
Envy 24HT	Philips Sonic Engine	Philips Dynamic Engine	Crystal CS4630	C-Media CMI8738	Envy 24HT	Envy 24
24bit, 192KHz	16bit, 48KHz	16bit, 48KHz	16bit, 48KHz	16bit, 48KHz	24bit, 192KHz	24bit, 96KHz
7.1	4.1	5.1	5.1	5.1	7.1	5.1
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔
✗	✗	✗	✗	✗	✗	✗
✔	✗	✗	✔	✔	✔	✗
✗	✔	✔	✔	✔	✔	✔
✗	✗	✗	✗	✗	✔	✔
Compact 7.1 option for laptop users	Low cost	Reasonable price	Good surround-sound support	Great features	Excellent sound quality; 7.1 support	Some excellent features for musicians
Not great for desktop users	Poor range of features	Shows its age	Sound quality can't compare to 24bit cards	Outputs aren't colour coded	No Midi ports for musicians	Not great for gamers
A good, low-cost surround-sound option for laptops	Outclassed by the competition	Pales in comparison to the competition	Expensive for what it offers	An excellent low-cost option	A great performer with excellent features	Still a great card for musicians
★★★☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★☆☆	★★★★☆	★★★★★
★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
★★★★★	★★★☆☆	★★★☆☆	★★★☆☆	★★★★★	★★★★★	★★★★☆
★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆	★★★★☆

outputs are all green so you need to have a good look at the icons stamped on the plate to see which goes where. Sensibly Terratec has also included a joystick daughterboard that you can choose to install if you've got an older joystick or just want to use the port for Midi applications.

The Aureon 5.1 Fun may be a budget card but it has some top-end features. We were especially impressed to see a digital in as well as the more usual digital out on the card's plate, but unfortunately, unlike the Aureon Space, the Fun card doesn't come with ASIO drivers.

Sound quality was good, as we've come to expect from Terratec, but obviously it's not in the league of the 24bit cards. Nevertheless, for the money, the Aureal 5.1 Fun is a steal and works extremely well for both gaming and movies.

Terratec's **Aureon 7.1 Space** is one of a few new sound cards that offer a seemingly endless number of outputs. Like the M-Audio Revolution, the card is based on Via's Envy 24HT chip. It supports 24bit playback at rates of up to 196KHz across all its audio outputs so it's suitable for playback of DVD Audio. However there's no DVD Audio software player shipped with the card.

Physically there are six mini jack plugs on the card for the eight output channels. You'll also find microphone and the line inputs as well as optical in and out. Unfortunately the speaker sockets aren't colour coded, so it's either a case of squinting to make out the icons stamped on the plate or a quick rummage for the manual.

There's no joystick port either. Terratec makes no apologies for this, pointing to the fact that most game peripherals now use the USB port, but this does mean that if you're a musician you're a bit handicapped and will have to invest in an additional Midi adaptor. It's a shame though, particularly because the card does come with ASIO drivers.

Overall, the Aureon is a very good card but not exactly a must-have one. As with all these 7.1 cards you get the feeling that the extra outputs are merely a marketing numbers game for the manufacturers because there's little or no support for these formats at present. Interesting, yes, essential, no.

When Terratec's **DMX 6fire 24/96** first appeared it was a leap ahead of other cards on the market. However, time has somewhat dulled its desirability as its once razor sharp 24bit 96KHz performance has been overtaken of late with the arrival of 192KHz cards such as Creative's Audigy 2.

Whereas the Creative supports recording at up to 24bit 192KHz, the DMX is a tad more limited at 24bit 96KHz. But it's still not to be sniffed at and, unlike the Creative, the Terratec offers a full 24bit effects path so your recorded audio won't have to go through any nasty downsampling while it's being processed.

However, there's no denying that the DMX has been overtaken when it comes to gaming, as it only supports 5.1 surround sound. So this is really a card for musicians and there's plenty on offer to still make it a good choice for music matters.

For starters it uses proper phono jacks for its outputs, so you don't have to mess around with less professional mini jack plugs. The card also comes with ASIO drivers and the full-sized Midi sockets on the front mean you can just connect and go with your existing Midi leads. There's also both coax and optical digital ins and outs so you can easily connect digitally to your other audio gear and the digital inputs can also be synchronised to an incoming clock signal allowing both internal and external digital audio to be mixed without resampling or glitching. There's even a proper phono input complete with pre-amplifier which will be useful for anyone wanting to convert old LPs onto CD (see this months Hands on Sound column for more on this).

So while the DMX is no longer a truly awe-inspiring card for gamers it is still a great choice for those wanting to use their PC to knock out some serious tunes. The other bonus is that it's slightly cheaper than the Audigy 2 Platinum EX so you can save yourself some cash without losing out when it comes to features.

Conclusion

It's difficult to pick one definitive product from the cards reviewed here because different people have different needs. Some users really need a card with both digital input and output, some just want the latest surround-sound standards for gaming, while others are only interested in the music-making abilities of a particular card.

However, we think there's one option that is a truly desirable piece of kit for all and that's the **Creative Audigy 2 Platinum EX**. It's safe to say that not everyone will need all the features it offers and some will sniff at the fact that it doesn't support 7.1 surround sound, but we think its overall balance of features still makes it an all-round winner. If you love audio, you'll love the EX.

Niall Magennis

USB audio cards

Until recently if you owned a laptop you were pretty much stuck with less than cutting-edge audio. The same was true if you weren't the type to go delving around inside your PC adding new components.

Thankfully sound card manufacturers cottoned on to the fact that people needed more options than just PCI add-on cards and developed USB audio modules.

M-Audio's Sonica Theatre is one such USB sound card. Not only does it connect to the computer via USB but it also draws its power from the port so there's no need for an awkward external power supply. The unit is very small and light, but its diminutive dimension belies its power. The Theatre offers onboard decoding of 7.1 surround sound and includes a digital coax output and a line in for recording. It's a 24bit card so the audio quality is superb. If you're after surround-sound support for your laptop then it's a reasonably priced option.

The Sonica Theatre is small, light, but powerful

Unlike the Sonica Theatre, the Creative Extigy is designed for much more than just surround-sound playback, although naturally it can take care of this too. The Extigy is more of an audio docking station containing a wealth of different connectors as well as coming with its own remote control. The Extigy isn't just designed for laptops; it could, at a push, be used as an external sound card for any machine.

It's pricey, but the Extigy is worth a look

The Extigy is essentially the original Audigy sound card in an external box. It connects to your PC via USB but needs an external PSU for power so it's not as portable a solution as the Sonica Theatre. However it does have plenty of connectors including coax and optical digital inputs and outputs, full-sized Midi in and out ports, and microphone and line-in sockets.

The main problem with the Extigy is its wallet-stinger of a price. If you're a laptop owner who is seriously into audio it's certainly worth a look, but desktop users would be much better served with a PCI add-on card.

POCKET PC

Viewsonic V35

A lightweight, compact PDA at a good price

This is by far the cheapest Pocket PC we've seen, as well as one of the lightest, coming in at under 120g. What is particularly surprising is that it is well specified too: the V35 runs on a reasonably fast 300MHz Intel Xscale processor, has 32MB of Rom and an especially impressive 64MB of SD-Ram, with 36.4MB free for use.

The screen is a 240 x 320, 3.5in transflective TFT. The only other transflective display that we've seen is that on HP's 1910 Ipaq, which was superior quality. Nevertheless, the 240 x 320 version on the V35 is very clear, and bright enough to be seen in sunlight. Media playback therefore looks fantastic and runs smoothly thanks to the fast processor.

Coming in silver and dark grey, it looks like most other PDAs, so won't stand out from the crowd. On the downside, the speaker is one of the tinniest we have heard, but there is a headphone socket at the bottom right, though no headphones are supplied.

The four standard shortcut buttons on the front are programmable, and the joypad in the middle is comfortable and responsive. The stylus is long, reasonably sturdy and therefore good to hold, making a good pairing with the responsive screen.

The V35 has a power connector so it can be charged without the need for a cradle. That said, the supplied dock is solid and user friendly.

There's an SD (Secure Digital) slot on the top next to the power button. The infra-red port is very small, so getting a signal is tricky. The V35 has no wireless capability. There is a voice memo shortcut and a jog dial, both of which are on the right.

There's little special about this PDA, other than its price and weight, but they certainly make it worthy of consideration.

Mark Walsh

DETAILS

PRICE £220 (£187.23 ex VAT)
CONTACT Viewsonic
www.viewsoniceurope.com
SPECIFICATIONS
Pocket PC 2002 • Intel Xscale 300MHz processor • 32MB Rom • 64MB SDRam • 3.5in 240 x 320 transflective TFT screen • SD slot • 118g • 76.5 x 12.6 x 122.5mm (w x d x h)
PROS Price, weight
CONS Lack of features
VERDICT
A great value Pocket PC, as well as being compact and lightweight

PERFORMANCE	★★★★☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

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Compact systems
Small yet powerful systems – turn to page 99

COMPACT PC

MSI Mega PC and Systemax Encore 3602

We take a look at MSI's new barebones system, and test a prebuilt PC from Systemax

Looking like a cheap and cheerful 1990s CD player, the Mega PC case is roughly the same size as those from Shuttle, yet with more features than you'd expect from a box this size. It can be used as a standalone radio and MP3 and audio CD player, as well as being a proficient PC.

The case is currently only available for use with Pentium 4 chips, and won't use the latest 800MHz front-side bus (FSB) revision: 533MHz is as fast as this FSB goes. The chipsets are the Sis 651 and the 962 southbridge, so there are integrated graphics but not enough for decent games.

There is an AGP slot, but no spare power connectors – that is, unless you don't want an optical or hard drive. The slot is so close to the power supply and CPU that we struggled to get it in. As the CPU's fan is on the side of the heatsink and it is drawing its air from next to the graphics card where it is already warm, it did get hot quickly, but never reached its automatic shutdown temperature of 85 degrees. MSI recommends only processors under 2.8GHz be used. Installing components was fiddly, as you'd expect with a case this size. The only order in which to attach them was processor, hard disk, then graphics card followed by memory.

The fastest memory supported is DDR 333MHz, and there are two slots. Inside is a PCI slot for those who wish to upgrade the onboard sound from Realtek or install a TV tuner. However, the system comes with no way of connecting the Mega PC to a TV; you'll need to put in a graphics card with an S-Video connection to use it in your living room.

Modem and Ethernet are on the motherboard. There are serial, parallel and video-outs, two USB2 ports and two PS/2s. Open the flap at the front and you'll find two more USB2 ports, a Firewire, mini-Firewire, headphone and mic sockets and an S/PDIF. There is also a card reader option above this that you can replace with a floppy drive. Using it as a standalone radio or CD player is simple – you don't even need to boot up the PC. Controls are easy and the remote has all you need.

For a little more than a Shuttle case, you are getting far more features and a CD player and radio that wouldn't look out of place in your living room. It's not the quietest, or the most efficient at cooling, but is still a bargain.

Systemax has used this case with high-quality components and bundled it with a CTX 17in LCD to create a £999 PC; the box alone is available for £699 ex VAT. The 2.6GHz Pentium 4 gave a high Sysmark score of 266, and the Geforce FX5200 got 8,109 in 3Dmark 2001. This model is the first to come with Nvidia's Personal Cinema remote which is supplied as well as MSI's own. Resembling ATI's Remote Wonder, this controls on-screen functions and media playback.

Considering the small form factor, the 3602 is good value, but you are paying a premium for the extra features. As a living room PC it's almost ideal, and with a three-year on-site warranty, it's a tempting proposition.

Mark Walsh

DETAILS

MSI MEGA PC
PRICE £292.58 (£249 ex VAT)
CONTACT Scan www.scan.co.uk
SPECIFICATIONS
Socket 478 533MHz FSB support • Sis 651 graphics • 2 x DDR333 Dimms • 1 x PCI, 1 x AGP • 6 x USB2, 2 x Firewire • 6-in-1 card reader • Realtek AC97 audio
PROS Price; ease of use after setup
CONS Fiddly setup
VERDICT
Slightly difficult to set up, but a good stab at a barebones system for the living room

FEATURES	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

PERFORMANCE

* Tested at 1,024 x 768 in 32bit colour

DETAILS

SYSTEMAX ENCORE 3602
PRICE £1,174 (£999 ex VAT)
CONTACT Systemax
www.systemax.com
SPECIFICATIONS
Windows XP Home • Intel Pentium 4 2.66GHz • 512MB DDR memory • 120GB hard disk • CD-RW & DVD combo drive • Geforce FX5200 graphics with Personal Cinema • CTX 17in S700B LCD monitor • Realtek AC97 Audio • Videologic ZXR-500 speakers • Modem • Lan • Ability Office • 3yr on-site warranty
PROS Fast; compact; extra remote
CONS Monitor defeats PC's purpose
VERDICT
Good value, though we'd recommend the monitor-free option and plugging it into a TV

PERFORMANCE	★★★★½
FEATURES	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

INTEGRATED GRAPHICS MOTHERBOARD

ATI Radeon 9100 IGP

Graphics speed puts this ahead of rivals

The board shown closely resembles the retail version

ATI's second voyage into integrated graphics, codenamed RS300, gives it the technical lead over Nvidia, as it has pixel and vertex shaders built in. We preview here an early board from ATI to check out its graphics prowess.

The Radeon 9100 IGP motherboard supports Intel's Pentium 4 processors, and can handle an 800MHz front-side bus (FSB). This is coupled with dual-channel DDR400 memory architecture, and there are two Dimms for each of the channels.

Despite integrated graphics, you can upgrade using the AGP 8x slot. The board we saw came with four UBS2 ports, Firewire support, along with the usual serial, parallel, six-channel audio and a 3Com 10/100 Ethernet port.

Sadly, system performance was not up to scratch by the time we went to press, so we were unable to run Sysmark, but the graphics elements were complete. The chip is based on the Radeon 9000 desktop chip, allowing 4 x FSAA (full-scene anti-aliasing) and 16x anisotropic filtering. Performance was pretty good, coming in slightly higher than an Nforce2 in 3Dmark 2001 and far better than Intel's 865G onboard graphics. It also got 803 in 3Dmark 2003, almost four times higher than the Intel board achieved. However, none of these scores were leagues ahead of the competition.

ATI claims the 9100 costs less than a comparable Intel 865G board, we have yet to confirm this. By the time you read this though, we will have tested a fully functioning board; check out www.pcw.co.uk for the result.

Mark Walsh

PERFORMANCE

* Tested at 1,024 x 768 in 32bit colour

DETAILS

PRICE TBC
CONTACT ATI www.ati.com
SPECIFICATIONS
Socket 478 support • ATI RS300 chipset • Four Dimms • AGP 8x • ATI Radeon 9100 IGP graphics • Five PCI slots, four USB2/serial/parallel slots• 56K modem • 3Com 10/100 Ethernet
PROS Graphics speed; pixel and vertex shader support
CONS Not much faster than the competition
VERDICT
Impressive graphics performance and good features mean this could easily be the best integrated graphics board going

PERFORMANCE	★★★☆☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

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3.2MEGAPIXEL CAMERA

Canon Digital Ixus II

Pocket-sized with superb performance

The Digital Ixus II shares many of the features of its predecessor, the Ixus V3, with a 3.2megapixel CCD sensor, a 35-70mm rated lens (35mm equivalent) and a 2x optical/3.2x digital zoom. But all this is packed into Canon's smallest ever chassis, fitting neatly into the palm of your hand.

On the top of the unit a power button sits next to the zoom control dial, at the centre of which is the shutter button. The back panel houses a clear 1.5in LCD screen and a mode dial that lets you switch between auto or manual shooting, movie capture and review modes. A navigation button under the integrated speaker helps you through the on-screen menus (OSMs) and gives quick access to light metering, flash and self-timer settings, as well as macro mode. Using macro mode for close-up shots you can snap your subject from 10cm with the zoom set to wide-angle or 27cm set to telephoto.

The menu button calls up an OSM with camera settings, tools and themes, while the function button lets you select resolution and image compression levels in auto shooting mode, and adjust white balance, ISO and exposure settings in manual mode.

There are three compression levels and four image resolution options, from 2,048 x 1,536 to 640 x 480 pixels, with a maximum resolution of 640 x 480 pixels in movie capture mode.

For such a small camera, the Ixus II produced some excellent quality shots. Areas of tonal transition were smoothly reproduced and outlines were crisp and even between similar tones. Using the auto settings, colours were well rendered in a variety of lighting conditions, and in macro mode it captured detail and texture very well, right into the corners of the image.

At £370, it's not the cheapest 3.2megapixel camera, but for its quality output and pocket-size dimensions, it's well worth it.

Emilie Martin

DETAILS

PRICE £369 (£314.04 ex VAT)
CONTACT Canon 0870 514 3723
www.canon.co.uk
SPECIFICATIONS
3.2megapixels • 2x optical/3.2x digital zoom • 35-70mm focal length (35mm equivalent) • Auto, on, off, slow-sync • Red-eye reduction • 1.5in LCD screen • 16MB Secure Digital memory card • 165g • 85 x 24 x 56mm (w x d x h) • USB, A/V-out • 1yr warranty
PROS Output quality; size; features
CONS Only a 2x optical zoom
VERDICT
With great performance and petite proportions, the Ixus is one to snap up

PERFORMANCE	★★★★½
FEATURES	★★★★★
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

5MEGAPIXEL CAMERA

HP Photosmart 935

High resolution for under £400

As a general rule of thumb, you can expect to pay roughly £100 for every megapixel of resolution that a digital camera offers. At £399 then, the 5megapixel HP Photosmart appears to offer very good value for money.

The camera is rather a chunky unit, with a mode dial mounted on the top surface that lets you switch between auto, portrait, landscape and action modes, while a fifth AV mode offers a choice of two shutter speeds.

At the back of the unit the 1.5in LCD screen gives a clear live view of your subject, but doesn't cope too well with movement. An OK button at the centre of a set of four navigational cursor buttons to the right of this calls up the on-screen menu (OSM), which features a basic help menu. There are only two image size options on offer – 2,608 x 1,952 pixels or 1,296 x 976 pixels – but you can select compression, saturation, sharpness and contrast levels here. For the more experienced photographer there are also white balance, AE metering and ISO speed setting sub-menus.

A rocker button lets you control the 3x optical/7x digital zoom, and the inclusion of a sliding scale on the LCD screen that shows you when you are about to switch to digital zoom is handy. The image-cropping frame shows you exactly what part of the image is being magnified when you are using the digital zoom function.

Image quality was fair but some images showed evidence of severe chromatic aberration between areas of shade and light. Colours were generally well-rendered but the 935 had trouble with fine lines placed close together. Detail capture in macro mode was good, with a range of 14cm or greater from the subject.

For an extra £50, a docking station is bundled that comes with a remote control – useful if you're presenting a slideshow on your TV.

Emilie Martin

DETAILS

PRICE £399 (£339.57 ex VAT)
CONTACT HP 08705 474 747
www.hp.co.uk
SPECIFICATIONS
5.3megapixel resolution • 3x optical/7x digital zoom • 37-111mm focal length (35mm equivalent) • Auto, on, off, night time, red-eye reduction flash modes • 1.5in LCD screen • 32MB SD card • 225g • 97 x 45 x 67mm • 1yr warranty
PROS Price; on-screen help menu
CONS Only two resolution settings
VERDICT
Decent image quality at an attractive price

PERFORMANCE	★★★½☆
FEATURES	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★½☆

19IN MONITOR

Sharp LL-T19D1HB

A stylish TFT with a clear picture

Initially we thought the £579 price this 19in monitor from Sharp must be a mistake, as similar displays from the likes of NEC Mitsubishi cost £750.

The LL-T19D1HB TFT has a resolution of 1,280 x 1,024 and is a stylish unit with a fairly narrow bezel, and the look is helped by an internal power supply that only requires a mains cord with no external power brick. The stand is very basic and has a Z joint so it can be raised, lowered and tilted. Although the movement is limited, the stand contributes to the good looks of this display. You can buy an alternative stand with more movement for an extra £50.

When we first turned on the LL-T19D1HB, we found it very bright, but this was easily remedied in the OSD (on-screen display). A lot of TFTs have a very basic OSD that consists of little more than an auto adjust button, but the Sharp has a number of options including four presets for brightness and five presets for white balance. There is also a custom setting so you can independently adjust red, green and blue contrast.

The T19D1HB did very well in our tests, with colour intensity and graduation looking good. All colours of text were clear on the background colours, however the arrangement of the pixels means that if a straight line changes colour half way along its length (eg from red to green), the pixels don't quite meet up, resulting in a jagged effect. On the down side, the relatively low resolution means that solid blocks of pale colour can show the gaps between the lines of pixels if you are sitting very close to the screen. However, the geometry is spot on, and the response time is fast enough to avoid any ghosting.

Leo Waldock

DETAILS

PRICE £579 (£492.77 ex VAT)
CONTACT Sharp 01923 434 647
www.sharp-uk.co.uk
SPECIFICATIONS
19in TFT screen • Native resolution 1,280 x 1,024 • 2 x VGA, 1 x DVI-D inputs • 6.9kg • 423 x 222 x 392mm (w x d x h) • 300cd/m² • Contrast ratio 700:1 • Horizontal and vertical viewing angle 170 degrees • 3yr on-site exchange warranty
PROS Low price; good range of presets; very clear picture
CONS Low resolution; no pivot
VERDICT
A good TFT display with lots of features. For the price it is excellent and thoroughly deserves an award

PERFORMANCE	★★★★☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

VIDEO-EDITING CARD

Matrox Millennium P750

Parhelia performance at a reasonable price

Matrox dual-head graphics cards have been a big hit with users who just can't get enough screen space. While the original Parhelia offers dual DVI ports, the P750 is aimed at those who don't want to pay in excess of £300 for blistering video-editing and Cad design performance.

The P750 is based on a new Parhelia-LX chip, boasts an AGP 8x interface, 64MB of DDR memory and dual 400MHz Ramdacs. All these enable it to drive twin digital panels at resolutions up to 1,600 x 1,200, and dual-analogue displays up to 1,920 x 1,440.

The displays are fully symmetric – that is, there is no primary and secondary display – so what you can do on one, you can do on the other. This extends to video overlay, which can be run concurrently on both displays with independent gamma correction and proc-amp controls for calibrating digital inputs.

At its simplest, you can just connect a digital flat panel to each connector, but the P750 comes with a variety of cables which can be used to connect digital panels, analogue monitors and a TV in any combination. Typically, you might connect a digital flat panel to one port and an analogue monitor and TV to the other for digital video editing.

The performance boost provided by the Parhelia-LX chip will extend the appeal of this card, from financial markets to the 3D Cad workstation market. But despite support for surround gaming – using three monitors placed at 30 degree angles to give an ultra-wide field of view – this card isn't going to impress anyone looking for 3D games performance.

As an alternative to the now aging G550 though, and for anyone feeling the squeeze of 2D applications bursting at the screen seams, the P750 makes a lot of sense.

Ken McMahon

DETAILS

PRICE £203.28 (£173 ex VAT)
CONTACT Matrox 01753 665 544
www.matrox.com
SPECIFICATIONS
256bit core • 64MB DDR memory • 128bit memory architecture • DirectX 8.1 and OpenGL 1.3 • AGP 2x/4x/8x
PROS Good value; versatile multi-display options
CONS 3D performance, despite surround gaming support
VERDICT
Excellent value triple-head display adaptor offering some Parhelia performance benefits, without the price overhead

PERFORMANCE	★★★☆☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

COLOUR LASER PRINTER

HP Laserjet 1500

Excellent output quality and small footprint

With its fluid contours, the HP Laserjet 1500 is pretty easy on the eye and is a fairly compact unit. At the base of the curved front panel is the primary input tray, which is capable of holding up to 250 sheets of paper at a time and has a paper level indicator that is visible when the drawer is shut. There is a fold-down 125-sheet capacity multipurpose input tray just above this, with paper guides to help you cope with a range of different media. A fold-down flap to the rear provides a more direct path from the imaging drum for thicker media, otherwise your printouts will appear in the output tray moulded into the top of the unit.

The remaining surface of the front panel folds up to give access to the printer drum unit and four individual ink cartridges. Access to the cartridges is controlled by a button on the control panel that rotates the cartridge carousel, while a set of four lights shows which cartridge is accessible at any one time. Installation and removal is a doddle.

A single black cartridge costs £72.45 and should be good for 5,000 pages while the cyan, magenta and yellow cartridges have a duty cycle of 14,000 pages and cost £87.63 each.

Output quality was excellent – characters were solid with crisp, smooth outlines and legible right down to 2pt. Areas of shading or solid colour were well rendered with no visible banding and areas of tonal graduation were smooth. In our timed tests the HP printed our mono text document at 16ppm, our 10-page mixed mono content document at 5ppm and produced four colour pdfs per minute. It took a respectable 44 seconds to print our test photo.

Unfortunately for a printer aimed at the small business market, there is no automated duplex option, nor is there an upgrade available.

Emilie Martin

DETAILS

PRICE £729 (£620.43 ex VAT)
CONTACT HP 08705 474 747
www.hp-expo.com/uk/eng
SPECIFICATIONS
Laserjet • 250-sheet input/125-sheet output • 4ppm colour • 16ppm mono printing • 600 x 600dpi resolution • Four cartridges • 16MB memory • USB2 • 482 x 451 x 376mm (w x d x h) • 23.9kg
PROS Price; output quality; small footprint
CONS Printing speeds; no duplex capability
VERDICT
Appeals on print quality and price but we would like to have seen a duplex option

PERFORMANCE	★★★★☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

7.1 SPEAKERS

Videologic ZXR-750

The first 7.1 system costs less than £100

EXCLUSIVE

RECOMMENDED PERSONAL COMPUTER WORLD

Finally, the first 7.1 speaker system has arrived, and to our surprise it's under £100. It uses a very similar design to Pure Digital's 5.1 Videologic ZXR-550 speakers, but includes the extra inputs as well as a second amplifier to support the extra channels. Pure Digital claims the extra amp (and the technology behind it) is the reason it's taken so long for 7.1 speakers to reach the market.

We aren't particularly impressed with the ZXR-750s' styling, but at least they are sturdy, functional and come not only with detachable stands but also wall mounting brackets and the necessary screws. Setup is reasonably simple, though a touch more colour co-ordination to help you know what goes where wouldn't have gone amiss. The real bonus in this system is that you can upmix 5.1 to 7.1. The built-in processor uses the side front and side rear signals to create two extra channels.

The 750s also come with an auxiliary input whose output you can easily access by using a big red button at the back. The buttons on the front control the overall volume, and you can adjust the centre, rear and subwoofer levels.

Due mainly to the extra amp, the 750s are louder than the 550s, though not much. The subwoofer is 28w, and each satellite has a 7w output, making a rather hefty 77w in total. Sound quality is again very similar to the ZXR-550s – even and crisp if not stunning, and more than good enough considering the £100 asking price.

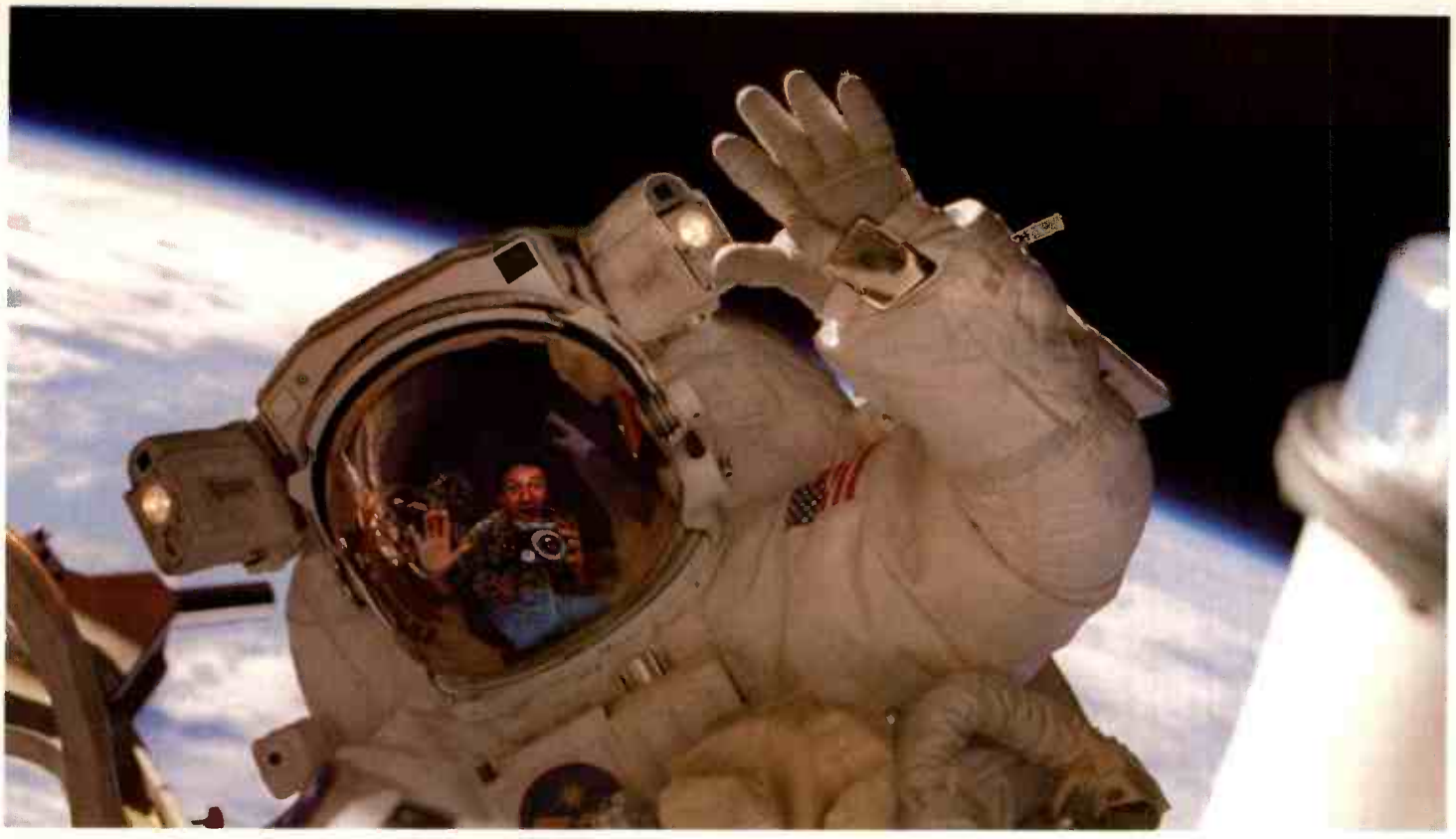
One of the fundamental problems with surround-sound speaker sets is the number of wires you need, and adding two extra satellites into the mix further exacerbates the problem. However, if 7.1 is something that you want to get into, these – despite being the only ones available – are a very good set and well priced.

Mark Walsh

DETAILS

PRICE £99 (£85 ex VAT)
CONTACT Pure Digital
www.pure-digital.com
SPECIFICATIONS
8-speaker set • 28w subwoofer, seven 7w satellites • RCA connection from subwoofer to satellites • Will require mini jack to RCA cables to connect to sound card • 18-22KHz frequency response
PROS 7.1 sound; price
CONS Ill-fitting looks
VERDICT
Good value, plenty of features and just loud enough to annoy the neighbours. A great buy

PERFORMANCE	★★★★☆
FEATURES	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆



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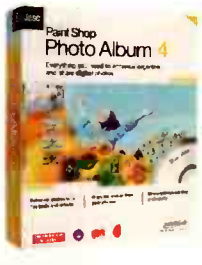

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COMPACT DIGITAL CAMERA

Fujifilm Finepix F410 Zoom

A stylish performer with fourth-generation Super CCD HR technology

With a 3megapixel resolution, 3x optical zoom and stylish looks, Fujifilm's Finepix F410 Zoom is targeted squarely at the highly competitive mid-range digital camera market. While it may share essentially the same exterior design as the earlier F401, there's one crucial difference: it's the first camera to use Fujifilm's fourth-generation Super CCD HR technology.

Fujifilm's proprietary Super CCD technology employs octagonal pixels turned by 45 degrees and arranged in a honeycomb pattern. It claims this increases apparent resolution and, as a consequence, offers optional internal scaling to produce higher resolution output.

In January Fujifilm announced its fourth-generation Super CCD technology, consisting of new SR and HR sensors. SR claims to increase tonal dynamic range and will be first seen in the Finepix F700. HR stands for high resolution and delivers this on physically smaller chips, in turn allowing smaller cameras to record more detail.

To illustrate this point, the earlier F401 featured 2.1megapixel resolution, whereas the new F410 boasts 3.1megapixels in a body measuring the same size. While the F410 is perfectly happy to record 3.1megapixel images, it additionally offers a mode which internally scales them to 6megapixels.

Where the old F401 recorded its images onto dated Smart Media cards, the F410 now uses the tiny XD format, recognising capacities up to 256MB.

Fujifilm supplies a 16MB XD card which can store around 10 jpeg images at the highest 6megapixel mode, or around 21 at the native 3.1megapixels. While you can select four different recording resolutions, there are no options to alter jpeg compression nor use tiff or raw modes. There is, however, a movie mode which can record 320 x 240 clips with sound, but sadly there is no TV output.

The camera itself feels solid and looks the business in its silver metal casing. It's pretty compact and light too, weighing 195g, complete with XD card and the supplied lithium-ion rechargeable battery pack. The premium kit includes a cradle.

Like the F401, it's powered up by sliding a front panel slightly to one side, after which the lens cover nips out of the way, allowing the optics to extend outwards. During this process, three small lights on the front panel briefly illuminate a rather satisfying blue – these also flash when you are using the self-timer.

The lens is a 3x optical zoom, equivalent in coverage to 38-114mm on a 35mm camera, while the closest focusing distance in macro is an average 10cm. Composition is with an optical viewfinder or a crisp 1.5in LCD. There's the option to overlay a 3 x 3 grid on the screen to aid composition, but no specific scene presets.

One external improvement over the old F401 is the addition of a small blue photo mode button, which immediately takes you to the resolution, colour and sensitivity options; the latter ranges from 200 to 800 ISO, although at 800, you're forced to drop to 1megapixel.

While there's a manual mode, you're limited to adjusting exposure compensation or white balance. The built-in flash can be set to auto, on, off, red-eye reduction or slow-synchro, but otherwise, the F410 is pretty much an automatic camera.

In terms of image quality, the F410 is a big improvement over the earlier F401, but in our tests it didn't resolve any more detail than other decent 3megapixel cameras, and in some areas suffered from greater electronic noise. The internal scaling certainly smoothes edges on big enlargements but, unless you're printing direct from the card, we'd recommend the 3megapixel mode and scaling using software where necessary.

The F410 is a good camera but faces tough competition from the likes of Nikon's Coolpix 3100, Sony's Cybershot DSC-P72 and Canon's Powershot A70. The latter won our June group test, and all three cost at least £60 less on the street. Additionally Fujifilm may declare the HR chip allows smaller cameras to be made, but the Pentax Optio S and Canon's Ixus II already match its resolution and features in a shorter and slimmer body for around the same street price.

As always, design plays a big role, and if you've fallen for the looks of the F410, you'll certainly end up with a good overall performer. Our only reservation is that its pictures are no better than the models we've mentioned, which also happen to be slightly cheaper.

Gordon Laing

DETAILS

PRICE £449.99 (£382.97 ex VAT)
CONTACT Fujifilm
020 7586 1477
www.fujifilm.co.uk/di
SPECIFICATIONS
3.1megapixels, 2,816 x 2,120 max resolution • 3x optical zoom, 3.6x digital zoom • 38-114mm focal length (35mm equiv) • Flash modes: on, off, red-eye, slow synchro • 1.5in LCD XD 16MB memory card • 8.5 x 6.9 x 2.7cm (w x d x h) • 195g including battery and card • USB connection • 1yr warranty
PROS Stylish; cradle supplied in premium kit
CONS No TV output; expensive
VERDICT
A decent stylish camera, but its features and images were no better than the competition, which are slightly cheaper

PERFORMANCE	★★★☆☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

WIRELESS PALM PDA

Palm Tungsten C

A well-built PDA with Qwerty keyboard

The Tungsten C has a 400MHz Xscale processor, runs Palm OS 5 and has multimedia playback facilities. It is also the first PDA to take advantage of Palm 5's embedded wireless support, and has a Qwerty keyboard, although it lacks the GPRS of its brother the Tungsten W.

Using a very similar chassis to the Tungsten W (minus the aerial at the top), it's quite chunky and heavy at 178g. However, this does make it feel more comfortable to hold and use than the Sony (see right). While we're not particularly keen on the idea of a Qwerty keypad on such a small device, this is one of the best to use, as the keys are raised quite high and are reasonably large.

The more traditional layout of the navigation keys means that it's quicker to get to grips with not using the stylus, though we would have liked to have seen a jog dial on the side to speed things up. The supplied stylus is fabulous though, and we resorted to this very quickly.

On the top of the device sits an SD (Secure Digital) card slot, as well as an infra-red port and a headphone socket. Apart from the cradle connector at the bottom, that's as far as ports go.

The 802.11b wireless access is easy to set up using the provided software that searches for and connects you to any available network. It also comes with Avant Go, which downloads online content for offline reading.

The screen is a bit of a disappointment, as it's rather dull and pales in comparison to Sony's and even Palm's own Tungsten T. Besides the reservations about this and the keyboard, this is a well-built device that fills a niche for those who want a wireless PDA that uses Palm OS. However, £400 is a lot for a PDA like this, and with the Tungsten T now selling for £255.50, we're not sure that the extra £145 is worth it for wireless.

Mark Walsh

DETAILS

PRICE £399 (£339.57ex VAT)
CONTACT Palm
www.palm.co.uk
SPECIFICATIONS
Palm OS 5.2.1 • Intel Xscale 400MHz processor • 64MB Rom (51MB usable) • 3.5in screen • 320 x 320 resolution • SD slot • Infra-red • 802.11b • 78 x 122 x 17mm (w x d x h) • 178g • USB connection
PROS Wireless access; best Qwerty keyboard so far
CONS Screen; weight; price
VERDICT
A fast wireless PDA that is let down by its screen and price

PERFORMANCE	★★★★☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

PALM PDA

Sony TG50

Plenty of features make this good value

The second of two similar devices reviewed this month, both of which use Palm 5, is a sleek if heavy number from Sony. The TG50's Xscale chip runs significantly slower than the Palm (see left) at 200MHz, though we couldn't notice much of a difference between this and the 400MHz version in the Palm. This is Sony's second device using Palm 5, and it remains the only other company besides Palm itself, to use the OS; version 6 is rumoured to be launched later this year.

As is the case with most of Sony's models, we weren't particularly keen on the use of a lid. While this protects the screen (which incidentally is great, but more on that later), it doesn't flip the whole way round the back and therefore feels cumbersome when in use; it's very difficult not to notice it if you're making a few notes or playing a game.

Apart from this, there's very little to fault in the device. The 320 x 320 screen is beyond reproach – clear, bright and unbeatable when it comes to video playback. The stylus is long and, while the jog dial on the side is a welcome alternative, we preferred the stylus for navigation – even the extra scroll button and other shortcuts couldn't lure us away.

Despite the tiny buttons on the handily backlit Qwerty keypad, we found that entering text this way took no longer than using the stylus. This device uses Graffiti 2 handwriting recognition, which we find an unsettling and confusing mix of the original Graffiti and Pocket PC's own data input system.

With Bluetooth, infra-red and a Memory Stick slot, the TG50 is well featured. There's also a shortcut to make voice memos on the left-hand side, while LEDs on the top of the device flash to indicate whether it is activated for Bluetooth, or recording. Great value overall.

Mark Walsh

DETAILS

PRICE £298.45 (£254 ex VAT)
CONTACT Sony
www.sony-europe.com/clie
SPECIFICATIONS
Palm OS 5 • Intel Xscale 200MHz processor • 16MB Ram (11MB available), 16MB Rom • 3.5in 320 x 320 resolution TFT screen • Memory Stick slot • Infra-red, Bluetooth • 71.6 x 16.2 x 126mm (w x d x h) • 184g • USB connection
PROS Screen; price
CONS Clumsy lid design makes it too large
VERDICT
Very well featured and priced; if you want a keypad, this is the Palm device to go for

PERFORMANCE	★★★☆☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

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- **MOTHERBOARD** MSI K7N2G (NVIDIA® nForce2™) • **MEMORY** 256MB PC2100 266DDR
- **HARD DRIVE** 120GB Ultra DMA 100 7200rpm • **DVD/CD-ROM** Systemax 52x24x52 CD-RW & 16x DVD combo drive • **MONITOR** 15.1" CTX LCD S500 • **GRAPHICS CARD** On-Board NVIDIA® GeForce™ 4 MX440 + 8x AGP slot
- **SPEAKERS** Creative SBS-250 • **SOUND CARD** MSI S-Bracket for On-board 6 channel digital sound • **EXTRA SOFTWARE / HARDWARE** On-board 10/100 Fast Ethernet, On-board IEEE1394 Firewire port, Systemax wheel mouse, Systemax deluxe keyboard
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PART NO: BV70414

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- **HARD DRIVE** 60GB Ultra DMA 100 • **DVD/CD-ROM** DVD/CD-RW combo
- **OPERATING SYSTEM** Microsoft® Windows® XP Home • **MONITOR** 15" SXGA+ TFT colour display • **EXTRA SOFTWARE / HARDWARE** Cyberlink Studio, Symantec Norton Anti-Virus 2003, Ability Office, SiS645DX chipset motherboard, Optional external USB 3.5" 1.44MB floppy drive, ATI Mobility Radeon 9000 M9 64MB DDR graphics, 5.1 channel support & built-in dual stereo speakers, 1x PCMCIA Type II, 1x InfraRed port, 1x S-Video out port, 4x USB 2.0 ports & Firewire™, Internal 56K fax/data modem & 10/100 Ethernet, CD control panel, 12-Cell Li-ion battery & AC adaptor, 2 Year Hardware collect & return Warranty • **EASY PAY PLAN FINANCE OPTION AVAILABLE**

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- **PROCESSOR** AMD Athlon™ XP 2800+ 333FSB with Quantispeed™
- **MOTHERBOARD** MSI K7N2 (NVIDIA® nForce2™) • **MEMORY** 512MB PC2700 333DDR
- **HARD DRIVE** 120GB Ultra DMA 100 7200rpm • **DVD/CD-ROM** Systemax 16x DVD-ROM drive & Systemax 52x16x52 CD-RW drive • **MONITOR** 17" CTX LCD S700
- **GRAPHICS CARD** MSI NVIDIA® GeForce™ FX 5200 64MB AGP8X TV-Out / DVI
- **SPEAKERS** Creative Inspire 4400 speakers • **SOUND CARD** NVIDIA SoundStorm™ 5.1 Dolby Digital • **EXTRA SOFTWARE/ HARDWARE** On-board 10/100 Fast Ethernet, On-board IEEE1394 Firewire port, Systemax wheel mouse, Systemax deluxe keyboard
- **PLUS ALL STANDARD FEATURES** • **EASY PAY PLAN FINANCE OPTION AVAILABLE**

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PART NO: BV70697

- **PROCESSOR** Intel® Pentium® 4 2.8GHz 800FSB Inc Hyper-Threading Technology
- **MOTHERBOARD** MSI 865PE NEO (Intel® 865PE) • **MEMORY** 512MB PC2700 333DDR
- **HARD DRIVE** 160GB Ultra DMA 100 7200rpm • **DVD/CD-ROM** Sony DVD±RW drive
- **MONITOR** 17" CTX LCD S700 • **GRAPHICS CARD** MSI NVIDIA® GeForce™ FX 5600 128MB AGP8X TV-Out / DVI • **SPEAKERS** Videologic ZXR-500 5.1 surround sound
- **SOUND CARD** Creative Sound Blaster® Audigy™ 2 6.1 Inc Firewire
- **EXTRA SOFTWARE / HARDWARE** Systemax 3.5" 6-in-1 media card reader, Psion WaveFinder digital radio, Hauppauge WinTV-Primio-FM TV-Tuner card, Systemax cordless keyboard & mouse • **PLUS ALL STANDARD FEATURES**
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PDA OPERATING SYSTEM

Pocket PC 2003

A worthwhile upgrade, especially if you're looking for a wireless solution

Pocket PC 2003 is the third incarnation of the PDA operating system, and Asus' 620N is the first device to reach *PCW*'s labs with it installed. The 620N was released a month or two ago and is the upgrade to the previous model, the Mypal A600, which we reviewed in our November 2002 issue, but we'll talk about the hardware later.

The main aim of Pocket PC 2003 is to enhance what Microsoft already considers to be an excellent interface, concentrating on making these devices cheaper, (potentially down to £150 according to Microsoft) and more standalone than they have been previously. The most important enhancements are in the wireless area and improving some fundamental ease of use issues that have plagued previous versions. Another interesting avenue of support is for smaller screens, which are now 2.8in as opposed to the previous standard 3.5in. This will allow a host of new shapes and sizes, potentially widening the appeal among consumers. Microsoft expects business users to stick with the larger screens and predicts the 4.5in screen of Toshiba's latest creation, the E750, to be a big seller.

Pocket PC 2003 runs on the latest version of Windows CE .Net, v4.2. Besides the aforementioned ability to use smaller screens, v4.2 also allows manufacturers to use Nand memory. This was first seen in HP's lightweight and low-cost Ipaq 1910. First off, it's comparatively cheap, but its real advantage is it can store the operating system (OS) as a compressed folder and unzip it every time you boot. This saves on storage space, therefore reducing cost and leaving more memory free for use.

Other built-in support features are the ability to include a Qwerty keyboard. Palm OS has had this for a few revisions now but, while we are not convinced about the ease of using such a small keyboard on a PDA, the ability to have one is still welcome. Hitachi will be the first to integrate a keyboard and its device will also come with Wireless Lan a camera and a radio, though it has not been confirmed whether it will be released in the UK.

One of the most impressive inclusions in Pocket PC is that it can act as a USB host for devices such as remote controls and potentially external optical drives, though obviously it could not supply power to them.

Strike it up and you'll notice few differences in basic use. Warning bubbles are now far bigger, which can easily become annoying, but they do let you fix the problems directly, rather than having to press OK and work through various menus for a solution.

As already mentioned, wireless support has been improved, and there's a wireless symbol on the taskbar, which will direct you straight to the upgraded Connection Manager. Here, PPC 2003 will automatically search for available networks, list them and let you activate whichever one you want. Also, if a program you are running needs net access, Connection Manager will search for the best connection available and hook you up. This is an interesting feature, but as wireless access can be expensive, it may be worthwhile disabling it if you don't need it.

PPC 2003 uses the same Bluetooth stack as that used for XP, which means there will be fewer of the compatibility issues that normally plague the technology. Dialup networking is also supported. PPC's browser has also been updated to support the latest versions of Javascript (5.5), XHTML 4, Wap 2 and IPv6, as well as CSS and WTLS.

2003 Phone Edition has been updated too. Microsoft has added a mute button to the front menu, as well as call barring and forwarding. It has also created separate phone and overall volume settings; a major complaint with the original edition. WMA and Midi ringtones are supported, and GPRS and instant messaging can remain on even when the device is off.

Sadly, the Asus model with which we tested Pocket PC was not equipped to take advantage of many of the features, in particular wireless, nor was it a Phone Edition model. We see this as a key disadvantage of the OS. It makes little difference to a standard PDA – it's only in the wireless arena that it really shines.

There are, however, plenty of devices on the horizon that will support more of the new features. HP's new 5550 model will be wirelessly enabled – this will be reaching our pockets in the near future. HP will be releasing a new, slimmer model called the 2210 at around the same time. Dell's Axim PDAs will be updated in July, and completely new devices from JVC and Panasonic will arrive soon after.

Mark Walsh

DETAILS

PRICE Approx £30 upgrade from 2002; see manufacturers for details
CONTACT Microsoft
www.microsoft.com
PROS Wireless functions are more comprehensive and easier to use
CONS Has little or no effect on the bog-standard PDAs
VERDICT
While there are little or no changes to the interface, Microsoft has done some hefty work in expanding areas the previous version was lacking, particularly wireless. It's therefore a worthwhile upgrade, primarily for wireless users

EASE OF USE	★★★★☆
FEATURES	★★★★½
VALUE FOR MONEY	★★★½☆
OVERALL	★★★★½

VIDEO EDITOR

Pinnacle Edition 5

Impressive DVD authoring tools make this a useful upgrade

Left: Edition 5's easy-to-use DVD Wizard

Below: The not so realtime preview of the GPU effects

Pinnacle acquired Edition, then known as Fast Studio, when it bought German video specialist Fast in 2001. Edition is aimed at professional and advanced amateur users.

In the box you get a two-port Firewire card and a red Firewire cable. There's also a DV500 version which includes Pinnacle's realtime editing card and a Pro version which includes an adaptor that lets you preview realtime effects on a TV monitor. The big new features in Edition 5 are realtime previewing and DVD authoring – the two things that probably come top of any videographer's wish list.

Pinnacle uses both the CPU and GPU to support realtime Digital Video Effects (DVEs) and transitions. Early beta reviews made ambitious claims for this approach, but in our view Edition 5's realtime performance is a big disappointment.

DVEs are categorised into CPU and GPU assisted groups. While the CPU assisted effects previewed well in almost real time with only occasional dropped frames, the GPU effects – which are by far the larger group, including page curls, 2D and 3D editors and a variety of special effects filters – struggled to preview at all, often dropping so many frames that it was more of a snapshot than a preview.

Other aspects of the rendering and preview system are less than sparkling. Like other video editors, Edition indicates the rendering state of a clip by means of a colour bar – grey for no effect, yellow for real time, green for rendered and red for needs rendering. Every effect we applied – realtime or not – produced the red 'needs rendering' bar, although the realtime effects did preview without the need for rendering.

2D and 3D effects editors allow you to custom build effects by generating keyframed adjustments to size, crop, rotation, transparency, shadow and other parameters. Additionally, there are a variety of 2D, 3D and image adjustment preset effects, but these are just numbered, rather than given any sort of name that might provide some clue as to what they do. There are only two ways to determine this: either to apply them, or to open the effect properties dialogue which provides a static thumbnail.

But if Edition 5's realtime performance is disappointing, its DVD authoring tools more than make up for it. DVD authoring tools are fully integrated so you don't have to learn an entirely new package and make constant round trips to incorporate corrections to the original video project.

To make life even simpler, there's a DVD wizard to guide you. Initially this involves template selection – the supplied templates aren't bad and there's ample opportunity to edit them. Your chosen menu template is then added to a special DVD track. You should have the opportunity to select Film Style mode for the insertion, so the video clips aren't overwritten. However, we couldn't get this to function and had to manually shift everything up the timeline to accommodate the menu.

The next stage involves linking menu buttons to events, such as clip in-points, with varying degrees of automation. One very neat trick that is easily accomplished is converting static graphic buttons on the template to animated video buttons simply by dragging a clip from the project browser onto the corresponding button.

For more serious menu editing, a template editor is supplied. This is strikingly similar in appearance and function to Title Deko, the title generator supplied with Edition, so it shouldn't pose too many problems for experienced users. There are a handful of other additions, the most significant of which is the inclusion of a fully functioning integrated version of the Hollywood FX suite of filters. Automatic scene detection of captured clips, enhanced colour controls and an autosave function complete the picture.

Pinnacle gets top marks for DVD authoring, but could do much better on the realtime front. If more time had been spent revamping the interface, adding real customisation options instead of the fixed layout templates and toolbar buttons currently on offer, this would have been a more exciting upgrade.

Ken McMahon

DETAILS

PRICE £499 (£424.68 ex VAT)
CONTACT Pinnacle Systems
www.pinnaclesys.com
SYSTEM REQUIREMENTS
1GHz Intel or AMD processor, 256MB Ram, Windows 2000 or XP, AGP graphics card with 64MB of video Ram for realtime effects
PROS Integrated DVD authoring
CONS Poor realtime performance
VERDICT
Realtime letdown; DVD success

EASE OF USE	★★★☆☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★☆☆
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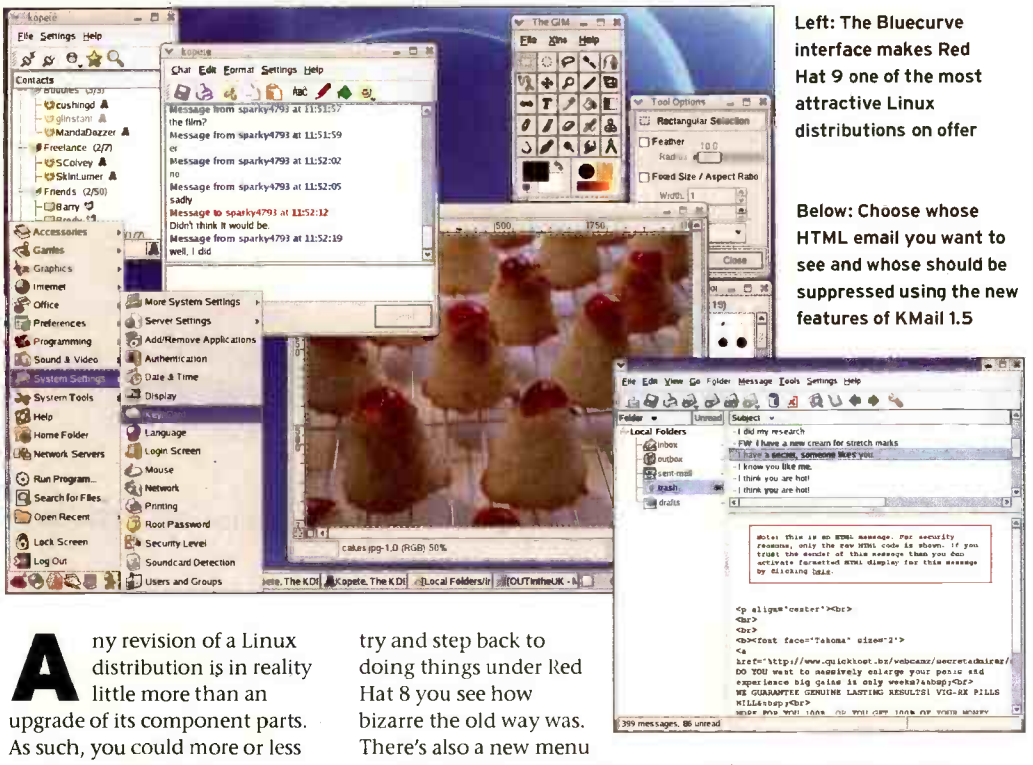
LINUX

Red Hat 9

An attractive upgrade that's easy to install and use



Left: The Bluecurve interface makes Red Hat 9 one of the most attractive Linux distributions on offer

Below: Choose whose HTML email you want to see and whose should be suppressed using the new features of KMail 1.5

Any revision of a Linux distribution is in reality little more than an upgrade of its component parts. As such, you could more or less create an improvised copy of much of Red Hat 9 by downloading updates to the components of Red Hat 8, or Suse, or any similar distribution. You won't, of course, get the benefit of the Bluecurve interface, which is undeniably pretty and far more attractive in this latest release. That's mere window dressing, but it does take away some of the rough edges traditionally associated with running Linux, and comes close to rivalling the look of Mac OS X.

This is perhaps why Red Hat 9 is still one of the most talked about Linux options, and is a good choice for anyone looking to switch from Windows. This new release contains a few interesting tweaks. Its equivalent of the Start menu has been reorganised so that 'extra' programs, which used to appear on a completely separate menu, have been repositioned in a flyout of the section in which they would otherwise be found. Existing users will take a couple of days to get used to this but it's far more logical, and when you try and step back to doing things under Red Hat 8 you see how bizarre the old way was. There's also a new menu item for Add/Remove programs, which replaces the old 'Packages' entry and makes far more sense.

KMail has been upgraded to version 1.5, in which it's now far easier to read HTML emails. By default these would previously have been displayed as source code, with a global option to render all incoming HTML messages as web pages. This is a potential security risk as it might involve downloading referenced external links, which could confirm the validity of your email address. In this revision, though, each HTML email contains a hyperlink that will render just that message and leave all others as source, allowing you to download referenced elements only from contacts you trust.

There is a natural preference towards using Gnome over KDE for window management – Red Hat invests in its development after all, and in our tests Gnome was quicker when it came to basic operations such as opening browsers and email clients. It is also far easier to set up network shares between Red Hat and Windows machines under Gnome, so it is the logical choice for users of small home networks.

While Mozilla is installed, the default browser is Konqueror (on which Apple's Safari browser is based) and email is taken care of by Evolution, a Pim (personal information manager) to rival Outlook. This is overkill for many, and it's somewhat quirky when it comes to copy and paste, which may be reason enough to switch to the bundled KMail.

Installation is as simple as ever and when complete you'll be running the 2.4.20 kernel, Evolution 1.2.2, Open Office 1.0.2, Gnome 2.2.0 and KDE 3.1. As long as you're not using Red Hat's shrinkwrapped evaluation edition, you can upgrade from version 8, retaining your files and settings. This is what we'd recommend, as is downloading the ISOs from the Red Hat site rather than shelling out on the boxed edition. Check out the fairly steep system requirements first, though.

Depending on how you feel about paying for Linux, you may be disappointed by the update service, which does not yet rival that in Windows XP. It's easy to see when your system needs updating from the Red Hat Network icon in the system tray, but in three weeks of testing we only successfully logged onto the network once to download the updates using the free version of the service. Paying for it gives you preferential treatment, but starting at $60 (£36) a year it doubles the cost of a boxed installation.

So, is it worth the effort of an upgrade? Well, if you're using Red Hat 8 then it's so ridiculously easy you'd be foolish not to. As for switching from another distribution, unless you're willing to pay the subscription on a support account we suspect the update service – in its current form – will do more to irritate than ingratiate newcomers to the distribution. There are plenty of good touches here, though; it's easy to install and use, and for anyone making the switch from Windows it is a sensible choice.

Nik Rawlinson

DETAILS

PRICE £36.06 (£30.69 ex VAT) for boxed edition; free to download
CONTACT Red Hat
www.europe.redhat.com
SYSTEM REQUIREMENTS
400MHz or faster processor, 475MB free hard drive space (1.7GB recommended), 128MB of Ram for graphical operation (64MB for text-only mode)
PROS Attractive; easy to use; installs in under 30 minutes
CONS Update service is often clogged; default installation options may not suit some
VERDICT
A sensible choice for those new to Linux or looking to upgrade from Red Hat 8. Has everything needed to get a fully functioning low-cost system up and running, so should appeal to IT hobbyists looking to build a second system

EASE OF USE	★★★★★
FEATURES	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

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ENTRY-LEVEL PC

Systemax Inspire 3127

REVIEW June 2003, p51 **PRICE** £821.33
(£699 ex VAT) **CONTACT** Systemax 0870 7297 366
www.systemaxpc.co.uk

An Nvidia Nforce2 motherboard shows its performance, with an Athlon 2500+ and a Geforce FX5600 Ultra graphics card. A 19in monitor makes this an amazing bargain for an entry-level system.

MID-RANGE PC

Multivision Vision KT4 bundle

REVIEW January 2003, p123 **PRICE** £1,056
(£899 ex VAT) **CONTACT** Multivision 0870 066 0885
www.multivision.co.uk

An Athlon 2200+ processor with 512MB of Ram gives this PC the edge in its price range. The graphics are handled by Gainward's Ti4200 Geforce4 and the excellent Iiyama 19in monitor.

HIGH-END PC

Hi-Grade Ultis PV4 GPW02

REVIEW February 2003, p109 **PRICE** £1,410
(£1,200 ex VAT) **CONTACT** Hi-Grade 020 8532 6123
www.higrade.com

Backing up the 2.8GHz CPU and 512MB of Ram inside this PC is a massive 160GB Raid array and a Geforce4 Ti4800. A front-mounted unit takes various memory cards and features USB2 ports.

FULLY FEATURED NOTEBOOK

Hi-Grade M6600-2500

REVIEW June 2003, p46 **PRICE** £1,526.33
(£1,299 ex VAT) **CONTACT** Hi-Grade 020 8532 6123
www.higrade.com

This notebook offers great performance thanks to a 2.5GHz Pentium 4 Mobile processor, 512MB of memory and a Geforce 440 Go chip. In addition there is a DVD-RW drive and memory card reader.

ULTRA-PORTABLE NOTEBOOK

Sony PEG-TR1MP

REVIEW August 2003, p47 **PRICE** £1,800
(£1,532 ex VAT) **CONTACT** Sony
www.vaio.sony-europe.com

The TR1 brings great style to the Centrino platform. It might not be fast, but its battery lasts just under three hours and you get a brilliant screen. It also has an internal CDRW/DVD drive, as well as USB2 and Firewire ports.

BUDGET NOTEBOOK

Toshiba Satellite 3000

REVIEW July 2002, p108 **PRICE** £999
(£850 ex VAT) **CONTACT** PC World
www.pcworld.co.uk.

Fully featured and costing less than £1,000, the 3000 performs well, and its battery life is up there with the best. It's also the only notebook in its class capable of completing our graphics tests.

FLAT-PANEL MONITOR

CTX PV722E

REVIEW May 2003, p69 **PRICE** £427.70
(£364 ex VAT) **CONTACT** CCL Computers 01274 471 201
www.cclcomputer.co.uk

CTX has updated the previous model in this range with a powered USB2 hub and a detachable speaker section. The display performance is good with excellent viewing angles. A pivot mode is also included.

17IN CRT MONITOR

NEC-Mitsubishi Diamond Pro 750SB

REVIEW October 2002, p61 **PRICE** £151.58
(£129 ex VAT) **CONTACT** Simply 0870 727 2100
www.simply.co.uk

The 750SB is pretty much infallible as far as 17in monitors go. It's very compact, reasonably good looking and has fantastic image quality, but it's the price that really stunned us – it's amazingly cheap.

19IN MONITOR

CTX PR960F

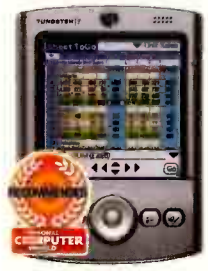
REVIEW June 2002, p125 **PRICE** £287.88
(£245 ex VAT) **CONTACT** Simply 0870 727 2100
www.simply.co.uk

Excellent image quality, as well as a USB hub, make this 19in monitor more than worth its £316 asking price. Although this display is a little on the large side, it does have both VGA and BNC inputs.

PDA

Palm Tungsten T

REVIEW January 2003, p61 **PRICE** £255.50
(£217.45 ex VAT) **CONTACT** Expansys 0161 868 0868
www.expansys.com



The first device to adopt Palm OS5 is also one of the best PDAs around. It features Bluetooth, the screen is almost without fault and it's the fastest PDA we've ever laid our hands on.

POCKET PC

HP Ipaq 1910

REVIEW May 2003, p72 **PRICE** £250.28
(£213 ex VAT) **CONTACT** Simply 0870 727 2100
www.simply.co.uk

This may be the smallest Pocket PC available, but no compromises have been made in its capabilities. The screen is excellent under all conditions. There is an SD slot and 64MB of Ram.

MULTIFUNCTION DEVICE

Hewlett-Packard PSC 2210

REVIEW January 2003, p82 **PRICE** £212.68
(£181 ex VAT) **CONTACT** Simply 0870 727 2100
www.simply.co.uk

This multifunction device is a rarity as it offers print and scan quality that is normally only seen in standalone devices. Card slots are also included making this an excellent bargain.

SCANNER

HP Scanjet 4500c

REVIEW February 2003, p125 **PRICE** £122.79
(£104.50 ex VAT) **CONTACT** Scan 0870 755 4747
www.scan.co.uk

Once again, HP shows that it can combine good hardware with great software. The scanner has plenty of shortcut buttons and won't keep you hanging around for scans to finish either.

LASER PRINTER

Epson EPL-5900

REVIEW April 2003, p179 **PRICE** £216.20
(£184 ex VAT) **CONTACT** Simply 0870 727 2100
www.simply.co.uk

Excellent photo and text quality, backed up by exceptional ease of use put the EPL-5900 at the top of the list. It may not be much to look at but it's a speedy worker that's ideal for the small office.

INKJET PRINTER

Canon i320

REVIEW January 2003, p89 **PRICE** £45.81
(£38.99 ex VAT) **CONTACT** Simply 0870 727 2100
www.simply.co.uk

It may not be much of a looker, but the i320 is superb value. Photo printing is just as good as many models at twice the price, and it is very easy to use. All this for under £50 makes it irresistible.

WEBCAM

Philips Touchcam Pro PCVC-740K

REVIEW March 2002, p139 **PRICE** £54.04
(£45.99 ex VAT) **CONTACT** Simply 0870 727 2100
www.simply.co.uk

This is a brilliant webcam that can be used for high-resolution still snaps, or 60fps video at 640 x 480. It is even capable of text recognition with the help of Xerox's Pagecam technology.

SPEAKERS

Acoustic Energy Aego2

REVIEW April 2002, p138 **RRP** £299.95
PCW SPECIAL OFFER PRICE £79 .95 + £7.50 P&P
(£68.07 ex VAT) **CONTACT** www.offersdirect.pcw.co.uk

Dressed in stylish plastic, the Aego2s are the best-looking 2.1 speakers we've seen. Sound quality is almost infallible too but, as you'd expect, a setup of this quality comes with a big price tag.

SOUND CARD

Creative Audigy 2 Platinum EX

REVIEW May 2003, p76 **PRICE** £151.58
(£129 ex VAT) **CONTACT** Simply 0870 727 2100
www.simply.co.uk

This feature-filled card and external unit provides 24/96 recording, 6.1 sound and loads of software, including Cubasis VST 4.0 CE for music makers, and Ulead Videostudio SE DV for movie buffs.

LOW-END SPEAKERS

Creative Inspire 6700

REVIEW December 2002, p59 **PRICE** £63.64
(£54.16 ex VAT) **CONTACT** CCL Computers 01274 471 201
www.cclcomputers.co.uk

These 6.1 speakers are great sounding, and not too bad to look at either. They are also capable of 'upmixing' a 5.1 signal to a 6.1 one, as well as having one of the lowest signal-to-noise ratios around.

ATHLON MOTHERBOARD

Gigabyte 7VAXP-A Ultra

REVIEW August 2003, p116 **PRICE** £106.92
(£91 ex VAT) **CONTACT** Gigabyte 01908 362 700
www.gbt-tech.co.uk

This board from Gigabyte is packed full of features. There are extra IDE and Serial ATA connectors, and enough back brackets to fill a case without any extra cards.

PENTIUM 4 MOTHERBOARD

Abit IC7-G

REVIEW August 2003, p118 **PRICE** £161
(£137.02 ex VAT) **CONTACT** Abit 01438 228 888
www.abit.com.tw

Bringing a host of features to primarily a workstation board, the IC7-G offers Firewire and six-channel integrated sound. Serial ATA is also included, with a Serillel adaptor for parallel hard drives.

DIGITAL VIDEO CAMERA

Sony TRV33E

REVIEW July 2003, p142 **PRICE** £750 (£638.30 ex VAT) (£501.28 ex VAT) **CONTACT** Sony 0870 511 1999

www.sony.co.uk

This slimmed-down model uses an innovative touchscreen menu. The Super Steady Shot image stabiliser is included, as well as still image options and anamorphic 16:9 recording.

GRAPHICS CARD

Gainward Powerpack Pro/450 TV

REVIEW August 2002, p118 **PRICE** £45.81 (£38.99 ex VAT) **CONTACT** Simply 0870 727 2100

www.simply.co.uk

Geforce MXs mean great value for money. This card has a single VGA and a TV-out in addition to good performance. However, there isn't any extra software beyond the Nvidia drivers.

VIDEO-EDITING CARD

Hercules All-in-Wonder 9000 Pro

REVIEW March 2003, p74 **PRICE** £142.01 (£120.86 ex VAT) **CONTACT** Dabs

www.dabs.com

The latest edition of the All-in-Wonder series offers the 9000 chip running at full speed. There's a breakout box and radio remote control, although it is lacking a Firewire port.

DIGITAL CAMERA

Canon Power Shot A70

REVIEW June 2003, p128 **PRICE** £254.99 (£217.02 ex VAT) **CONTACT** Dabs

www.dabs.com

Excellent picture quality combined with a great range of features makes this camera stand out. Although a little heavy, the A70 offers a 5cm macro and 3x optical zoom with its 3.3megapixel CCD.

DVD-RW

NEC Multispin ND-1100

REVIEW July 2003, p71 **PRICE** £126.02 (£107.25 ex VAT) **CONTACT** CCI Computers 01274 471 201

www.cciccomputers.co.uk

Lending support to the DVD+ format, the NEC also delivers good CD writing performance. The software bundle is comprehensive, including Nero v5 and Sonic MyDVD.

CD-RW

Asus CRW-4816A

REVIEW October 2002, p116 **PRICE** £44.58 (£37.94 ex VAT) **CONTACT** SMC Direct 01252 339 706

www.smcdirect.com

Optimised for quiet and error-free performance, the CRW-4816A stands out from the crowd. This model is now only available as a 52x speed version, but has Nero and a 2MB buffer as before.

OFFICE SOFTWARE

Ability Office

REVIEW April 2003, p194 **PRICE** £48.76 (£41.50 ex VAT) **CONTACT** Ability 020 7231 1004

www.uk.ability.com

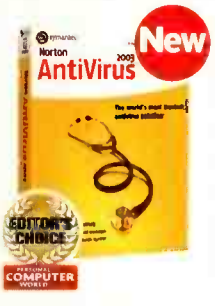
Costing a fraction of Microsoft Office's price, Ability Office still manages to offer a similar look and features. There isn't a presentation package although it does include a macro language.

ANTI-VIRUS SOFTWARE

Symantec Norton Anti-virus 2003

REVIEW August 2003, p140 **PRICE** £39.99 (£34.03) **CONTACT** Symantec 020 7616 5600

www.symantec.com



Norton is everything a good anti-virus package should be. It does its job well and is easy to use with automatic updates and intelligent colour coding. Instant messaging is also protected.

WEB-EDITING SOFTWARE

Macromedia Dreamweaver MX

REVIEW December 2002, p153 **PRICE** £319 (£271.50 ex VAT) **CONTACT** Macromedia 0800 169 8216

www.macromedia.com/uk

A very powerful web-editing suite that supports most server technologies and integrates with other Macromedia products, Dreamweaver demands some effort but the results are worth it.

IMAGE-EDITING SOFTWARE

Corel Draw Graphics Suite 11

REVIEW July 2003, p128 **PRICE** £457.08 (£389 ex VAT) **CONTACT** Corel

www.corel.com

Corel Draw Graphics Suite is easy to use, with a great selection of filters, fonts and clip art. An invaluable error-catching feature gives you a chance to save files before a crash.

VIDEO-EDITING SOFTWARE

Ulead Video Studio 7

REVIEW July 2003, p149 **PRICE** £41.12 (£35 ex VAT) **CONTACT** Dabs

www.dabs.com

With a simple interface and lots of tools, this is a great choice for the amateur. Realtime preview could be better, but other tools such as automatic scene detection are valuable.

GRAPHICS SOFTWARE

3D Studio Max 5

REVIEW December 2002, P85 **PRICE** £3,166.63 (£2,695 ex VAT) **CONTACT** Tyrell Corporation 020 7343 5500 www.tyrell.co.uk

This edition of 3D Studio Max builds on its previous success with more powerful tools and increased functionality. Despite its high cost this is the best package around.

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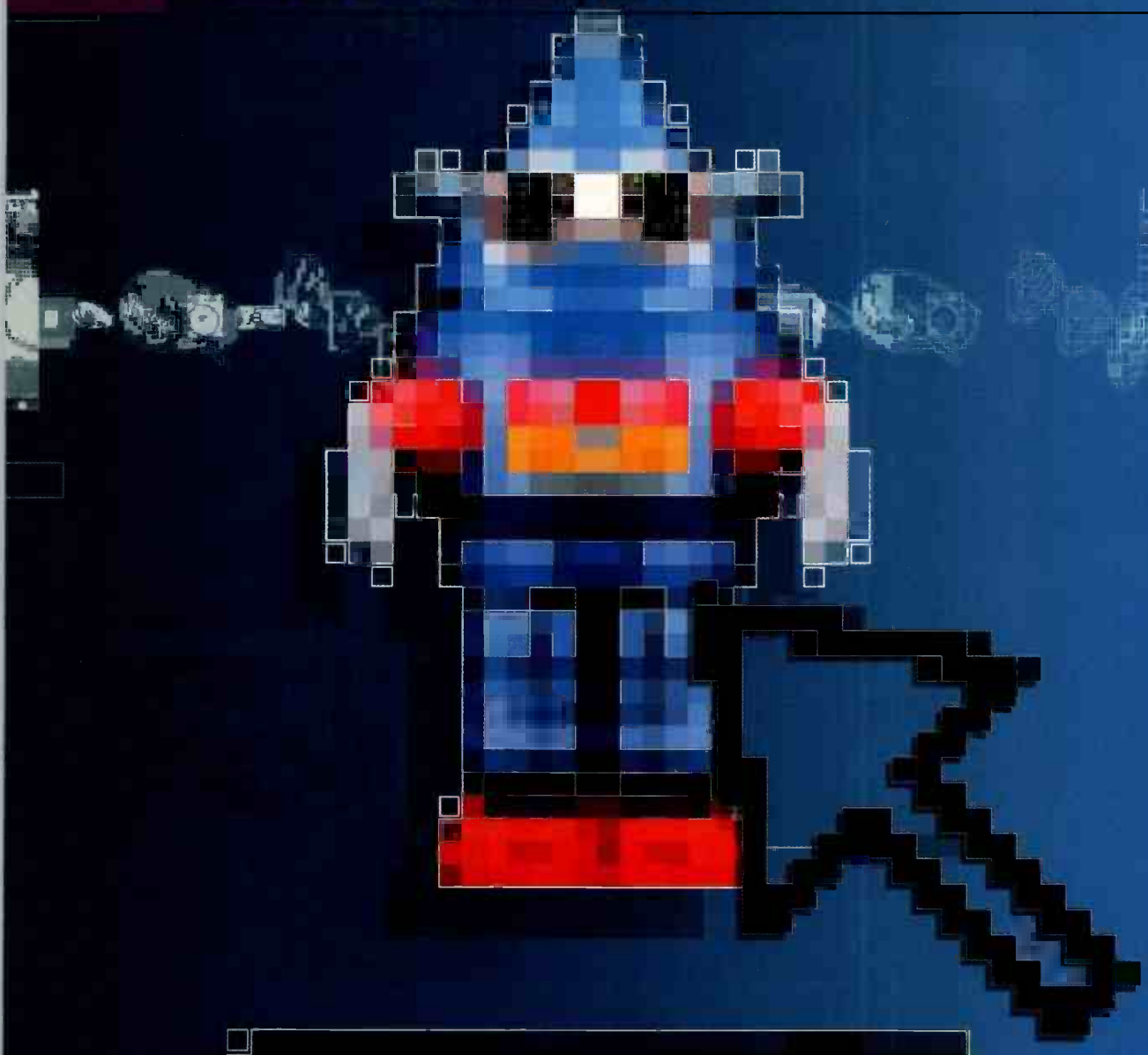
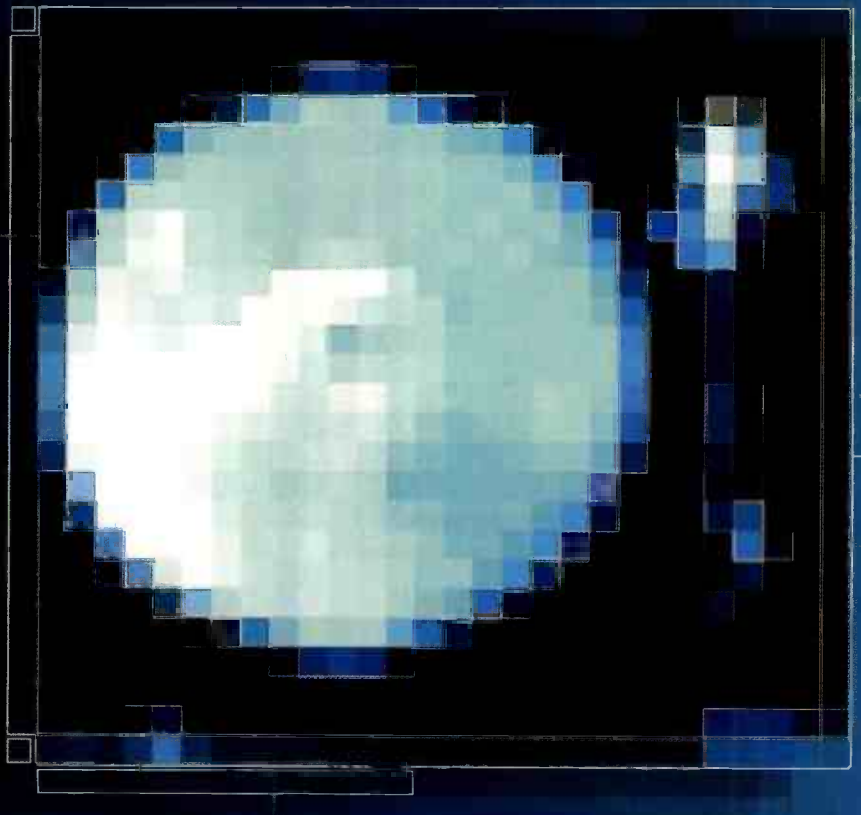
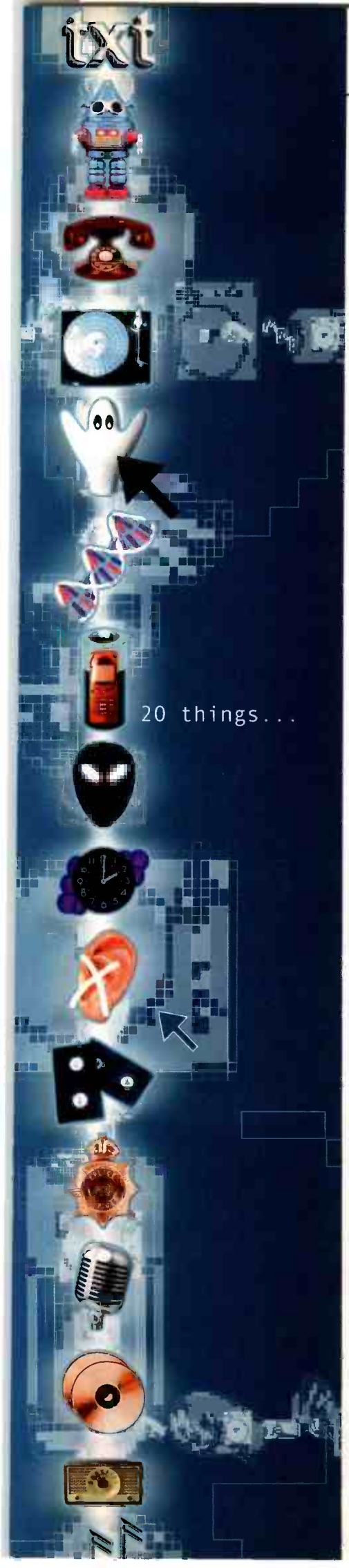






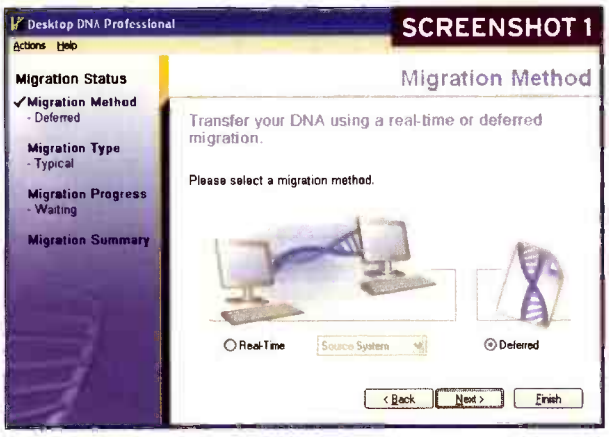
Think different

WORDS: SCOTT COLVEY ILLUSTRATION: DAVID ANGEL

Don't just sit there and do the same old thing with your PC. Here are 20 unusual things for you to try out – from charging your mobile phone to becoming a karaoke supremo

It's the beginning of the working week and you've just fired up the PC – so what's the first thing you would usually do? Spend some time reading through your emails before responding to any that demand attention? Savour your morning coffee while surfing a few news websites? Launch Excel so you can log the previous day's expenses? Indulge in a quick mosey around Minesweeper or maybe a swift hand of Solitaire? Perhaps the answer is all of the above, followed later by some Word-prepared correspondence and the creation of a Powerpoint presentation or two.

The fact is that most computer use is routine: the same few jobs and operations played out day after day, week after week. But it doesn't have to be that way. Today's computers are enormously versatile tools and with a little imagination they can perform in ways you may never have considered. To help you out, the *PCW* team has engaged in a heads-down huddle and come up with 20 unusual uses for your PC. So, as one industry figure once famously put it – think different.



Transplant your virtual surroundings using Desktop DNA

Hidden charge

Ordinarily, you mightn't think of a machine weighing several kilograms as an ideal tool for juicing up a portable telephone, but attach a Telecharger to your desktop PC and it'll be transformed into the largest mobile phone charger you've ever seen. As simple as it is useful, the Telecharger cable slides into a USB socket and uses that connection to charge a mobile handset attached to the other end of the cord.

While it can draw power from any USB socket, the device is intended to appeal to notebook-packing travellers: mobile workers can dispense with phone chargers knowing that the Telecharger can do the job instead, wherever their travels might take them. Manufactured by Teleadapt (020 8233 3000; www.teleadapt.com), the Telecharger costs £14.99 and is available for most Ericsson, Motorola and Nokia handsets.

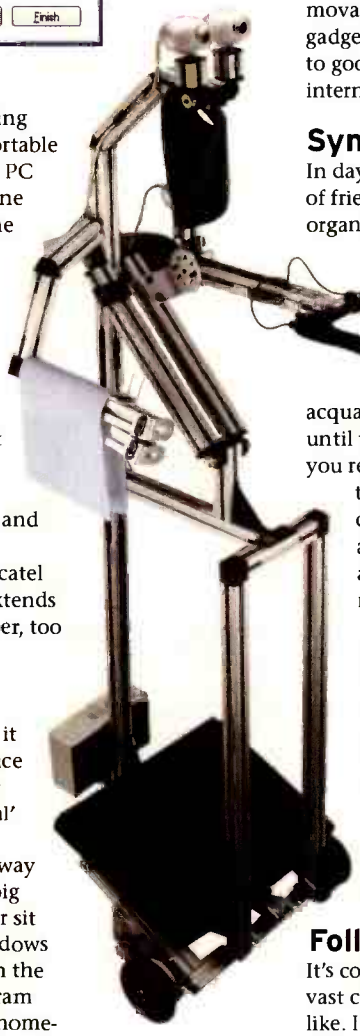
If you're the owner of a Siemens, Panasonic or Alcatel handset, APC's USB Mobile Phone Charger range extends to models from these manufacturers. They're cheaper, too – £9.40 from APC (020 8990 6400; www.apc.com).

Clone home

Does your computer have a soul? Probably not, but it almost certainly has a personality: every menu choice you've ever made and every option box you've ever ticked will have contributed to putting the 'personal' into your PC. The upshot of all this unconscious customisation is a computer that's attuned to your way of working – and three cheers for that. However, a big snag arises when you upgrade to a new computer, or sit down to work at someone else's machine. One Windows interface might look much like another but beneath the surface, the environment can be utterly alien: program shortcuts aren't where you'd ordinarily find them, home-made macros are missing and myriad settings and configurations of favourite applications are at odds with your own preferences.

If you're switching from one Windows XP-based PC to another then the operating system offers a partial solution to this problem in the guise of the Files and Settings Transfer Wizard. Found under System Tools, within the Accessories menu, this step-by-step utility will transport the bulk of your computer's inner spirit – files, folders and some application settings – but it's far from perfect.

Depending on your requirements, a better option might be to invest a few quid in a commercial alternative to the Files and Settings Transfer Wizard. A program such as Miramar's Desktop DNA, for instance, affords much finer control over proceedings: the utility can be used to create a self-extracting 'DNA file' that a user can carry around on CD in readiness for application to another PC (see screenshot 1). More importantly, Desktop DNA will unravel any changes it makes to a new computer, retuning the machine to its original state. Desktop DNA can be purchased as a $39 (approx £25) download from www.miramar.com.



Turn your laptop into a robot

Robotise your laptop

As strange as it sounds, you can turn your laptop into a roving robot around your home or, even better, the office reception area at work. Not only will it impress friends and clients, it will do – within reason of course – what you program it to do. The ER1 Personal Robot System from Evolution Robotics comes with a lightweight aluminium frame, webcam, programmable software and various movable bits and bobs. It's perfect for enthusiasts and gadget lovers alike and an ideal way to put any old laptops to good use. Prices start at $500 (£312) and you can place international orders via www.evolution.com. Coffee anyone?

Synching feeling

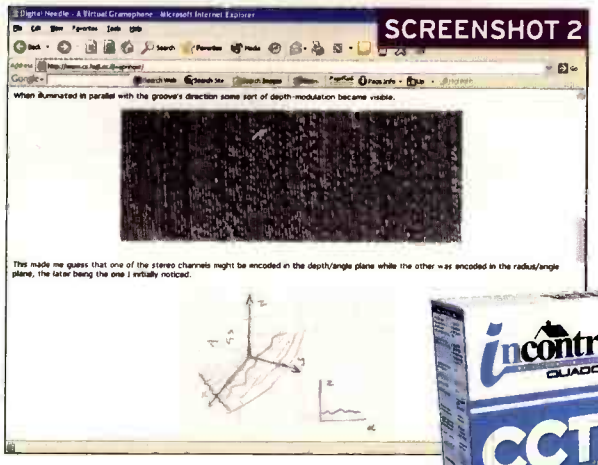
In days of yore, you might have noted the contact details of friends and colleagues in a pocket diary or paper organiser, like a Filofax. However, the times they are a-changing. According to figures from telecommunications regulator Oftel, 80 per cent of UK householders now possess a mobile phone and most owners rely on the electronic facility provided by their handset to store and retrieve acquaintances' telephone numbers, which is just dandy – until the phone is lost or stolen. Then it's panic time as you realise that your entire collection of contacts has gone the same way as the handset. Yes, your mobile phone contract might include handset insurance, and your airtime provider will obligingly disable the lost SIM and issue a replacement, but the collected names and numbers are gone forever.

However, it needn't be this way. Attach a device like the Chipy SIM Card Reader to your PC and you can use the computer's hard disk to back up all those important contacts-book entries. The unit connects via the serial port and accepts standard GSM-style SIM cards, while the supplied software handles the job of managing stored contacts. The Chipy SIM Card Reader (pictured below) costs £19.96 inc VAT from the mail-order division of bargain merchant Morgan Computers (0870 120 4930; www.morgancomputers.co.uk).

Follow-me MP3

It's common for computer-owning music fans to build vast collections of digital music files – MP3s, wavs and the like. If that sounds like you and you'd like to retain access to these audio delights when away from your main PC then you should consider installing Muse.net's Agent program. The Muse.net service is designed to allow real time access to both audio and video files stored on a remote computer. In other words, you can listen to your music

Use this Chipy SIM Card Reader to back up your mobile phonebook



Put the needle on the record – digitally

collection when you're working away from the desktop. To download a trial version of the software or to find out more about the service, surf on over to www.muse.net.

Put the (virtual) needle on

Got an old collection of vinyl LPs that you fancy converting to MP3 format? The traditional way to go about it would be to connect a turntable to your PC's sound card and use an audio-capture program to grab tracks as the disc plays. But why go to all that bother when you could simply use your scanner to capture a digital image of the record's grooves before applying a virtual needle to play them? No, we're not joking: point your web browser at www.cs.huji.ac.il/~springer and delight in Ofer Springer's super-geek programming project. The benevolent chap has made his Digital Needle source code available for download (see screenshot 2) so if you fancy building your own virtual turntable, the job's half done. Be sure to let us know how you get on!

Above and below: Watch your home via your PC with a motion-detecting security camera

Emulation station

When is a PC not a PC? When it's a Sinclair Spectrum, Commodore 64, Atari VCS, Gameboy, Playstation – or any one of 100 other computer platforms past and present that your mind might care to conjure up. That's the joy of emulation software: with the right software installed, your PC can play-act at being almost any make and model of computer or games system. The reason might be for pleasure, perhaps reliving a misspent youth by having your PC emulate a favourite 8bit computer platform, or more productive purposes – like running Mac applications on a PC, or vice versa. Either way, an emulator can make your PC do something that you never realised it was capable of doing. The Emu Unlim website (www.emuunlim.com) offers a list of emulator links and downloads sorted by platform, while Classic Gaming's Vault section (www.classicgaming.com/vault) has a vast database of old games and software titles for use with emulator programs.

Clocking on

Like the watch on your wrist, a computer's internal clock can lose a few seconds each day. Over weeks and months these time units can tot up, potentially making the Taskbar clock inaccurate by a margin of minutes. Windows XP users can offset this slide by having their operating system synchronise the computer's internal clock with an ultra-accurate atomic timepiece. To do this, right-click the Taskbar clock and select Adjust Date/Time from the context menu. Now choose the Internet Time tab from the Date and Time Properties dialogue box and tick the Automatically synchronise with an Internet time server box: the dropdown menu offers a choice of online services, should you feel the need to specify a preference. If you're not an XP user, you can still benefit from molecular-level time-keeping by downloading the Atomic Clock Sync program from www.worldtimeserver.com.

PC Plod

When you're away from home, your PC can be employed to keep an electronic eye on things. The Incontrol Quadcam (pictured left) connects to your computer using a USB socket and can subsequently be used to control up to four colour CCTV cameras, one of which is included in the £199.95 asking price. Passive infra-red sensors combine with microphones to keep a constant watch on the target area, with the supplied software kicking in to record any detected activity. Install the Incontrol Receiver program on another computer and you can even indulge in some remote surveillance. The Incontrol Quadcam system is available from Digital Cybermasters (01892 730 999; www.digital-cybermasters.co.uk).

Along the same lines is the Veo Wireless Observer (pictured below left), an all-in-one movement-detecting webcam that connects to the host computer cordlessly, so it can be positioned anywhere with ease. Due for release in the UK around about the time you read this, you can find out more about the £139.99 Veo Wireless Observer at www.veo.com.

The PC TV VCR

Using a PC as a TV is nothing new, but how about turning your hard disk into a digital video recorder? With an add-on like the PCTV Deluxe from Pinnacle (pictured below), you can do just that. The £169 box of tricks taps into a USB socket and adds not only television reception to a computer, but also the ability to record programmes in mpeg1 or 2 formats. Moreover, the PCTV Vision software allows live broadcasts to be paused, while the hard disk continues picking up the slack. More information is available from Pinnacle Systems on 01895 442 003, or visit the company's website at www.pinnaclesys.com.

Double vision

Bought a 42in plasma display and still craving more space on the Windows desktop? Well, you could always install an additional monitor or two – or nine. Later versions of Windows (98 onwards) include support for outputting the display to multiple monitors, with Windows XP able to control up to 10 screens. You'll need to fit an additional graphics card for each monitor you wish to set up, or install a graphics card with built-in multi-monitor support. For example, the new Millennium P750 card (pictured overleaf) (£173 ex VAT from Matrox, 01753 665 544; www.shopmatrox.com), has

Record TV onto PC or DVD using the PCTV from Pinnacle

Left: The Matrox Millennium P750 can output its graphics to multiple monitors

Right: Phone the world at a discount with Net2phone

the ability to split its graphical goodness between up to three monitors at once (or two monitors and a television).

Silent running

As computer processors get quicker, they generate more heat – heat that needs to be dissipated. The industry's main response to this problem is to equip computer chips and cases with fans: lots of big, noisy fans. Couple the whirring of these coolers with the clicks and clatters emitted by a PC's hard disk and other drives and it adds up to a cacophony. If this din is driving you to distraction, then it's time to look for a silencing solution – like the Hush Kit from noise-reduction specialist Quiet PC (0870 321 4620; www.quietpc.com). The £128.08 inc VAT AMD/PIII package (pictured below) comprises five components specifically designed to dampen the din coming from within and includes a whisper-quiet 300w replacement power supply unit and Silentdrive, an acoustic enclosure for the hard disk. The same firm also sells the £116.33 inc VAT Acousticase, a PC case constructed with noise-attenuating foam and steel.

Phone home.com

During the heady days of the dot com boom there was a lot of hype about 'Internet telephony': essentially, employing the infrastructure of the web as a low-cost transport for voice calls, with computers acting as transceivers. Several years on you'd be forgiven for thinking that hype was all it ever was. However, not only is the idea of using a PC to make telephone calls alive and kicking – it's thriving. Net2phone was a pioneer of the technology (see screenshot 3) and the company's PC2phone software remains one of the simplest Internet telephony applications around. If your computer is equipped with speakers, microphone and a speedy net connection then download the program from www.net2phone.com and start saving money on international phone calls.

Bottom left: Shhh... silence your computer with Quiet PC's Hush Kit

Get the message

The use of instant-messaging applications is fast growing among the online community, but few users explore or appreciate the more advanced aspects of the technology. Microsoft's Messenger client, for example, can be used for a whole lot more than simple text chat: open the Actions menu and select Start Application Sharing, and you'll be able to work collaboratively using your favourite software programs. Alternatively, use the Whiteboard function to draw silly pictures that'll appear instantaneously on your Messenger-using mate's machine.

To leave a message, left-click once

Far be it from us to promote the proliferation of those infuriating automated telephone switchboards, but if you run a small enterprise, a program like EZVoice ($18.50 from www.internetsoftsolution.com) could help you maintain a professional front on demanding days. Essentially a high-tech answerphone, EZVoice uses a PC's hard disk to record incoming calls that you're unable, or unwilling, to answer. The voice-mailbox feature can be used to direct calls to any one of up to 10 slots. Your PC will need to be equipped with a voice modem in order to make use of the program.

People power

Carry out a time and motion study on your computer use and, chances are, you'll discover that your PC spends much of its life idle. The simple fact is that most of the time a PC is switched on, it uses only a fraction of its computing potential, because common tasks, such as word-processing and Internet activities, are not processor-intensive operations. This processing surplus can be put to good use by joining a so-called distributed-computing effort, such as the Search for Extra Terrestrial Intelligence's seti@home project. Download the seti@home program from http://setiathome.ssl.berkeley.edu and your home PC can lend a helping hand in the hunt for life beyond our planet. If you'd prefer more down-to-earth use of distributed-computing power, perhaps even exploiting idle time on your office network for other business purposes, then visit the United Devices home page (www.ud.com) for more information.

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"Solid performance and excellent component quality throughout" — Computer Shopper - Mar 2002

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	Home PC	Pro PC	Evo PC	Elite PC	CUBE PC
Motherboard	ASUS A7N266-VM	Giagabyte GA7VA	Gigabyte 8PE800	MSI K7N2 Delta, NFORCE2	
Memory	256 MB DDR PC2100	256 MB DDR PC2100	256 MB DDR PC2100	512 MB (2 x 256MB) DDR PC2700	
Hard Drive	40 GB UDMA 100 7200 RPM	40 GB UDMA 100 7200 RPM	40 GB UDMA 100 7200 RPM	80 GB UDMA 100 7200 RPM	
Graphics	GeForce2 Graphics (nForce Chipset)	64MB GeForce4 MX440, TV-OUT	64MB GeForce4 MX440, TV-OUT	128MB GeForceFX 5200, 8x,TV-OUT, DVI	
Multimedia	16x DVD-ROM Drive	16x DVD-ROM Drive	16x DVD-ROM Drive	16x DVD-ROM Drive	
CD-RW	Option Available	52x24x52 CD-ReWriter (BurnProof)	52x24x52 CD-ReWriter (BurnProof)	52x24x52 CD-ReWriter (BurnProof)	
Sound	Dolb Digital Sound O/B	6 Channel Sound	6 Channel Sound	6 Channel Sound	
Modem	56K v.92 Modem & 10/100 Network Card	56K v.92 Modem	56K v.92 Modem	56K v.92 Modem & 10/100 Network Card	
Monitor	17" SVGA Colour Monitor	17" SVGA Colour Monitor	17" SVGA Colour Monitor	17" SVGA Colour Monitor	
Speakers	Desktop Speakers Keyboard & Mouse	Subwoofer & 2 Satellites Keyboard & Mouse	Subwoofer & 2 Satellites Keyboard & Mouse	Creative 5.1 Inspire 5300 Keyboard & Mouse	
Extras	4 USB Ports 3.5" Floppy Disk Drive	6 USB (4 USB2.0) Ports 3.5" Floppy Disk Drive	6 USB (4 USB2.0) Ports 3.5" Floppy Disk Drive	4 USB2.0 Ports, Firewire, 3.5" Floppy Disk Drive	Aluminium CUBE Chassis 256MB PC2100 DDR 40GB 7200RPM HDD 3D Graphics 6 Channel Sound 16x DVD-ROM and 48x CD-RW COMBO Drive 3.5" Floppy Drive 10/100 Network Card 4 USB2.0 Ports 2 1394 Firewire Ports
Warranty	12 Months RTB Warranty	12 Months RTB Warranty	12 Months RTB Warranty	12 Months RTB Warranty	
All Prices include VAT	AMD Athlon 2000+XP £330	AMD Athlon 2400+XP £435 inc VAT AMD Athlon 2600+XP £455 inc VAT	Pentium 4 2.66GHz £540 inc VAT Pentium 4 2.8GHz £595 inc VAT	AMD Athlon 2600+XP £640 inc VAT AMD Athlon 2800+XP £705 inc VAT	AMD Athlon 2400+XP £430 inc VAT Pentium 4 2.66GHz £550 inc VAT

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- Upgd to 15" TFT Monitor £125
- Upgd to 17" TFT Monitor £255
- Upgd 256MB to 512MB DDR £25
- Upgd 40GB to 80GB (7200 PRM) £15
- Upgd MX440 to GF FX 5200, 128MB £92
- Upgd MX440 to ATI 9700 PRO,128MB £203
- Add Windows XP-Home £70
- *For other upgrades visit website*

For a large selection of Components visit website

Pro Book	Evo Book	Elite Book
14.1" XGA TFT Colour Screen	15" XGA TFT Colour Screen	15" SXGA + TFT Colour Screen
256MB DDR Memory	256MB DDR Memory	512MB DDR Memory
30GB Hard Drive	30GB Hard Drive	40GB Hard Drive
DVD-ROM Drive	DVD-ROM & CD-Rewriter COMBO	DVD-ROM & CD-Rewriter COMBO
56k Fax Modem	56k Fax Modem	56k Fax Modem
10/100 LAN Card	10/100 LAN Card	10/100 LAN Card
8MB to 64MB Shared Graphics	8MB to 64MB Shared Graphics	ATI M9 Radeon Graphics
IEEE1394 Firewire	IEEE1394 Firewire	IEEE1394 Firewire
2 USB2.0 Ports	2 USB2.0 Ports	4 USB2.0 Ports
PCMCIA Type II Slot	PCMCIA Type II Slot	PCMCIA Type II Slot
3.5î Floppy Drive	3.5î Floppy Drive	Infra Red Port
Infra Red Port	Infra Red Port	TV OUT Port, Smart Li-Ion Battery
TV OUT Port, Smart Li-Ion Battery	TV OUT Port, Smart Li-Ion Battery	12 Months RTB Warranty
12 Months RTB Warranty	12 Months RTB Warranty	
Intel Celeron 2GHz £660 inc VAT	Intel Celeron 2.4GHz £790 inc VAT	Pentium 4 2.66GHz £1125 inc VAT
Pentium 4 2.66GHz £750 inc VAT	Pentium 4 2.66GHz £840 inc VAT	Pentium 4 2.8GHz £1275 inc VAT

NOTEBOOK UPGRADES

- Uprd to DVD-ROM and CD-RW COMBO £32
- Upgrade 256MB to 512MB DDR £39
- Upgd 30GB to 40GB Hard Drive £19
- Upgd 30GB to 60GB Hard Drive £76
- Add Windows XP-Home £70
- Add Carry Case £17

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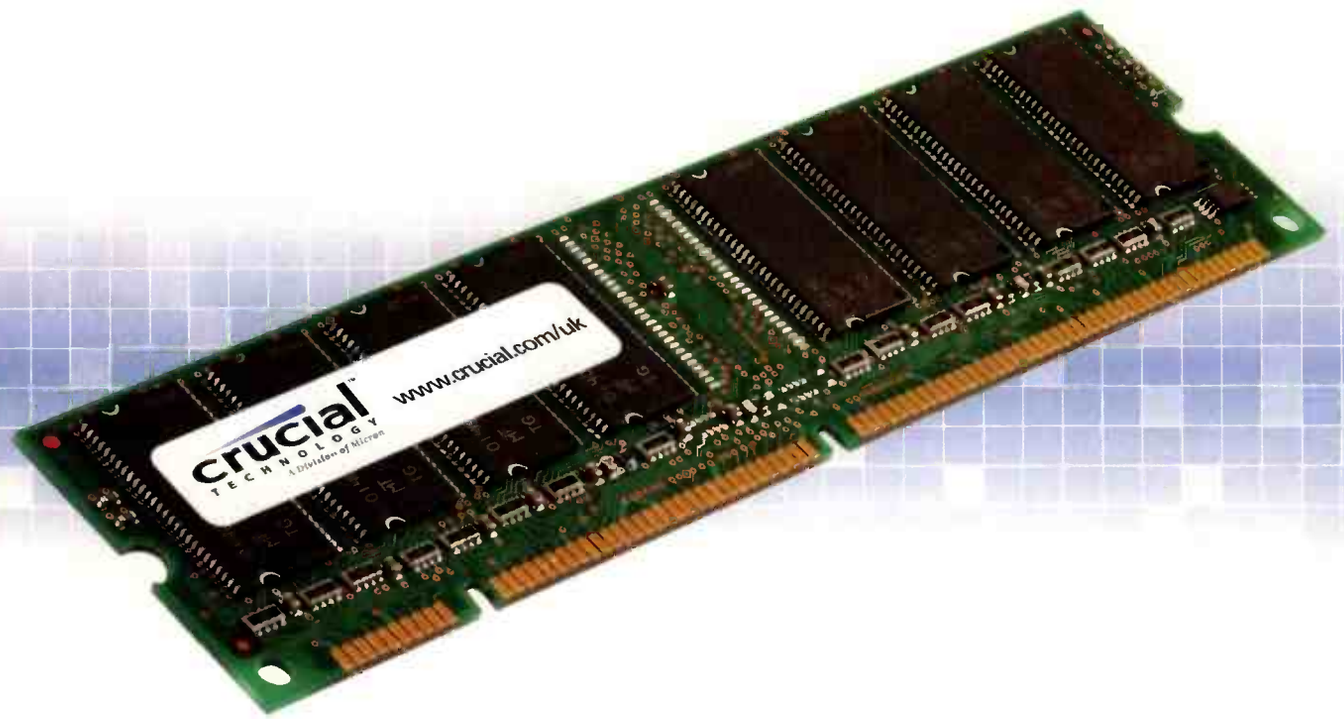

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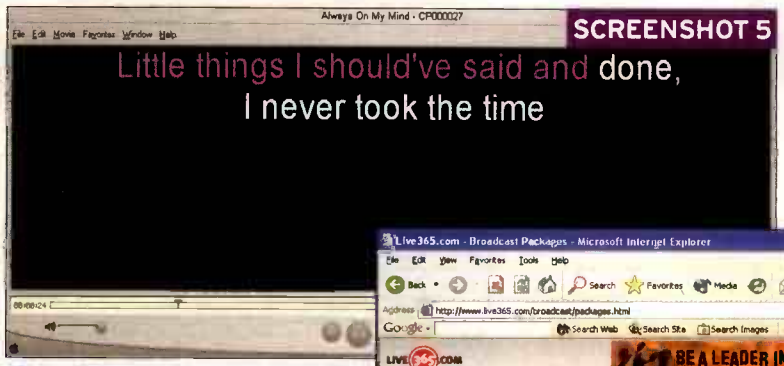
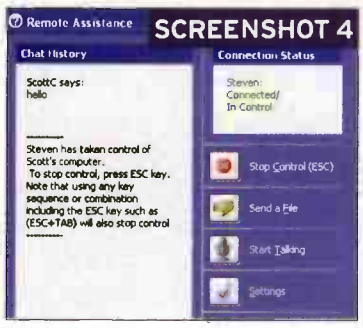




Remote control

Owners of Windows XP-based PCs can use the operating system's Remote Assistance feature to grab the reins of another XP user's computer (see screenshot 4). This can be useful for problem solving at a distance, or explored simply for a bit of fun. While the function works best over a broadband Internet connection, even dial-up modem users can take control of a friend or colleague's machine. To begin, open the Windows XP Help and Support Center (by clicking Help and Support within the Start menu) and then choose the 'Invite a friend to connect to your computer with Remote Assistance' option. Now follow the operating system's prompts to get connected to the remote machine. (Note that in order to make use of Remote Assistance, both parties must have Microsoft's Windows Messenger program installed or be using a Mapi-compliant email system, such as Outlook.) Once the marriage is made, click Take Control to assume charge of the distant user's computer: an image of their Windows XP desktop will be displayed on your local machine. Every action you make with the mouse and/or keyboard will be carried out in real time on the remote PC.

Top: Sing while you work. Turn your PC into a karaoke machine

Right: Set up your own radio station with Live365

Left: Solve a buddy's PC woes using Windows XP's Remote Assistance

Karaoke craziness

Ever felt the need to sing *Feelings* or *Rhinestone Cowboy* out loud and out of tune but couldn't remember all the words? Now, with a few clicks of your mouse, you can become a karaoke king or queen using your computer. Chances are, you already own all the hardware and software you need. Visit the Computer Karaoke homepage (**www.computer-karaoke.com**) for the full lowdown and prepare to sing and dance every night with the hula melody (see screenshot 5).

Radio ga-ga

When Guglielmo Marconi conducted his first experiements with wireless telegraphy, he could have had scarce idea what impact his findings would have more than a century later. In this era of digital audio broadcasting (DAB), radio listeners can choose to tune into any one of dozens of nationally available channels using a dedicated DAB receiver or via a cable/satellite set-top box. Alternatively, you might decide to tune a virtual dial by using your web browser to listen to the latest digital radio stations. Visit the Digital Radio Now website at **www.digitalradionow.com** to check the current line-up of DAB stations, along with links to the relevant broadcast web pages.

Those with an urge to drive a desk might want to consider setting up a radio station of their own. Surf on over to **www.live365.com** (see screenshot 6) and click the Broadcast tab, followed by the Personal Services icon. The Live365's net-radio-broadcast service is free to try for 14 days, following which a monthly subscription of $4.95 is payable for continued use of the basic broadcasting features.

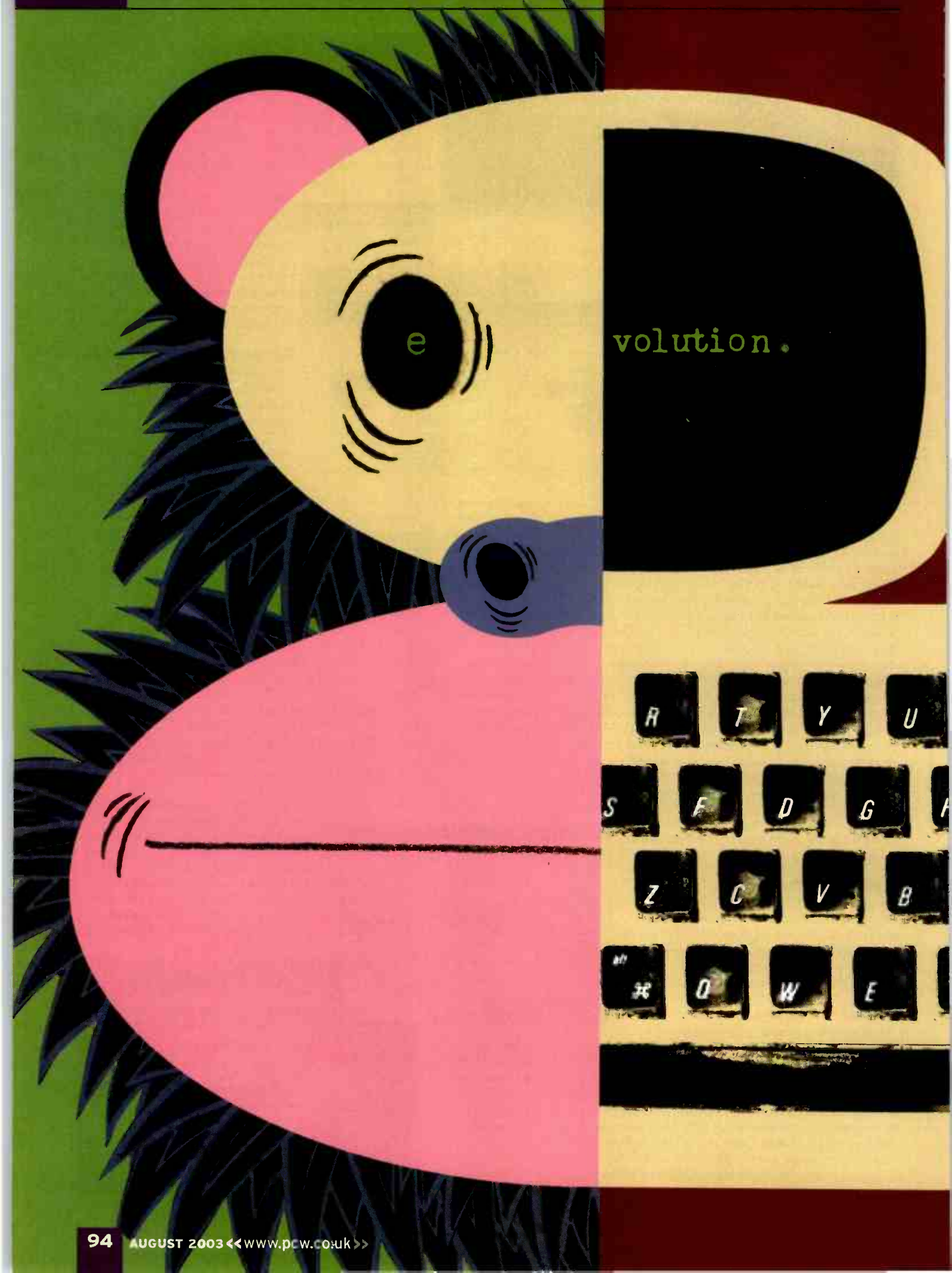
CD or DVD – you decide

While the DVD format is busy conquering the world of home entertainment, many computer users dream of being able to create DVD movie discs. Sadly though, at the moment, cost probably conspires against the desire, with prices for even the cheapest DVD writer drives hovering around the £150-200 mark – and that's before you've bought any media. The good news is that if your PC is kitted out with a CD-writer drive, as most are these days, you can use it to burn discs that can be played in standard DVD players.

Most CD-burning software programs are tooled up to make Video CD (VCD) discs – literally, compact discs that contain video files rather than audio – and this is a format that is acceptable to most modern domestic DVD players. However, there are a couple of downsides. First, playback of VCD-format video is not on a par with that of DVD, as files are encoded in mpeg1, not mpeg2 (think VHS quality rather than the refined images usually associated with digital video discs). Second, a CD has space enough to store little over 70 minutes of video – a lot less than a DVD disc. A more advanced version of Video CD – Super VCD, or SVCD – relies on mpeg2 encoding, addressing the quality issue, but this reduces recording time by around a half.

So, if you fancy using cheap CD media to make DVD-playable discs, fire up your burning software. We're not about to teach you how to suck eggs but, in case you were unaware of the VCD function, in Nero Burning Rom the option resides within the 'Other CD formats' section, while in Easy CD Creator the 'Make a photo or Video CD' button leads the way (see screenshots 7 and 8).

Popular disc-burning software can write Video CDs that will work in most DVD players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What do you think?
Have your say in the innovation-imitation debate.
Vote on our website at www.pcw.co.uk/debate

Innovation or imitation?

WORDS: NIK RAWLINSON, ALEX KEFFORD AND GORDON LAING ILLUSTRATION: BRETT RYDER

We address the vexing question of whether the past 20 years of the PC have been filled with innovation or if imitation has been the name of the game

Arguably the most innovative period in British computing history was the Second World War. Hitler and Churchill were too evenly matched for comfort. Nazi Germany had occupied much of Europe, while Britain tried to work out what its enemy's next move might be. It was not at all clear that brute force alone would be enough to win the war.

Fortunately, computing power came to the rescue. Dozens of the nation's brightest minds worked day and night in the huts of Bletchley Park to produce the computers that would break the German codes and help the Allies to win the war. But these computers were nothing like the ones we use today. They had valves and moving parts, not silicon chips and flat-panel displays.

At the end of the war, though, rather than build on what it had produced, the British government ordered that the computers be destroyed.

It could be argued that the heyday of modern computing was the 1980s. It was the age of miniaturisation, falling costs, standardisation, and compatibility was the watchword. But was it as good as we make out? Was everyone inventing new products and ways of doing things, or merely copying what had been done before?

What about the past 20 years? Has it been an age of innovation, or merely imitation? Alex Kefford, who has been creating professional websites for a decade, argues that imitation has been the watchword. However Gordon Laing, *PCW*'s Hardware expert and columnist, says there has been plenty of innovation. Read on to find out why Alex and Gordon have such opposing views, and then go to our website and tell us what you think.

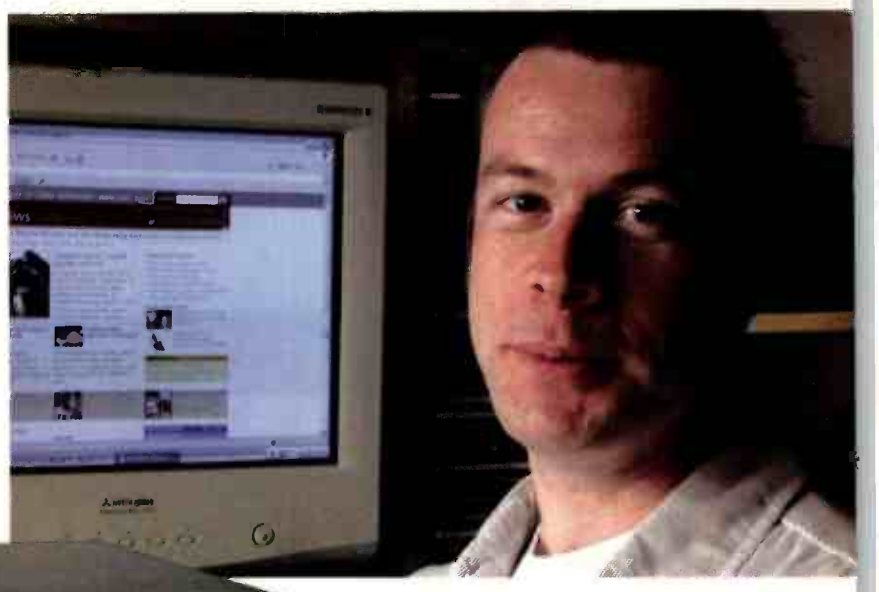
Imitation is king

In 1981, a mainframe manufacturer launched a new computer, a machine so successful it killed off the inventive spirit of the generation. Technologically speaking, it wasn't particularly advanced, but somehow it has been the basis of personal computing ever since. We know it today as the IBM PC, but back then it was merely a cheap way to provide computing power to businesses across the globe.

From that day on, the industry has done little but concentrate its efforts on refining the original design. Sure, clock speeds have been cranked up a notch or two, but the watchword has been evolution, not revolution.

The justification for this evolutionary path has been that of compatibility. Our PCs are saddled with compromises to maintain compatibility with the original; we still have the same basic motherboard layout, the same processor instruction set and operating systems that contain lines of code old enough to vote.

Assuming you could find a copy, it would still be possible to run an early version of MS-Dos on your brand-new, 3GHz PC. Even keyboard design has remained largely unchanged since the 102-key layout debuted with the IBM AT in 1984, and the reason the Office Paperclip springs to life when you hit F1 is no more logical than the fact that Lotus 1-2-3 used the same key for help way back in 1982. But do we really need that level of legacy compatibility, or has the industry simply become too frightened to innovate for fear of losing market share?



Alex Kefford believes there is no innovation these days, only 'evolution in the face of competition'

Left: The original IBM PC was launched in 1981

During the 1980s, colourful characters such as Clive Sinclair and Alan Sugar were busily bashing away at the home market, and in the process making computers available to everyone. In the great scheme of things, these weren't large companies, and they certainly didn't dominate the market like Intel, Microsoft and the other modern-day giants do now. Yet they were still able to lead the IT industry in new and exciting directions with compelling and innovative products. More importantly, though, they were keen to take risks.

In 1986, Amstrad's newly launched 1512 brought a fully featured PC within the reach of the average consumer. It wasn't especially compatible with anything that went before it – the graphics system was riddled with non-standard modes, some of the ports were proprietary and it was bundled with a previously unheard-of graphical user interface called Gem – but it was a runaway success, capturing 25 per cent of the European market. The scene was set: PCs soon became a commodity developed by companies with more than a passing interest in the bottom line.

The fastest way to market is to use existing products as the basis for development, and today our PCs are assembled from a range of generic components, each one an evolution of its predecessor.

Take AMD's latest processor, the Opteron. Designed to bring 64bit computing to the enterprise and workstation markets, the 'breakthrough architecture' of which AMD is so proud is, in fact, an extension of the same x86 instruction set we've been using for over 20 years. Indeed, the Opteron chip is itself just an evolution of its predecessor, the Athlon.

The Amstrad 1512 was a huge success all over Europe

What passes for innovation these days is nothing more than evolution in the face of competition. Marketing departments square up to each other and try to knock their opponents out of the market in the IT-equivalent of Sumo wrestling. Intel and AMD are busy racing each other to the next highest clock speed, while ATI and Nvidia are nailing texture buffers and wider pipelines onto their graphics chips like there's no tomorrow. Which, of course, there isn't, because tomorrow's hardware will be the same as today's but with more bandwidth and higher frequencies.

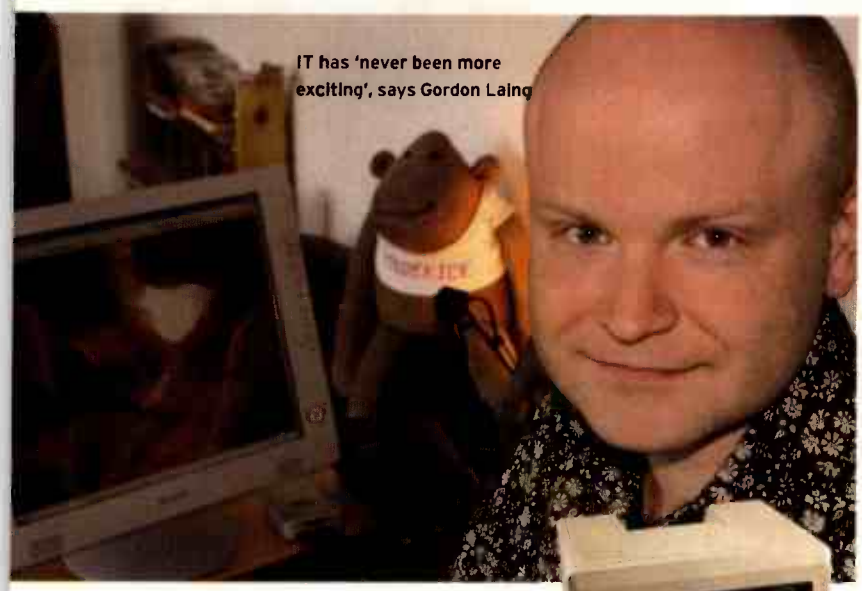
We'll be using our PCs in the same way, too. Windows XP's assortment of buttons, scrollbars and pulldown menus is still based largely on research conducted at Xerox Parc in the 1970s. Spreadsheets and word processors, the cornerstones of modern software, have remained almost unchanged since their initial introduction to the world. Even with a new version of Microsoft Office just around the corner, it's unlikely we're going to see an innovative variation of the paper or grid metaphors. Shouldn't we have moved on?

A truly innovative approach would be to produce a user interface people would actually want to use. While the wild gesticulations of Tom Cruise in *Minority Report* might not be the style of computer interaction we'd want in our homes and offices, it points towards an alternative method of communicating with our silicon friends.

In the absence of any real innovation, our computing experience hasn't become any more enjoyable or more productive. Can you achieve more in your day because your PDA can synchronise with your PC and mobile phone, or does it merely allow you to carry the problem around with you?

It's time the industry produced innovative solutions to the problems we all face every day. The old idiom of 'if it ain't broke, don't fix it' has applied for too long.

Alex Kefford

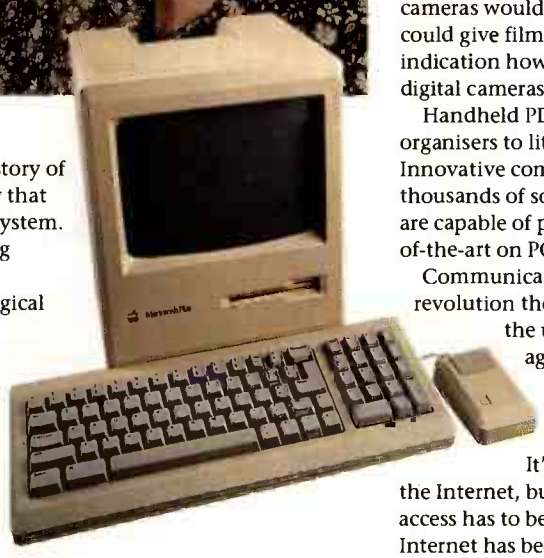


IT has 'never been more exciting', says Gordon Laing

Innovation is everywhere

The 1980s were a unique period in the history of computing, when rarely a month went by that didn't see the launch of a new computer system. Products from eccentric inventors working almost single-handedly went up against established corporate giants in a technological free-for-all.

While this IT melting pot was undoubtedly an exciting time packed with original ideas, they all had one major downfall: virtually every computer of the 1980s was incompatible with what came before it and had no intention of talking to anything else. Then the IBM PC AT came along and changed everything.



1984's Apple Mac popularised 'point-and-click' concepts

The IBM PC is the best thing that happened to the computer industry simply because over time the entire world adopted it. Sure you can argue alternative platforms had superior usability or better facilities at some point, but the fact is standards need to be adopted to enjoy the greatest innovation and subsequent competition. Far from killing off the inventive spirit, standardising on the PC allowed the world's greatest developers to concentrate on a single platform rather than spreading themselves thin.

Backwards-compatibility may be necessary to justify the greatest investment in software and peripheral development, but that's not to say PC processors are simply accelerated versions of their predecessors. They may still have x86-compatibility at heart, but are massively enhanced by subsequent technologies, including rafts of new instructions that deliver unparalleled multimedia performance. If we're talking raw clock speeds though, it's worth remembering processors have increased not just by a notch or two, but an enormous 300 times over the last 20 years.

When cynics argue we don't need this level of performance to run popular Office applications, they're absolutely missing the point. Ten years ago, Office applications were about the only things we had the power to run, whereas today it's easy to take for granted what we have at our fingertips: broadcast-level digital video editing, professional DVD creation, realtime photo-realistic 3D graphics and multi-channel audiophile-quality surround sound are all possible thanks to the continued innovation and development of the PC platform. And best of all, they all come as standard on systems which in relative terms have never been more affordable.

Modern operating systems may still use the same basic point-and-click concepts first popularised by the Apple Mac in 1984, but they've enjoyed considerable advancements since then. Processing power has now reached a point where modern PCs can recognise both handwriting and voice input, while realtime facial and gesture recognition is expected in as little as three years.

Indeed the same revolutionary neural and statistical networking advances behind facial recognition can be used to learn how we feel and even predict health issues. When your computer understands what you say and how you're feeling, it's impossible to say there's no innovation or justification for increasingly powerful processors.

As the PC has evolved so has everything around it. Who would have thought that in just a few years digital cameras would grow from toys to serious products that could give film a run for its money? Indeed, it's an indication how far they've gone that this year sales of digital cameras will overtake those of film models.

Handheld PDAs have evolved from primitive personal organisers to literally all-singing multimedia platforms. Innovative compression techniques now allow us to carry thousands of songs in our pockets. Even mobile phones are capable of playing games which were considered state-of-the-art on PCs less than a decade ago.

Communications have gone through the greatest revolution though, and we're not even going to mention the ubiquitous adoption of mobiles. Ten years ago the Internet was hardly heard of outside academic or technical environments. A decade later it has influenced billions of lives, revolutionising work and play.

It's impossible to pick just one highlight of the Internet, but delivering services to those with limited access has to be one of its greatest achievements. The Internet has become a lifeline for many. And if that ain't progress, I don't know what is.

Who'd have thought that the old copper wires that connect our creaky analogue telephones could be adapted to carry high-speed broadband Internet services? And you can't talk about innovation without mentioning wireless communications. Broadband and wireless networking is a match made in techno-heaven, allowing businesses to make the most of their resources, and homes to share printers and Internet connections without trailing wires. Rather than this technology tying us down, it has set us free.

Far from becoming stale, the IT industry has never been more exciting, nor packed with greater innovation. An astounding degree of development has led to revolution in what we can now achieve. Innovations in the IT industry touch our entire lives on a daily basis. It would be an almost inconceivable world without them.

Gordon Laing

Handheld PDAs have evolved into multimedia platforms

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The inch loss plan

WORDS: EMILIE MARTIN **TESTING:** VNU LABS **PHOTOS:** BRUCE MACKIE

If your desk is overrun with clutter, a smaller PC might be the solution. We put nine of today's best space-saving systems to the test

Liberate your desktop. Banish that CRT monitor. Rid yourself of cumbersome system towers and become reacquainted with inches of workspace that have not seen daylight for many years.

Sound appealing? If your workstation or home office could do with a healthy dose of minimalism and you hanker after a compact solution to your computing needs then this is the group test for you. This month we have rounded up nine of the best space-saving systems that money can buy and put them through their paces to help you clear computing clutter from your life.

We set no price limit or minimum technical specification for manufacturers participating in this group, just the instruction that the systems must be space efficient. The results are pleasingly varied in terms of features, specifications, design and price, so there should be something for everyone with limited desk space.

An Apple system goes head to head with eight PCs, two of which feature Athlon processors and six with Pentium 4s under the bonnet, along with three all-in-one systems and one home entertainment solution. There are two widescreen displays featured and one system boasts a clock speed dial to adjust the rate at which the processor runs.

All these varied systems have one thing in common: the promise that they will help you make better use of the space available to you. What you choose to do with these extra inches is, of course, entirely up to you.

Advent 3616 Ultra

Advent is one of only two manufacturers this month to have submitted a system built around an Athlon processor, in this case an Athlon 3200+ chip with a clock speed of 2.19GHz.

This is mounted on an MSI motherboard featuring an Nvidia Nforce2 chipset. Only one of the two Dimm slots is occupied with a 512MB stick of DDR SD-Ram memory, so you could add a 1GB module to ramp up system memory to 1.5GB in this configuration. An Nvidia Geforce FX5200 Ultra graphics card sits in the AGP slot and just below this two of the three PCI slots are unoccupied, leaving decent room for expansion. A modem card with two RJ-11 ports coming off the backplate sits in the third.

At the front of the system are two optical drive bays, both of which are occupied: one houses a 16-speed MSI DVD-Rom drive while the second houses an LG DVD-RW/CD-RW. A huge 200GB hard drive sits in one of the four 3.5in drive bays, another of which holds a floppy disk drive.

All of this comes in a smaller than usual system case, which nonetheless looms over the tiny system boxes submitted by the likes of Evesham and Mesh.

System performance was good with an overall Sysmark score of 234, breaking down to give individual scores of 329 and 167 in our Internet content creation and office productivity tests respectively. In 3Dmark, the Advent gained a score of 9,838 and managed 59.5fps (frames per second) in Unreal Tournament.

Advent supplies a Samsung Syncmaster 172W LCD with this system, which has a maximum viewable diagonal of 17in and a widescreen aspect ratio of 16:9 rather than the normal 4:3. There are sockets for both analogue and digital signal input and the display area is highly manoeuvrable – you can tilt the screen back considerably as well as adjust its height above the surface of the desk.

DETAILS

PRICE £1,599 (£1,361 ex VAT)
CONTACT PC World
08705 464 464
www.pcworld.co.uk
PROS Highly manoeuvrable widescreen monitor; DVD and CD recording capability; good upgrade potential
CONS That bulky system case occupies a considerable amount of desktop space
VERDICT
A well-specified PC that failed to shine and lacks the space efficiency of other systems

FEATURES	★★★☆☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★☆☆☆
OVERALL	★★☆☆☆

AJP NeoPC 4-17

AJP is one of three manufacturers this month to have submitted an all-in-one system. The guts of the NeoPC 4-17, which include a Pentium 4 2.8GHz processor and 120GB Western Digital Caviar hard drive, are housed in the unit's base section, onto which a silver LCD display unit with a 17in viewable diagonal is mounted.

At first glance screen manoeuvrability is not great, with the display tilting just 15 degrees, but the system is mounted on a revolving base plate so you can swivel the PC through 270 degrees.

The screen offers good image quality with wide viewing angles, but other than a brightness control dial there are no screen controls, so just the resolution and colour depth settings in Windows' display properties control panel are at your disposal. A volume control dial for the two speakers is built into the base of the unit, and a PC Card slot is below with room for two Type II cards or one Type III.

The PC's other storage devices include a floppy disk drive and a CD-RW/DVD-Rom combo drive.

The two Dimm slots on the bespoke motherboard house two 256MB modules of DDR SD-Ram memory, 64MB of which is shared with the Sis M650 onboard graphics chip.

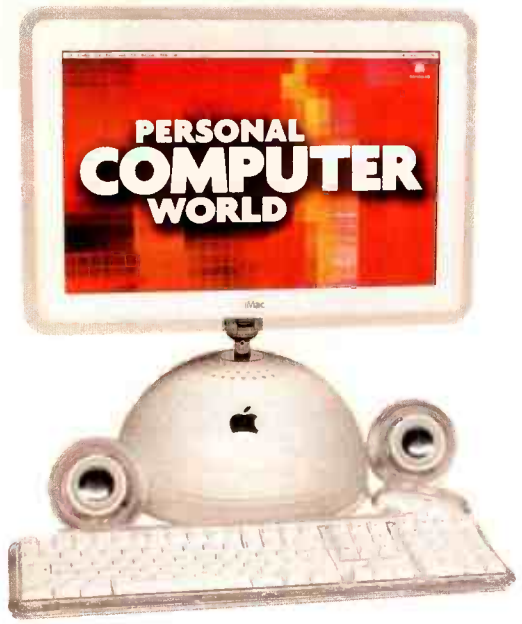
System performance was lacklustre with an overall score of 224 in Sysmark and the onboard graphics meant the AJP notched up just 1,126 in 3Dmark and 11fps in Unreal Tournament.

With a 395 x 180mm footprint the NeoPC 4-17 is a compact unit but features a good range of connectivity with four USB2, a Firewire port and serial, parallel and VGA sockets. There is also a modem with a pass-through port and a separate Lan connection, as well as audio mini jacks. A Microsoft multimedia wireless keyboard and optical scroll mouse are included with a copy of Windows XP Professional.

DETAILS

PRICE £1,462.88 (£1,245 ex VAT)
CONTACT AJP
020 8208 9744
www.ajp.co.uk
PROS Compact all-in-one design; good unit manoeuvrability; PC Card slot; Windows XP Professional
CONS System performance failed to impress; very limited display area controls
VERDICT **One of the most compact systems in this group, but fell down on system performance**

FEATURES	★★★★☆
PERFORMANCE	★☆☆☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆



Apple Imac 17in Superdrive

When it comes to conserving desktop space, fewer systems are more efficient than Apple's Imac 17in Superdrive. The system case has a 10.6in diameter base, keeping the footprint down, and a bespoke circular motherboard on which a 1GHz Motorola PowerPC G4 processor sits.

While the clock speed of this CPU may sound puny compared to AMD and Intel processors, Motorola chips are designed to perform at about the same speed as a Pentium 4 clocked twice as fast. As our benchmark tests are incompatible with Apple systems, it is impossible to make direct performance comparisons, but on paper, at least, the Nvidia Geforce4 MX440 graphics card with AGP 4x compares well to the graphics processing units featured in other systems on test.

The 80GB Maxtor hard drive is larger than those provided with the ECS or Fujitsu-Siemens machines, although the 256MB of system memory, arranged as a single module in one of the two Dimm slots, will seem small to a PC user. In this configuration you could increase this to 768MB by adding a 512MB stick.

The Apple Superdrive offers CD-RW speeds of 16-speed write, eight-speed rewrite and 32-speed read, along with four-speed DVD writing and eight-speed DVD reading functions.

Aside from the Superdrive's sleek design, its most desirable external feature is a highly manoeuvrable 17in widescreen LCD with a maximum resolution of 1,440 x 900.

At the rear of the unit there are two Firewire ports and three USB1 ports to supplement the two USB1 ports integrated into the matching Apple keyboard. There is a single modem socket as well as a Lan connector and headphone, audio line-in and line-out mini jack sockets.

This system runs Mac OS X as its operating system, which incorporates a number of useful components.

DETAILS

PRICE £1,449 (£1,233.19 ex VAT)
CONTACT Apple 0800 039 1010
www.apple.com/ukstore
PROS Great design that conserves space and looks fantastic; highly manoeuvrable 17in widescreen display area
CONS Features only 256MB of system memory; the USB ports are version 1 only
VERDICT
Very easy on the eye but there are more substantial offerings with a greater range of features on test here

FEATURES	★★★★☆
PERFORMANCE	**N/A**
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

ECS EZ-Buddie

At first glance you would be forgiven for mistaking the silver ECS case for a hi-fi system, with its LED icon screen and CPU clock speed dial that lets you alter the speed at which the CPU runs. A section of the plastic strip running down the side of the front panel opens to reveal a USB2 port and two mini jack sockets. A second flap conceals a four-in-one memory card reader compatible with Memory Stick, Secure Digital (SD), Compact Flash (CF) and Smart Media formats and the Artec DVD/CD-Rom drive pops out from behind a third when you press the eject button below.

Inside the case, a 2.4GHz Pentium 4 processor sits on an ECS motherboard that features a single PCI slot housing a TV tuner card, also by ECS. An ECS graphics card based on the Xabre 200 chipset sits in the AGP slot while a 60GB Seagate hard disk drive sits in one of the 3.5in bays, and two 256MB modules of DDR SD-Ram system memory occupy both Dimm slots.

The ECS trailed the rest of the competition in Sysmark with an overall score of 210, but did better in our graphics tests, achieving 5,826 in 3Dmark and 23fps in Unreal Tournament.

At the rear of the case are a further four USB2 ports along with two PS/2 slots, a serial port, two VGA ports and a parallel port. All the sockets you would expect to find on the back of a TV tuner card are present but, while there is a Lan port, there is no modem port or modem card – a problem if you don't have ADSL or a cable connection.

The EZ-Buddie ships with a 17in ECS LCD panel with six function buttons arranged down the right-hand side of the bezel. A wireless silver A4 Tech scroll mouse, matching wireless keyboard with a selection of multimedia and Internet controls and hot keys, and an ECS remote control are also included.

DETAILS

PRICE £927.08 (£789 ex VAT)
CONTACT Multivision
0870 066 0885
www.ecs.com.tw
PROS Compact system case; variable clock speed dial; TV tuner card; four-in-one memory card reader
CONS No DVD or CD writing capability; hard disk is a little small; no modem
VERDICT
Not the most powerful system on test here but offers good value with a price under £1,000

FEATURES	★★☆☆☆
PERFORMANCE	★☆☆☆☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★☆☆

Evesham E-Style 2.66

Evesham's system this month comprises a small form factor system case and separate LCD flat-panel monitor from LG with a 17in viewable diagonal. The case takes up just 200 x 300mm of desk space – less than this page – with a light blue transparent fascia covering the front panel.

Set into this fascia is an S/PDIF-in port, microphone and headphone mini jack sockets, two USB2 ports and a Firewire port. Two further Firewire ports and two more USB2 ports are at the rear of the system along with another S/PDIF-in socket, two VGA and a DVI port, two serial ports and the usual mini jack sockets. A modem with a pass-through port and a separate Lan connection are also present.

Inside the Shuttle case is a Shuttle FS51 small form factor motherboard on which a 2.6GHz Pentium 4 processor is mounted. The AGP slot is home to a Radeon 9600 Pro graphics card while the single PCI slot houses the modem card. A total of 512MB of DDR SD-Ram memory sits across the two Dimm slots.

A Sony CD-RW/DVD-Rom takes up the optical drive bay. There is no floppy disk drive but there is a 3.5in drive bay with external access should you want one. Alternatively, supplement the 80GB Western Digital hard disk with a second drive.

System performance was good with a score of 238 in Sysmark and scores of 357 for Internet content creation and 159 for office productivity. The system came third in 3Dmark with 10,999, and scored 59.3fps in Unreal Tournament.

The LG Flatron L1710B monitor has good image quality and a range of screen controls, with a source button to switch between analogue or digital input, menu button and cursors.

The system includes the same wireless optical mouse and keyboard set that ships with the AJP, as well as a copy of Windows XP Home edition.

DETAILS

PRICE £1,399 (£1,190.64 ex VAT)
CONTACT Evesham 0870 160 9500
www.evesham.com
PROS Space-efficient system case; good range of connectivity including analogue and digital visual signal output
CONS Hard disk capacity smaller than some other systems here; graphics processing disappointing
VERDICT
Cheaper than much of the competition; worth considering if graphics processing power is not an imperative

FEATURES	★★★☆☆
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

Fujitsu-Siemens Scenic E600

The Fujitsu-Siemens Scenic E600 PC is housed in a desktop case on top of which you can perch the 15in Fujitsu-Siemens S5 Silverline LCD monitor that ships with this system. The display features built-in stereo speakers and can be tilted through 30 degrees.

Slide back the case cover to expose the system core and you will find a 2.4GHz Pentium 4 processor in there, along with 512MB of Ram arranged as two modules occupying both Dimm slots. A 40GB Samsung hard disk drive sits in one of the two 3.5in drive bays, the second of which houses a floppy disk drive, while a 48-speed Liteon CD-Rom drive occupies the optical drive bay.

The CPU is tucked away under a green plastic funnel that conducts heat straight to the case fan on the right-hand side panel and reduces system noise dramatically.

Only one of the two PCI slots is unoccupied, the other houses a modem, and an Nvidia Geforce4 MX440 graphics card sits in the AGP slot. This helped the Scenic E600 get a fair result in 3Dmark, with a score of 7,115 and 54.6fps in Unreal Tournament. System performance was also good in Sysmark 2002, scoring 230.

If you have a wealth of peripherals sitting around at home, you will be pleased to hear that the Scenic E600 features six USB2 ports, two of which are located at the front of the system case and four at the rear. Sadly, there is no Firewire. This system has both a DVI and VGA socket, two serial ports and a parallel port for hooking up older printers, a modem socket with a phone pass-through and Lan connection point, along with the usual provision of mini jack sockets.

A security card reader is included to restrict other users from accessing your PC. The bundled optical scroll mouse is rather small, though, and the basic keyboard is unexciting. The inclusion of Windows XP Pro, however, is a bonus.

DETAILS

PRICE £996.40 (£848 ex VAT)
CONTACT Fujitsu-Siemens 0800 004 003
www.fujitsu-siemens.com
PROS Great monitor with in-built speakers; security card reader; plastic funnel to aid heat dissipation and reduce noise; Windows XP Pro
CONS Features the smallest hard disk drive in the group; no Firewire connectivity
VERDICT
Not the most evenly specified system here, and eclipsed by other contenders

FEATURES	★★☆☆☆
PERFORMANCE	★★☆☆☆
VALUE FOR MONEY	★★★★½
OVERALL	★★☆☆☆

Hi-Grade Xperian 1700-2660

The Xperian 1700-2660 is one of the most space-efficient systems on test, crammed with features aimed at delivering converged home entertainment and computing functions in one small package.

The migration of home entertainment to the PC has been frustrated by the often lengthy boot times involved in powering up a PC. Hi-Grade has overcome this by installing both Windows XP and Linux-based playback tools onto the Xperian, so you can load the MP3 player, FM radio or TV tuner in seconds without launching Windows.

The system itself is powered by a 2.6GHz Pentium 4 with 512MB of DDR SD-Ram memory. A Radeon 9000 graphics card sits in the AGP slot and the 120GB hard disk drive should give you plenty of storage space to make full use of the TV tuner card or FM radio antenna-in socket to record programmes. Additional storage options are provided, including a Type II PC Card slot and memory card reader compatible with Multimedia Card (MMC), SD, Smart Media and Memory Stick formats. There is also a Sony CD-RW/DVD-Rom drive.

There is no bezel to speak of bordering the 17in LCD screen so the integrated stereo speakers are mounted directly onto the screen surface, which extends out on either side of the display area.

Performance in Sysmark topped the group with an overall score of 267, although others beat Hi-Grade's scores of 6,231 and 47.5fps in 3Dmark and Unreal Tournament respectively.

There are four USB2 ports, with mini and regular size Firewire ports, an S/PDIF socket and modem port but no parallel port to hook up older printers. The range of connectivity is rounded off with an 802.11b wireless networking card and Lan socket.

A wireless keyboard, optical scroll mouse and remote control are bundled along with a set of 5.1-channel Creative Inspire 5300 speakers.

DETAILS

PRICE £1,526.33 (£1,299 ex VAT)
CONTACT Hi-Grade
020 8532 6123
www.higrade.com
PROS Small footprint; Instant Play cuts time to access audio home entertainment features; good system performance
CONS Graphics processing performance was slightly lacklustre; no DVD writing function
VERDICT
A successful marriage of home entertainment and computing, worth every penny of its price

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★½☆
OVERALL	★★★★½

Mesh Cubex 3000+

Mesh, like Evesham, has submitted a system built inside a Shuttle system case with a 200 x 300mm footprint. Open it up and you will find an Athlon XP 3000+ processor at the heart of the system and a 256MB module of DDR-Ram system memory sitting in each of the two Dimm slots. A 120GB Maxtor hard disk provides plenty of storage and a floppy disk drive sits in the second 3.5in drive bay.

Performance was consistently good, with an overall Sysmark score of 237 and, in 3Dmark and Unreal Tournament, scores of 13,176 and 68.4fps respectively.

The single optical drive bay is occupied by the same Sony DVD-RW/CD-RW drive as featured in the Evesham, and opens out of the front of the system case. Just below this is an S/PDIF port, microphone and headphone mini jack sockets, two USB2 ports and a full-size Firewire port. There is also a six-in-one card reader compatible with Micro Drive, MMC, SD, CF Types 1 and 2 and Smart Media formats.

At the rear, video-in and -out sockets, a TV-in socket and a DVI port all come off the back of the ATI All-in-Wonder 9700 graphics card, which has 128MB of dedicated memory. There are an extra two VGA ports for onboard graphics output, a serial port, two additional USB2 ports and two more Firewire ports with Lan and modem ports and a pass-through port for a telephone line.

With a low-profile passive heatsink crouching over the CPU and pipes channelling heat to a case fan at the back of the unit, this is a fairly quiet system. The case itself is made of aluminium.

The system ships with an 18in NEC-Mitsubishi LCD monitor with a resolution of 1,280 x 1,024 and adjustable height to 110mm, while a Logitech navigator cordless keyboard and mouse and a set of Creative I-Trigue 2.1-channel 3300 speakers complete the package.

DETAILS

PRICE £1,499 (£1,275.74 ex VAT)
CONTACT Mesh
0870 046 4747
www.meshcomputers.com
PROS Small system case footprint; large hard disk drive; excellent performance; six-in-one memory card reader; great monitor
CONS Bundled speakers offer only 2.1-channel audio
VERDICT
A well-specified PC with great system performance that just loses out to the feature-packed Hi-Grade

FEATURES	★★★★½
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

"Great Value, Solid Build"

PC Home Gold Award (8375) - Jan 2003

AJP 8080 - Slim, Light & Wireless

- 14.1" TFT XGA (1024x768)
- Intel Centrino Mobile Technology with Intel Pentium - M 1.3GHz Processor (up to 1.6GHz)
- 1MB Level 2 Cache
- Intel Integrated Wireless LAN (802.11b) card
- 512MB DDR (upgradeable to 1GB)
- 40GB HDD (upgradeable to 80GB)
- Combo DVD/CD-RW Drive (HotSwappable with 2nd HDD)
- Built in 56K fax/modem & 10/100 Ethernet Adapter
- Intel 855GM with Dynamic Video Memory
- Ports: IEEE Firewire, 3x USB 2.0, IrDA, TV-Out, Monitor, S/P DIF output, Audio DJ
- Built in Smart Card Reader (supports MMC/SD/SM/MS)
- 318(W)x277(D)x25-30mm(H) / Weight: 2.4Kg
- Carry Case, 36 months RTB Warranty*
- Up to 4.5 Hours Battery Life
- Microsoft Windows XP Professional

Standard Features: Built in 3D Sound & Speakers, 1x PC Card Slot, Smart Li-Ion Battery**, 5 Hot Keys

14.1" TFT	Centrino 1.3GHz	512MB RAM	40GB HDD	Combo Drive

For all Upgrade Options please call or visit our web site

£899 ex.VAT
£1056.33 inc.VAT

AJP M3000N - Slim, Light & Wireless

- 14.1" TFT SXGA+ (1400x1050)
- Intel® Centrino™ Mobile Technology with Intel® Pentium® - M 1.4GHz Processor (up to 1.6GHz)
- 1MB Level 2 Cache
- Intel Integrated Wireless LAN (802.11b) card
- 512MB DDR (upgradeable to 1GB)
- 40GB HDD (upgradeable to 80GB)
- Combo DVD/CD-RW Drive (HotSwappable with 2nd HDD or 2nd Battery)
- Built in 56K fax/modem & 10/100 Ethernet Adapter
- Intel 855GM with Dynamic Video Memory
- Ports: IEEE Firewire, 4x USB 2.0, IrDA, Parallel, Monitor, PortBar (Docking Station), S/P DIF output
- Magnesium Alloy (top casing)
- 309(W)x254(D)x30mm(H) / Weight: 2.27Kg
- Carry Case, 36 months RTB Warranty*
- Up to 4.5 Hours Battery Life (up to 8 Hours with 2nd Battery option)
- Microsoft Windows XP Professional

Standard Features: Built in 3D Sound & Speakers, 1x PC Card Slot, Smart Li-Ion Battery**, 4 Hot Keys

14.1" TFT	Centrino 1.4GHz	512MB RAM	40GB HDD	Combo Drive

For all Upgrade Options please call or visit our web site

£999 ex.VAT
£1173.83 inc.VAT

AJP NeoPC 4 - Desktop with a Difference

- 17.1" TFT SXGA (1280x1024)
- 2.66GHz Intel Pentium 4 with 512K Cache (Optional 2.8GHz)
- 512MB DDR RAM (upgradeable to 1GB)
- 120GB HDD (7200 RPM)
- Combo DVD/CD-RW Drive (Optional DVD-RW/CDRW)
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- 64MB DDR Shared Video Memory
- IEEE 1394 Firewire 400Mbps port
- Ports: 4xUSB 2.0, Parallel, Monitor, 2x PS/2
- Built in Wireless Antenna
- Cordless Keyboard & Mouse
- 369(W)x188(D)x384mm(H) / Weight: 8.8Kg
- 0-15° Screen Tilt, 270° Swivel Base
- 36 months RTB Warranty*

Standard Features: Built in 3.5" FDD, Built in 3D Sound & Speakers, (Optional) Wireless LAN module, 2x PC Card Slot, Windows XP Home with CD & Manual

17.1" TFT	P4 2.66GHz	512MB RAM	120GB HDD	Combo Drive

For all Upgrade Options please call or visit our web site

£999 ex.VAT
£1173.83 inc.VAT

WhatPC? RECOMMENDED
What PC? Recommended August 2002

PC Home Silver Award July 2002

Contact Us

AJP Computers Plc
152-154 Coles Green Rd, London, NW2 7HD

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Fax: 020 8208 9701
Customer Care: 020 8208 9788
Technical: 020 8208 9799
Email: sales@ajp.co.uk

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Written quotations on request please call Sales
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Special Offer

FREE
64MB Pen Drive

Upgrade any notebook to 1GB RAM* or 80GB HDD*

Transfer your files from work to home using this USB Pen Drive, it holds 45 times more information than a floppy diskette and can be attached to your keyring. Dimensions 23mm(W)x10mm(D)x73mm(H)

"Excellent Specification"

What Laptop Silver Award (8880E) - May 2003

8880E - More Features than Ever, MP3, TV Tuner, Full Size Keyboard...

AJP 8880E - Ultimate Desktop Replacement

- 16.1" TFT UXGA (1600x1200)
- 2.8GHz Intel® Pentium 4 with 512K Cache (Optional 3.06GHz - Hyper Threading)
- 512MB DDR RAM (upgradeable to 1GB)
- 60GB HDD (upgradeable to 80GB)
- Built in 3.5" FDD
- Bay 1 Combo DVD/CD-RW Drive (Optional DVD-RW/CD-RW)
- Bay 2 Optional 2nd HDD,*DVD or IP Sharing
- Bay 3 Optional 3rd HDD or TV Tuner
- Bay 4 Optional MP3 Player / Storage Disk
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- ATI Mobility Radeon 9000 with Integrated AGP 4x
- 128MB DDR Video RAM
- IEEE 1394 Firewire 400Mbps port
- Ports: 4xUSB 2.0, IrDA,TV-Out, Video In, Parallel, Serial, Monitor, PS/2, S/P DIF output
- Built in Wireless Antenna
- Sony Memory Card Slot
- Audio DJ onboard
- Full Size Keyboard & Separate Numeric Keypad
- 360(W)x299(D)x54.5mm(H) / Weight: 4.9Kg
- Carry Case, 36 months RTB Warranty‡

Standard Features: (Optional) 4x IP Sharing Module for Networking/ADSL, (Optional) Wireless LAN module, Built in 3.5" FDD, Built in 3D Sound & Speakers, 2x PC Card Slot, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Windows XP Home with CD & Manual

16.1" TFT | P4 2.8GHz | 512MB RAM | Silent 60GB HDD | Combo Drive

£1275 ex.VAT £1498.13 inc.VAT

*An additional DVD will offer you a fast copy facility
For all Upgrade Options please call or visit our web site

Silver Award May 2003

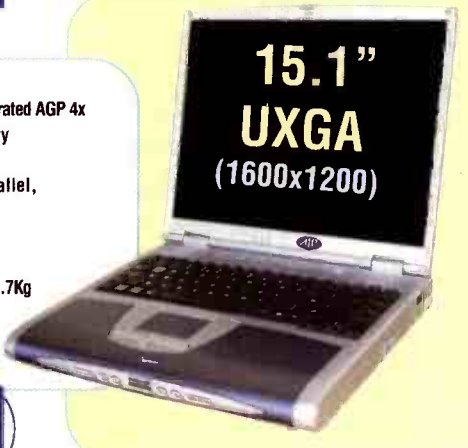
Highly Commended April 2003

Recommended Dec 2002

AJP 5600D - Ultra High End Notebook

- 15.1" TFT UXGA (1600x1200)
- 2.8GHz Intel® Pentium 4 with 512K Cache (Optional 3.06GHz)
- 512MB DDR RAM (upgradeable to 1GB)
- 60GB HDD (Removable, upgradeable to 80GB)
- Combo DVD/CD-RW Drive (Optional DVD-RW/CD-RW)
- Built in 3.5" FDD (HotSwappable with 2nd Battery, *DVD or removable 2nd HDD)
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- ATI Mobility Radeon 9000 with Integrated AGP 4x
- 64MB DDR Dedicated Video Memory
- IEEE 1394 Firewire 400Mbps port
- Ports: 4xUSB 2.0, IrDA, TV-Out, Parallel, Monitor,PS/2, S/P DIF output
- Built in Wireless Antenna
- Audio DJ onboard
- 329(W)x290(D)x44mm(H) / Weight: 3.7Kg
- Carry Case, 36 months RTB Warranty‡

Standard Features: Built in 3.5" FDD, (Optional) Wireless LAN module, Built in 3D Sound & Speakers, 1x PC Card Slot, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Media Player), Windows XP Home with CD & Manual



15.1" TFT | P4 2.8GHz | 512MB RAM | Silent 60GB HDD | Combo Drive

£1099 ex.VAT £1291.33 inc.VAT

*An additional DVD will offer you a fast copy facility
For all Upgrade Options please call or visit our web site

Computer Shopper Hit Award Feb 2003

Recommended Sept 2002

Best Buy Aug 2002

AJP 8640 - High End Notebook

- 15.1" TFT SXGA+ (1400x1050)
- 2.8GHz Intel® Pentium 4 with 512K Cache (Optional 3.06GHz)
- 512MB DDR RAM (upgradeable to 1GB)
- 60GB HDD (upgradeable to 80GB)
- Combo DVD/CD-RW Drive (Optional DVD-RW/CD-RW)
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- nVidia GeForce4 420 Go with Integrated AGP 4x
- 64MB DDR Video RAM
- IEEE 1394 Firewire 400Mbps port
- Ports: 4xUSB 2.0, IrDA, TV-Out, Parallel, Monitor, PS/2, S/P DIF output
- Built in Wireless Antenna
- Built in Smart Card Reader (Supports MMC/SD/SM/MS)
- 332(W)x285(D)x39mm(H) / Weight: 3.4Kg
- Carry Case, 36 months RTB Warranty‡

Standard Features: Built in 3D Sound & Speakers, (Optional) Wireless LAN module, 1x PC Card Slot, Smart Li-Ion Battery**, 4 Hot Keys (one button access to any application), (Optional) External USB 3.5" FDD, Windows XP Home with CD & Manual

15.1" TFT | P4 2.8GHz | 512MB RAM | Silent 60GB HDD | Combo Drive

£999 ex.VAT £1173.83 inc.VAT

For all Upgrade Options please call or visit our web site

Best Buy March 2003

Gold Award Feb 2003

Call: **020 8208 9755**

Buy Online: **www.ajp.co.uk**

ISO 9002

Prices exclude delivery. Prices and specifications are subject to change without notice. All trademarks acknowledged. AJP standard terms and conditions, which are available on request, apply to all sales. E. & O. E. All company details, machine specifications and general terms and conditions are also available on our web site. *Initial Purchase Only **Batteries are a consumable item and are not covered by the warranty. ‡36 Months Return to Base Warranty: Initial 12 Months; Parts & Labour, following 24 Months; Labour Only. Pictures are for illustration purposes only.

‡Account is interest free if repaid in full with the 6th monthly payment. A 5% deposit is required. At the offset a 48 month finance agreement is issued at 29.8% APR. Typical example: £1,000.00 less 5% deposit; financed sum £950.00. A) For a 48 month finance agreement 48 monthly payments of £32.25, (total payable £1,596.00 APR 29.8% Variable) or B) For a 6 month INTEREST FREE finance agreement 5 monthly payments of £32.25 and the balance of £788.75 on the 6th month (total payable £950.00 APR 0%). All loans are subject to status. Written quotations available on request. AJP is a Licensed Credit Broker.

AJP™

Making IT Happen

Systemax Reliance LT 3402

Like Fujitsu-Siemens, this month Systemax has submitted a system housed in a desktop case. Inside, a Pentium 4 processor with a clock speed of 2.6GHz sits on an MSI motherboard, with one 512MB module of DDR SD-Ram memory occupying one of the two Dimm slots. There is no graphics card in the AGP slot so the system relies on an Intel 845GE chip, which uses 8MB of system memory, for its graphics processing power.

Only one of the three PCI slots is free; a modem card and two-port Firewire card occupy the other two slots.

At the front, a 120GB hard disk sits in one of the two 3.5in drive bays, as the other is occupied by a floppy disk drive, while a Sony CD-RW/DVD+RW/-RW drive is housed in the optical bay. This combo drive supports both DVD-R and DVD+R recording formats as well as DVD-RW and DVD+RW and offers eight-speed DVD read capability and 32-speed CD reading.

With its onboard graphics, the Systemax clocked up just 1,791 and 10.5fps in 3Dmark and Unreal Tournament respectively. The Reliance LT 3402's performance in Sysmark was better with the second highest score in the group at 242.

This system features six USB2 ports, two of which are on the front panel of the system case with microphone and headphone mini jack sockets. At the rear of the system you will also find serial, parallel and VGA ports, along with two PS/2 ports and the usual Lan and modem sockets.

The monitor with this system, a 15in CTX S500 LCD panel with a maximum resolution of 1,600 x 1,200, is only compatible with analogue input.

A copy of Windows XP Home is bundled and Microsoft Works Suite is included. The wired scroll mouse and basic keyboard are both Systemax-branded and a set of Videologic ZXR-500 speakers is also thrown in.

DETAILS

PRICE £938.83 (£799 ex VAT)
CONTACT Systemax
0870 729 7366
www.systemaxpc.co.uk
PROS Price; optical drive supports vast range of DVD and CD recording formats; good USB connectivity
CONS Onboard graphics; poor graphics processing scores; analogue-only 15in monitor
VERDICT
Worth consideration if money is an issue and graphics processing is not a top priority. Lacks some of the features of other systems

FEATURES	★★☆☆☆
PERFORMANCE	★☆☆☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

Inside a Shuttle case

Shuttle is a name that has been cropping up in *PCW* with increasing regularity recently. This month is no exception, with two of the systems on test in this group – the Mesh and the Evesham – encased in Shuttle's small form factor boxes.

The Taiwanese company, which has been around since 1983, has made a name for itself as a manufacturer of small form factor barebones systems, comprising a small-footprint system case fitted with a tiny Shuttle motherboard; the two components critical to building a small form factor PC. There are currently 10 barebones models in the Shuttle product range, of which five are Socket 478 boards compatible with Pentium 4 processors, four are Athlon-compatible Socket A boards and one takes Pentium III chips.

Of these, two different models have made an appearance in this month's group. The Evesham, with its blue translucent fascia, is built around the SS51G small form factor solution, compatible with 400 or 553MHz Socket 478 CPUs and built around a Sis 651 chipset. It has two Dimm slots, in which you can house DDR 200, 266 or 333 memory.

The Mesh, on the other hand, which has an Athlon 3000+ processor at its heart, is based on a Shuttle SN41G2 system featuring a Socket A-compatible board, supporting DDR 200, 266, 333 or 400 dual-channel memory and built around an Nvidia Nforce2 chipset.

Both of these boards feature a single AGP slot and PCI slot. At first glance, that single PCI expansion slot may seem to offer fewer upgrade opportunities than a regular-sized PC, which is likely to be built around a larger, standard ATX form factor board with greater surface area to accommodate more slots. The level of hardware integration on modern motherboards both large and small, however, effectively means that manufacturers such as Shuttle can reduce the overall size of the board by cutting out a few PCI slots without compromising system specification or features.

The two barebones systems around which the Mesh and Evesham PCs are built both feature onboard 5.1-channel audio, Firewire, USB1, S/PDIF, Ethernet and graphics. While each PC manufacturer has chosen to supplement the board's onboard graphics processing capabilities with a dedicated graphics card, this nonetheless illustrates the levels of hardware integration that are becoming the norm today, which has been a key driver in reducing the surface area of motherboards.

But while a small form factor motherboard may be as feature-rich as its ATX big brothers, there is one very obvious obstacle that needs to be overcome if you are to build a high-performance small form factor PC: heat. You may physically be able to fit just as much hardware in a small system case through integration, but reducing the size of a system also reduces the volume of air in the box. In other words, you will reduce airflow in the case, which will lead to heat dissipation problems of the sort encountered in notebooks.

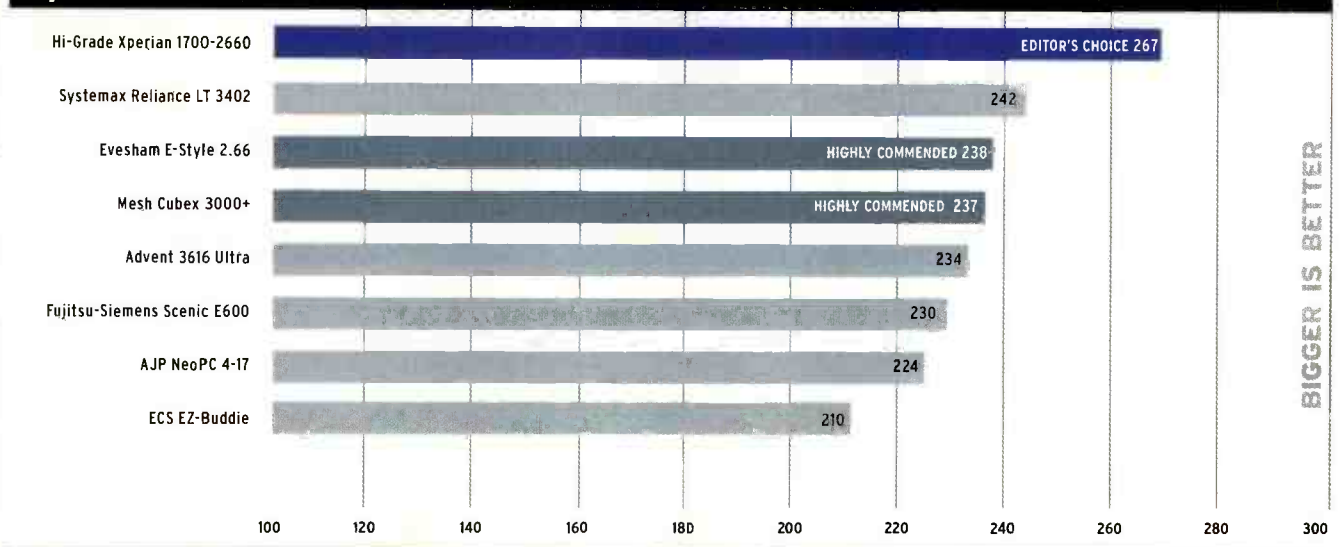
Companies like Shuttle use various means to cool down the system core when airflow is restricted. Both the cases used by Evesham and Mesh use Shuttle's proprietary ICE (integrated cooling engine) heat-pipe technology. This solution comprises sealed conductive pipes leading from the CPU to the case fan. Each of these contains a fluid that evaporates, flows through the pipe away from the processor in vapour form and condenses again, releasing thermal energy that is then dissipated by the case fan.

In this way, it is possible to pack a small form factor chassis full of high-performance components without overheating the system core.

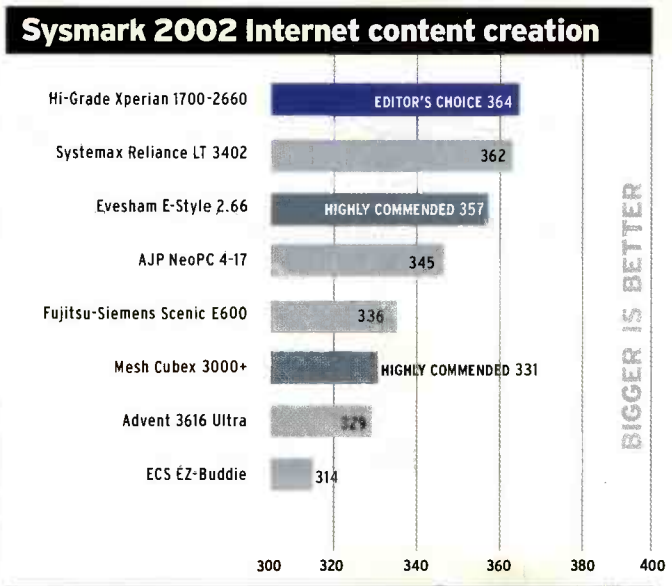
Lab results

vnu labs

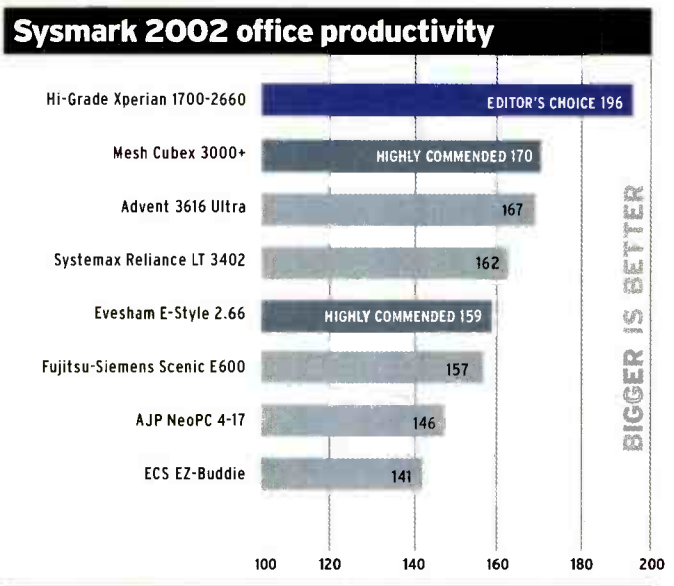
Sysmark 2002 overall



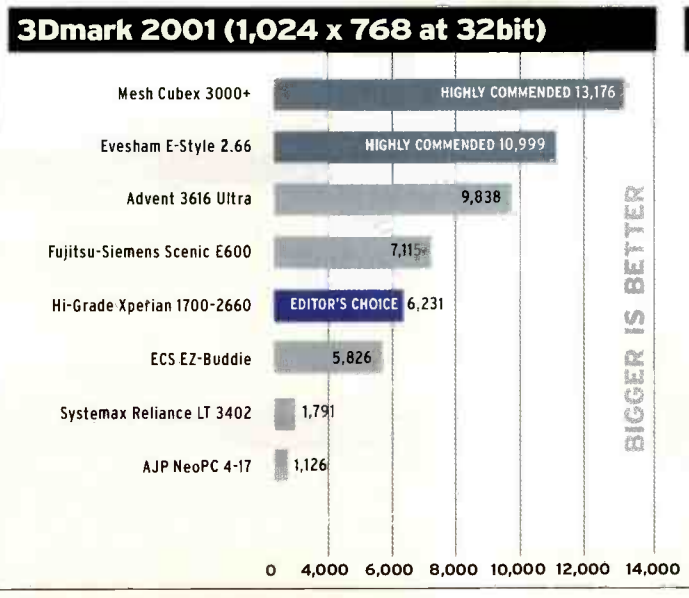
Sysmark 2002 Internet content creation



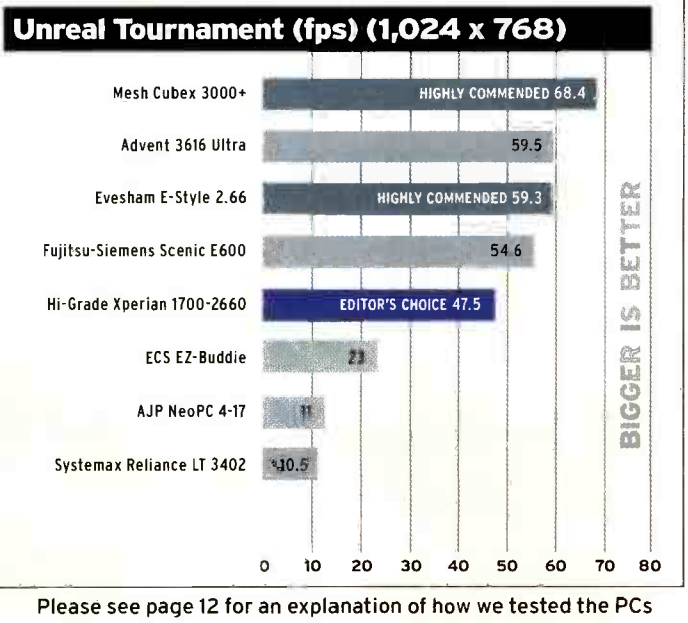
Sysmark 2002 office productivity



3Dmark 2001 (1,024 x 768 at 32bit)



Unreal Tournament (fps) (1,024 x 768)



No results are shown for the Apple Imac 17in Superdrive as our benchmark tests are incompatible with Apple systems

Please see page 12 for an explanation of how we tested the PCs

Table of features

MANUFACTURER	**ADVENT**	**AJP**	**APPLE**	**ECS**
MODEL NAME	**3616 ULTRA**	**NEOPC 4-17**	**IMAC 17IN SUPERDRIVE**	**EZ-BUDDIE**
Price inc VAT (ex VAT)	£1,599 (£1,361)	£1,462.88 (£1,245)	£1,449 (£1,233.19)	£927.08 (£789)
Sales telephone/URL	08705 464 464 www.pcworld.co.uk	020 8208 9755 www.ajp.co.uk	0800 039 1010 www.apple.com/ukstore	0870 066 0885 www.ecs.com.tw
HARDWARE SPECS				
Dimensions (w x d x h) (mm)	180 x 450 x 365	395 x 180 x 415	270 diameter footprint	160 x 320 x 267
Processor	AMD Athlon XP 3200+ 2.19GHz	Intel Pentium 4 2.8GHz	PowerPC G4 1GHz	Intel Pentium 4 2.4GHz
Memory quantity and type	512MB PC2700 DDR SD-Ram	512MB DDR SD-Ram PC2100	256MB SD-Ram	512MB DDR SD-Ram PC2100
Occupied/spare memory (Ram) slots	1/1	2/0	1/1	1/1
Max memory in this configuration	1.5GB	512MB	768MB	1.25GB
Max memory supported by board	2GB	1GB	1GB	2GB
Hard disk manufacturer, model, spin speed	Maxtor 6Y200P0 7,200rpm	Western Digital WD1200BB 7,200rpm	Maxtor 4D080H4 5,400rpm	Seagate IC35L060AVV207-0, 7,200rpm
Hard disk size	200GB UltraDMA133	120GB UltraDMA100	80GB	60GB UltraDMA100
Optical drives	LG GMA-4020B DVD-RW/ CD-RW combo MSI MS-8216 DVD-Rom	Teac DW-224E CD-RW/DVD-Rom combo	Apple Superdrive	Artec DRD8120B CD/DVD-Rom
Drive speeds	DVD-R/-RW/Ram, 2x/Rom 8x, CD 12x 8x 32x, 16x DVD-Rom	24x 10x 24x, 8x DVD-Rom	CD 16x 8x 32x, DVD-R 4x, Rom 8x	CD 40x, DVD 12x
MOTHERBOARD COMPONENTS				
Motherboard manufacturer/model	MSI 6777	OEM L287S	OEM	ECS S4-2
Chipset manufacturer/model	Nvidia Nforce2	Sis M650	N/A	Sis 650GX
EXPANSION AND I/O				
No of 3.5/5.25in bays	4/2	2/0	0/0	1/1
No of free 3.5/5.25in bays	2/0	0/0	0/0	0/0
No of PCI/shared/AMR slots	3/0/0	0/0/1	0/0/0	1/0/0
No of free PCI/shared/AMR slots	2/0/0	0/0/0	0/0/0	0/0/0
No of USB 1.1/USB2/Firewire ports	0/4/1	0/4/1	5/0/2	0/6/0
No of serial/parallel/PS/2 ports	1/1/2	1/1/2	0/0/0	1/1/2
MULTIMEDIA				
Sound card manufacturer and model	Realtek ALC650	Sis 961 AC97	N/A	Sis962 AC97
Speakers manufacturer and model	TGX-S2500	Inbuilt	Apple Pro Speakers	N/A
Graphics card manufacturer and model	Nvidia Geforce FX5200 Ultra	Sis M650	Geforce4 MX 440 AGP 4X	ECS AG200T8-D64
Chipset	Geforce FX5200 Ultra	Sis M650	Geforce4 MX 440	Xabre 200
Memory and type	128MB DDR SD-Ram	64MB shared system memory	64MB DDR	64MB DDR SD-Ram
Monitor manufacturer and model	Samsung Syncmaster 172W	OEM	Apple LCD TFT	ECS EZ17C
Monitor size/max viewable diagonal (in)	20/17	20.2/17	17in widescreen	21.5/17
Maximum resolution	1,280 x 768	1,280 x 1,024	1,440 x 900	2,048 x 1,536
OTHER INFORMATION				
Misc hardware/modem	SoftK56 modem	L285S MDC modem, 2x Type II PCMCIA, wireless Lan & antenna, 10/100 Ethernet adaptor	56K V.92 modem	EZ TV tuner card, multicard drive bay, ECS remote
Keyboard & mouse	Advent 3201U keyboard, Advent M051B0 optical scroll mouse	Microsoft wireless multimedia keyboard and wireless optical mouse	Apple Pro keyboard and mouse	A4 Tech wireless keyboard and mouse
OS/Bundled software	Windows XP Home Edition & Microsoft Works 7, Cyberlink PowerDVD, Ahead Nero 5.5	Windows XP Professional, Cyberlink PowerDVD, Roxio Easy CD Creator	Mac OS X, Ilife, Appleworks, Sound Studio	Windows XP Home, Intervideo WinDVD
Standard warranty*	1yr on site P&L**	3yrs RTB, 1st yr P&L, 2nd labour only	1yr RTB	2yrs RTB
SCORES				
Features	★★★☆☆	★★★★½	★★★★☆	★★☆☆☆
Performance	★★★☆☆	★☆☆☆☆	N/A	★☆☆☆☆
Value for money	★★☆☆☆	★★★☆☆	★★★☆☆	★★★★☆
Overall score	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆

*RTB = return to base, C&R = collect and return, P&L = parts and labour

	EVESHAM	**FUJITSU-SIEMENS**	**HI-GRADE**	**MESH**	**SYSTEMAX**
	E-STYLE 2.66	**SCENIC E600**	**XPERIAN 1700-2660**	**CUBEX 3000+**	**RELIANCE LT 3402**
	£1,399 (£1,190.64)	£996.40 (£848)	£1,526.33 (£1,299)	£1,499 (£1,275.74)	£938.83 (£799)
	0870 160 9500 www.evesham.com	0800 004 003 www.fujitsu-siemens.com	020 8532 6123 www.higrade.com	0870 046 4747 www.meshcomputers.com	0870 729 7366 www.systemaxpc.co.uk
	200 x 300 x 193	350 x 390 x 95	480 x 200 x 350	200 x 300 x 186	323 x 405 x 103
	Intel Pentium 4 2.6GHz	Intel Pentium 4 2.4GHz	Intel Pentium 4 2.6GHz	AMD Athlon XP 3000+ 2.16GHz	Intel Pentium 4 2.6GHz
	512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC2700
	2/0	2/0	2/0	2/0	1/1
	512MB	512MB	512MB	512MB	1.5GB
	2GB	2GB	1GB	2GB	2GB
	Western Digital WD800JB 7,200rpm	Samsung SP40A2H 7,200rpm	Maxtor 6Y120P0 7,200rpm	Maxtor 6Y120P0 7,200rpm	Samsung IC35L120AVV207-0 7,200rpm
	80GB UltraDMA100	40GB UltraDMA100	120GB UltraDMA133	120GB UltraDMA133	120GB UltraDMA100
	Sony DW-U10A, CD-RW/DVD+RW/DVD-RW	Liteon LTN486S CD-Rom	Sony SR-8177 DVD-Rom/CD-RW combo	Sony DW-U10A, CD-RW/DVD+RW/DVD-RW	Sony DW-U10A, CD-RW/DVD+RW/DVD-RW
	DVD -R 4x, -RW 2x, DVD+R/RW 2.4x, DVD-Rom 8x, CD-R 24x, CD-RW 10x, CD 32x	48x	16x 10x 40x, 8x DVD-Rom	DVD -R 4x, -RW 2x, DVD+R/RW 2.4x, DVD-Rom 8x, CD-R 24x, CD-RW 10x, CD 32x	DVD -R 4x, -RW 2x, DVD+R/RW 2.4x, DVD-Rom 8x, CD-R 24x, CD-RW 10x, CD 32x
	Shuttle FS51	Fujitsu-Siemens W26361	OEM	Shuttle FN41	MSI MS-6714
	Sis 651	Intel 865G	Intel 845PE	Nvidia Nforce2	Intel 845GE
	2/1	2/1	1/0	2/1	2/1
	1/0	0/0	0/0	0/0	0/0
	1/0/0	2/0/0	1/0/0	1/0/0	3/0/0
	0/0/0	1/0/0	0/0/0	0/0/0	1/0/0
	0/4/3	0/6/0	0/4/2	0/4/3	0/6/0
	2/0/2	2/1/2	0/0/0	1/0/2	1/1/2
	Sis 962 AC97	ICH5 AC97	ICH4 AC97	Realtek ALC650	Realtek ALC650
	Creative I-Trigue 3300	Integrated into monitor	Creative Inspire 5300	Creative I-Trigue 3300	Videologic ZXR-500
	ATI Sapphire Radeon 9600 Pro	Nvidia Geforce4 MX 440 8X	ATI Mobility Radeon 9000	ATI All-in-Wonder 9700	Intel Extreme Graphics 82845G
	Radeon 9600 Pro	Geforce4 MX 440	Mobility Radeon 9000	Radeon 9700	Intel 82845G/GL
	128MB DDR SD-Ram	64MB DDR SD-Ram	64MB DDR SD-Ram	128MB DDR SD-Ram	8MB shared system& dynamic video memory
	LG Flatron L1710B(U)	Fujitsu-Siemens S5 Silverline	OEM	NEC-Mitsubishi Multisync 1860NX	CTX S500
	19/17	17.5/15	22/17	20.5/18	19/15
	1,280 x 1,024	1,024 x 768	2,048 x 1,536	1,280 x 1,024	1,600 x 1,200
	CNXT V.92 modem	Intel Pro 1000 MT, smartcard reader	Smart Link 56K modem, Philips FM1256-PH TV tuner, 802.11b cardbus adaptor	SoftK56 modem, multicard drive bay	MSI MS-6971 Firewire PCI Card
	Microsoft wireless optical desktop	Fujitsu-Siemens KBS2 keyboard, Primax M011U0 mouse	Hi-Grade Notino wireless keyboard and optical scroll mouse	Logitech wireless desktop navigator keyboard and mouse	Logitech corded Deluxe Access keyboard, Logitech corded scroll mouse
	Windows XP Home, Pinnacle Studio 8SE, Ability Office, Instant CD/DVD	Windows XP Pro	Windows XP Home, Instant Play Cyberlink PowerDVD	Windows XP Home, Pinnacle Studio 8SE, Nero 5.5, Microsoft Works Suite 2003	Windows XP Home, Microsoft Works Suite Roxio Easy CD Creator, Cyberlink PowerDVD
	2yrs on site, 1yr RTB	3yrs on site	2yrs C&R	3yrs on site P&L	3yrs on site
	★★★½	★☆☆☆☆	★★★★★	★★★★½	★★☆☆☆
	★★★★½	★★☆☆☆	★★★★★	★★★★★	★☆☆☆☆
	★★★★½	★★★★½	★★★½☆	★★★★½	★★★★½
	★★★★½	★★☆☆☆	★★★★½	★★★★½	★★★½☆

Editor's Choice

Sometimes the biggest advances in technology involve scaling things down and this month's system group test is certainly a case in point. The world's first computers took up entire rooms. This month we have tested systems that take up less desktop space than this magazine. While there is upward pressure from consumers demanding increased system performance, the simultaneous downward pressure to reduce the overall footprint of the end product is driving the space-saving PC market.

Manufacturers are now packing more power into system components without increasing their size – the Advent this month, for example, features a huge 200GB hard disk drive – but other key technological advances are helping reduce the size of desktop systems. Developments in cooling technology are critical to cramming high-performance components into a tiny chassis without sacrificing the PC's capabilities; an important consideration in both the small form factor PC and notebook markets.

Taking a look inside the Mesh Cubex 3000+ illustrates this point well. This is a well-specified machine, with an Athlon processor clocked at 2.19GHz, 512MB of system memory, a large 120GB hard disk and a DVD-RW/CD-RW drive packed into a small 200 x 300 x 186mm case. With so many high-performance components squeezed into such a small space, dissipating the heat generated inside the case is a real issue, and Mesh has added a passive heatsink to the system with tubes conducting heat from the CPU straight to the case fan mounted at the back of the unit.

'We have tested systems that take up less space than this magazine'

It would be a mistake to think that a small system must, by virtue of its size, be lacking features. This month's group test proves this is not the case and the range of features that the participating manufacturers managed to include in such small systems is impressive. Three of the PCs feature memory card readers compatible with multiple formats and we also saw a number of TV tuner cards and some excellent, balanced system cores.

Hi-Grade Xperian 1700-2660

Mesh Cubex 3000+

Evesham E-Style 2.66

While we could not put the Apple through its paces in our benchmark tests, we have assessed its merits based on features, value for money, overall design and the extent to which the Imac fulfils the space-saving brief.

The winners

In every group test there must be a winner, and this month it is **Hi-Grade** that emerges as the leader of the pack with the **Xperian 1700-2660**, a PC that doubles as a home entertainment system complete with FM radio and TV functions. We liked the fact that you can boot up the PC in well under 10 seconds using Linux for fast access to the radio, TV or MP3 player.

System performance was very good, topping the group with an overall Sysmark score of 267 and decent performances in our graphics tests. This system also looks great, with the surface of the display area extending to the edges of the unit and housing the two integrated speakers. If you're buying an all-in-one system, design is important as the system will be on show. As this is both a PC and a home entertainment centre appearance is doubly important as you may set up the system in your living room.

The range of features, space-efficiency and system performance of this PC singled it out as the obvious choice for our **Editor's Choice** award. While it may be one of the most expensive systems on test here at just over £1,500, it offers a lot for your money.

It is the **Mesh Cubex 3000+** that receives the first of our **Highly Commended** awards this month. It put in an impressive performance across our benchmark tests and excelled in our graphics processing tasks. Despite the compact dimensions of the system case, this is a very well-specified PC, as we have already discussed above.

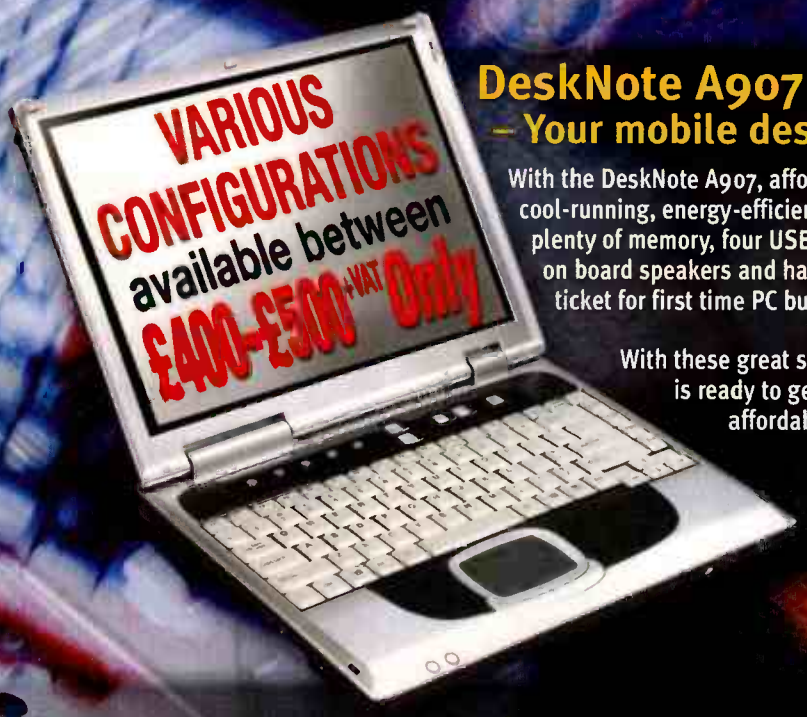
Connectivity was good, as was the range of storage options on offer, which included a six-in-one memory card reader and a DVD writer. The bundled 18in NEC monitor, which is height adjustable and tiltable, earned the Mesh extra points.

The **Evesham E-Style 2.66** scoops our second **Highly Commended** award. It put in a good performance across all the tests and the tiny Shuttle case opens to reveal a well-rounded system core built around a 2.66GHz Pentium 4 processor, 512MB of system memory and an 80GB hard disk drive.

While it may not boast all the features of the Hi-Grade or the Mesh, the Evesham E-Style represents good value for money with its £1,399 price tag, and wins points for its small overall footprint.

Performance, Mobility and Affordability

A DeskNote is a full-featured portable computer that delivers laptop mobility and powerful desktop specifications. A big deal? Actually it is: Before DeskNote, it took the better part of a year for mobile computers to catch up with the latest technology - No more! Desknote delivers both mobility and today's cutting edge PC features to laptops users - today.



DeskNote A907
– Your mobile desktop with Transmeta CPU

With the DeskNote A907, affordability does'nt mean stripped down. It comes with a cool-running, energy-efficient Transmeta CPU, a 14.1" XGA TFT clear LCD screen, plenty of memory, four USB ports, a built in modem, LAN card, cool audio system, on board speakers and hard drive tailored-made to meet your needs - just the ticket for first time PC buyers.

With these great specifications and outstanding features, DeskNote A907 is ready to get the job done with grace and power. Sure its very affordable, too. But no one will know unless you tell them!

DeskNote A980 – The first ever DIY Portable PC

This is just the ticket for the do-it-yourself fans who want to customise their computer from the ground up.

Though it's physically the smallest model in the DeskNote series, the 980 comes with all the power you'll need to get started. It's innovative modular design makes do-it-yourself CPU, memory or hard drive upgrades and adding optional devices snap. You can even upgrade your DeskNote A980 with proprietary nVidia GeForce4 420 GO-32 with 32MB DDR video memory for a new, vibrant visual experience with an LCD or CRT monitor.

A928 DeskNote P4 Solution

A929 DeskNote AMD Solution

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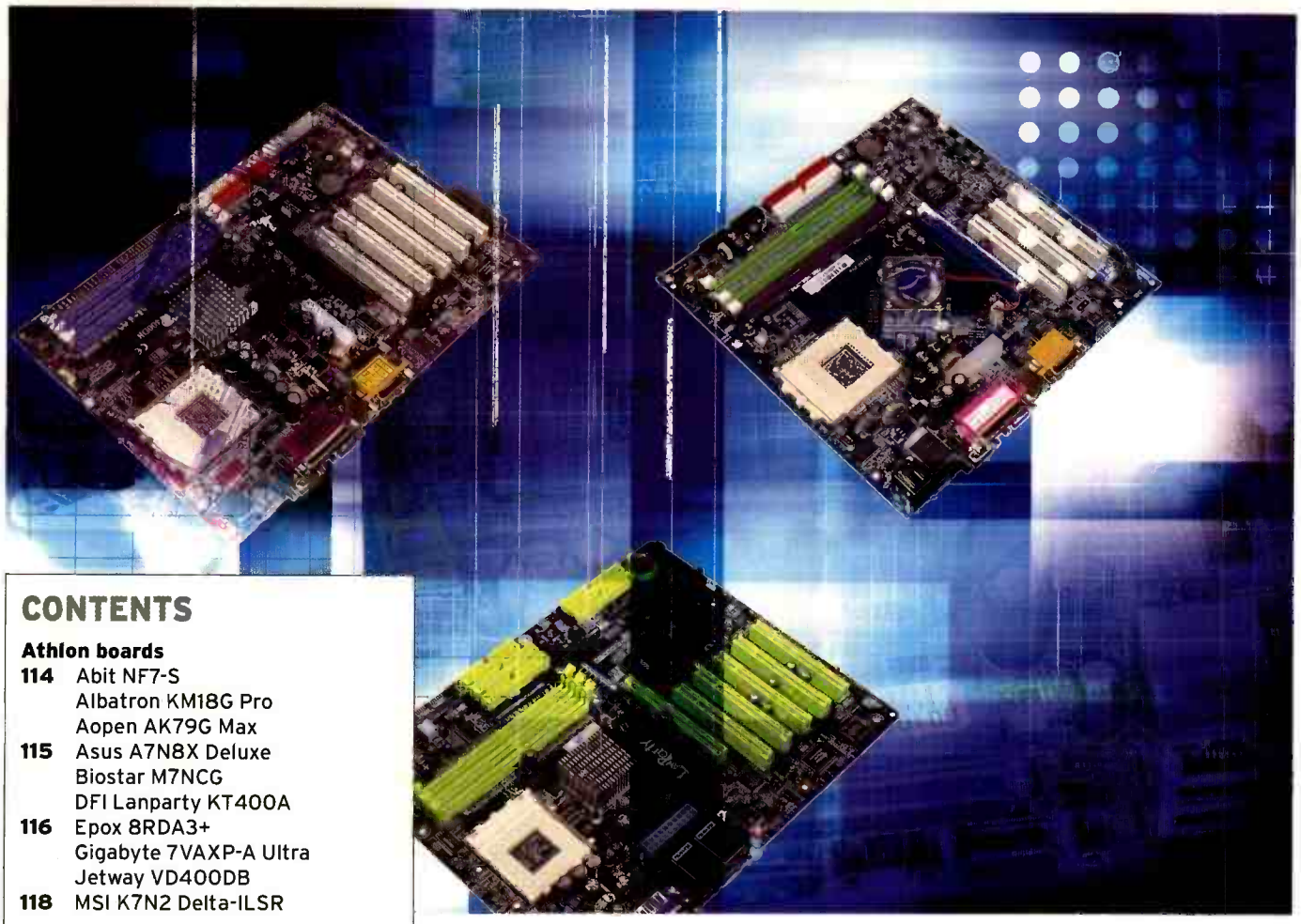

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Motherboard matrix

WORDS: LEO WALDOCK **TESTING:** VNU LABS **PHOTOS:** BRUCE MACKIE

You can get almost any combination of features on motherboards these days at any price, so to make your decision easier we've rigorously tested 23 Athlon and Pentium 4-based boards

Not so long ago, upgrading your PC was a real hassle and, for the most part, was considered to be in the realm of the super-geek. Today upgrading a PC is a bit like assembling Lego pieces, easy to understand and do. It's also a cost-effective way to delay the purchase of a new PC for another year or more.

For those new to the upgrade game, the motherboard is the part that determines which features are included on your PC, and how easy or difficult it will be to upgrade in the future with things like faster processors, graphics cards or memory.

Competition is incredibly tough in the motherboard arena and, as a result, you can find practically any combination of features that you want. With the release of each new generation of processor there is a wave of new chipsets and a torrent of new motherboards, so choosing the right model can be tough. Prices of boards vary enormously, with the range in this group starting at just over £40 and going up to £310.

It's not particularly difficult to change your motherboard but it's not a job you'll want to tackle too frequently. The best thing is to decide what you want to achieve with your upgrade or PC build, then choose the correct parts and finally spend an afternoon putting it all together.

Of course, the best place to start is with this group test, so we've taken 23 Athlon and Pentium 4-based motherboards and put them through their paces.

ATHLON BOARDS

Abit NF7-S

Abit has used the Nforce2 chipset to produce a motherboard that can encompass future upgrades, as well as current technology. In addition to the pair of ATA133 connectors, there are two Serial ATA connectors controlled by a Silicon Image 3112A chip, allowing you to use the Serial drives in a Raid array. Abit recognises that Serial ATA is an emerging technology and supplies one of its Serillel adaptors to convert a standard Parallel ATA hard drive to a serial interface, so you get plenty of choice as to how you connect up your drives.

The manual makes it very clear that there are theoretical limits to how much memory you can fit to the NF7-S, but in practice you can only use two modules of PC3200 or three modules of PC2700 SD-Ram.

On the backplate you get six-channel audio with S/PDIF optical out, as well as 10/100 Lan (local area network) and two USB2 ports. In addition Abit supplies a back bracket with two further USB2 ports, as well as a second bracket housing two Firewire ports.

The layout of the motherboard is tidy and the design includes an ATX12v connector, which provides extra power and stability for overclockers.

DETAILS

PRICE £95 (£80.85 ex VAT)
CONTACT Abit 01438 228 888
www.abit.com.tw
PROS Good value; Serial ATA Raid; Serillel adaptor
CONS Limited to two modules of PC3200 memory
VERDICT
A decent value motherboard that is very tempting

FEATURES	★★★½☆
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★½☆

ATHLON BOARDS

Albatron KM18G Pro

This is another Nforce motherboard, but it's one of the rarer ones with integrated graphics. When the integrated graphics are used, the maximum memory speed is PC2700, but with an AGP card you can go all the way to PC3200.

The board is built in a microATX form factor, so is much smaller than the ATX boards, but still has a reasonable list of features. One of the ways the Albatron saves space is to only have three PCI slots, but if you intend to use a high-end AGP card that effectively limits you to two PCI cards to allow for airflow. That would be a problem for some people, but this motherboard is clearly aimed at those whose priority is to build a small PC that takes up little space, and are prepared to make a few sacrifices to achieve that end. A small case won't have room for multiple optical drives or a huge Raid array, and a very small case may not even have room for an AGP card.

The layout of the Albatron board is surprisingly neat, given its tiny area, although the power connector is very close to a number of capacitors. Bearing this in mind, we don't think this motherboard will appeal to overclockers and power users, but it does address a legitimate slice of the market.

DETAILS

PRICE £68 (£57.87 ex VAT)
CONTACT Albatron
www.albatron.com.tw
PROS Cheap; size; all the integrated features you need
CONS No frills or extras
VERDICT
If you want to build a tiny PC with plenty of power this is a good starting point

FEATURES	★★☆☆☆
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★☆☆

ATHLON BOARDS

Aopen AK79G Max

Our second Nforce2 motherboard with integrated graphics is Aopen's AK79G Max. It is packed with features and has three Parallel IDE connectors, two Serial connectors, four USB2 ports, 10/100 Lan and six-channel Realtek audio, plus the graphics of course.

There are plenty of extras on the four back brackets included with this package. For starters one has a gameport and two USB2 ports, another features two Firewire ports, a third has optical and coaxial S/PDIF inputs and outputs and a fourth TV-out for the integrated graphics in both S-Video and coaxial flavours.

There are five PCI slots plus an ACR slot, but we feel this is not the best use of space as we can't recall seeing significant numbers of ACR products on sale. Nor can we imagine how you'd use up the five PCI slots as there are so many integrated features, but it's good to have the option.

As so many of the ports are on brackets the board itself is uncluttered and it is laid out very neatly with a tiny passive heatsink on the southbridge, which reinforces the impression of neatness. The power and floppy connectors are outboard of the memory slots, and the dual Bios chips are tucked away in the corner next to the onboard speaker.

DETAILS

PRICE £123.38 (£105 ex VAT)
CONTACT Aopen **www.aopen.com**
PROS A huge array of ports; very good value; Nforce2 performance
CONS The number of back brackets means there is little space for expansion cards
VERDICT
A motherboard for builders who prefer the integrated route

FEATURES	★★★★½
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

ATHLON BOARDS

Asus A7N8X Deluxe

Where the regular A7N8X uses the Nforce2 MCP (Media and Communications Processor) southbridge, the A7N8X Deluxe uses the MCP-T (Media and Communications Processor Turbo) version, which has extra features. That means the chip has a Firewire controller and the back bracket houses a regular and a mini Firewire port. The audio controller is more comprehensive, and there are five mini jacks plus coaxial S/PDIF on the back plate. The most obvious visual clue to the use of MCP-T is the existence of two 10/100 Lan ports. While this may be of no interest to some users, they will save you time and money if you use cable Internet connections and home networks.

Some of those ports sit where you'd normally find a second serial port, and Asus has put the 'missing' port on a back bracket.

More usefully you get a gameport and a pair of USB2 ports on a bracket, but we are mystified by Asus' habit of omitting an AGP retention device, as a loose graphics card can prevent your PC from starting up.

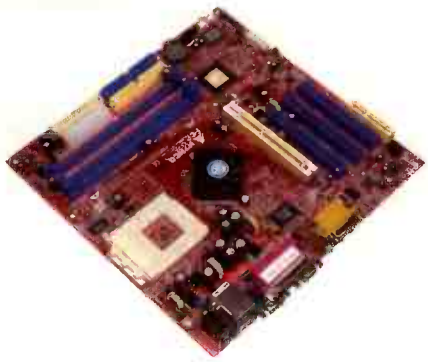
Other motherboards have fans to keep the chips cool, but Asus gets by with a passive heatsink on the northbridge and a bare southbridge. For anyone building a PC that will sit in a communal area, this is a good thing, as it reduces noise.

DETAILS

PRICE £103.40 (£88 ex VAT)
CONTACT Asus
01908 518 000
www.asustek.co.uk
PROS Dual Lan; a minimum of noisy fans; Serial ATA and Firewire
CONS No AGP retention device
VERDICT
Everything you need for your Athlon for just over £100

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

ATHLON BOARDS



Biostar M7NCG

Competing with the Albatron KM18G Pro is Biostar's M7NCG. It, too, is a microATX design with integrated graphics built around the Nforce2 chipset, so it's no surprise that the two have a lot in common.

Biostar has supplied three back brackets to add features that wouldn't fit on the board itself. Taken together they bump up the number of USB2 ports to four, plus two regular Firewire, as well as optical and coaxial S/PDIF. It would make no sense to use all those brackets together as you would end up with a full-sized PC, but instead you could pick and choose. That would give you the ability to configure your mini PC to act as a printing and scanning centre, handle your DV camcorder, or act as a simple DVD and music player.

In terms of Sysmark performance, this is the slowest Nforce2 motherboard by a fair margin and our office productivity tests were very poor.

The Biostar's components are packed closely together, but everything fits in neatly enough. The IDE, floppy and power connectors are grouped together very tidily, but the AGP retention device is very close to a power regulator and is awkward to operate.

DETAILS

PRICE £86.95 (£74 ex VAT)
CONTACT Biostar 01952 461141
www.biostar.com.tw
PROS USB2 and Firewire ports; price
CONS Almost too many features for a micro ATX product
VERDICT
If you want the extra ports, we'd recommend the Biostar. If not, then it's the Albatron

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

ATHLON BOARDS

DFI Lanparty KT400A

It looks as though DFI has studied the Chaintech Apogee, the board that won an Editor's Choice award in our November 2002 group test, and decided to bring out its own version. The Lanparty KT400A comes in a box so large it has a carrying handle and inside there are loads of extras. These include the PC Transpo carrying strap so you can lug your PC to gaming Lan parties (hence the model name), and a box of rounded cables.

Other extras include a back bracket with a gameport, and another with coaxial S/PDIF input and output, but no optical. DFI also includes a FrontX device that will add ports to a spare 5.25in drive bay. There are headphone and microphone mini jacks, as well as two USB2 ports and one Firewire port.

Only two motherboards in this group test use the KT400A chipset, the other one being the Gigabyte 7VAXP-A Ultra, and, although the DFI did well in our testing, Nforce2 still has the edge on performance.

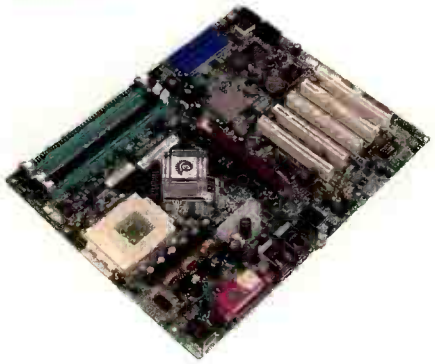
We liked the layout of this board, with no chipset fans and an ATX12V connector in case you feel the need for extra power. We were less impressed by the number of bright green components that DFI has used, but once the board is installed they will be safely out of sight.

DETAILS

PRICE £122.99 (£104.67 ex VAT)
CONTACT DFI 02380 407 072
www.dfi.com
PROS Four IDE connectors; dual Lan; six USB2 ports
CONS No Serial ATA; fairly pricey; slower than the Nforce2 competition
VERDICT
With no Serial ATA this board is backwards-looking

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

ATHLON BOARDS



Epox 8RDA3+

The 8RDA3+ is built to a very neat design that has clearly been carefully thought out. The five PCI slots are a good distance away from the AGP slot to leave space for cooling air to circulate around the graphics card. There are also two Firewire ports on a bracket that would sit neatly in the first PCI position. Both the northbridge and southbridge have passive heatsinks, and there is more space around the processor socket than we usually see, so there is plenty of room for a large heatsink if you want to install one.

Epox has used an ATX12V connector, and both power connectors have loads of room, which makes life easy. On the backplate there is a parallel port, but underneath that there is nothing at all. A gameport and serial port are supplied on a second bracket, but the vast majority of users will have no need to install them. The four USB2 ports and two Lan ports should be plenty for most users, and having the option of Parallel and Serial ATA is always desirable.

At the bottom of the board there's a diagnostic display that helps you to identify start-up errors, but the neatest touch of all is the price; £95 is a steal, however the Gigabyte costs only £10 more and has far more features.

DETAILS

PRICE £95 (£80.85 ex VAT)
CONTACT Epox 02392 667 667
www.epox.org
PROS Very good value; performance; lots of space for easy assembly
CONS Fairly basic audio
VERDICT
A good board, but for £10 more the Gigabyte is better value

FEATURES	★★★★½
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

ATHLON BOARDS

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

Gigabyte 7VAXP-A Ultra

The second KT400A motherboard in this group is loaded with features. Gigabyte has included a Promise PDC20276 chip so the 7VAXP-A Ultra supports four Parallel IDE connectors, and there is also a Silicon Image Sil3112A chip with two Serial ATA connectors. Both chips support Raid, so you could install a huge number of optical and hard drives on this motherboard.

In the box you get three back brackets to add four USB2 ports, a mini Firewire port and a regular Firewire port. A fourth bracket adds surround sound mini jacks as well as optical and coaxial S/PDIF outputs. Those are very welcome features but four brackets seems a bit excessive as it makes it awkward to add even one or two PCI cards.

Although the Gigabyte offering was slightly slower than the Nforce2 boards, it was a close-run thing and performance is very good.

In fact, there is very little to dislike about the Gigabyte. If you use a fair proportion of the features that it offers then the inside of your PC will become a rat's nest of cabling, particularly as the four IDE connectors are positioned very close together.

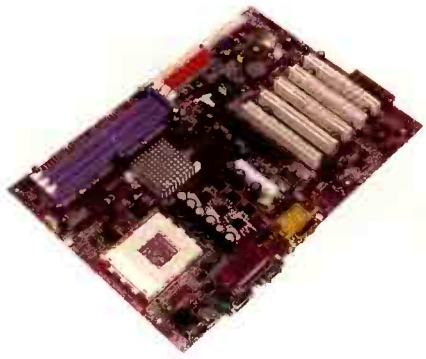
One minor oddity is that you have to force the FSB (front-side bus) to 200MHz with dipswitches if you're using a Duron.

DETAILS

PRICE £106.92 (£91 ex VAT)
CONTACT Gigabyte 01908 362 700
www.gbt-tech.co.uk
PROS A huge list of features; excellent value; good performance
CONS Slightly slower than the Nforce2
VERDICT
An excellent motherboard

FEATURES	★★★★★
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

ATHLON BOARDS



Jetway VD400DB

You don't get much in the way of extras with the Jetway VD400DB. Apart from the motherboard itself there's one IDE cable, a floppy cable, a manual and the driver CD. Then again it costs less than £47, so it's extremely cheap.

As it uses a KT400 chipset, rather than the KT400A, the Jetway doesn't support the latest generation of 400MHz FSB Athlons. That may not matter to you, but the KT400 is also slower than the KT400A, as Via has made a number of internal changes particularly in the memory controllers of the newer chipset. That means you'd be a little foolish to build a high-end PC around this Jetway motherboard, but there is no reason it shouldn't form the grounding for a basic PC.

This motherboard has no Lan and only two USB2 ports, but the absence of loads of integrated features and controller chips means that there is plenty of space, so it should be a doddle assembling a PC with the Jetway without getting yourself in a muddle.

There are five PCI slots and you are likely to end up using most of them to make up for the lack of features. That's fine if you're upgrading a current PC on the cheap, but it makes little sense if you're building a new PC from scratch.

DETAILS

PRICE £46.94 (£39.95 ex VAT)
CONTACT Eclipse Computers 0870 745 6000 **www.jetway.com.tw**
PROS Very cheap; passive cooling on the chipset
CONS Basic list of features; only two USB ports
VERDICT
If you don't want to spend much, look no further

FEATURES	★★½☆☆
PERFORMANCE	★★½☆☆
VALUE FOR MONEY	★★★★½
OVERALL	★★★½☆

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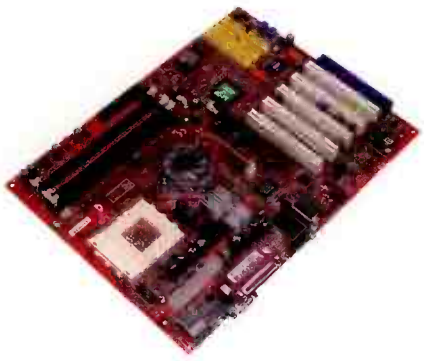
ATHLON BOARDS



MSI K7N2 Delta-ILSR

MSI has used the Nforce2 chipset with Turbo southbridge, just like Asus A7N8X Deluxe and, coincidentally, it charges the same price.

Grouped in one corner of the board are three Parallel ATA controllers plus two Serial connectors and the Promise chip. We are unimpressed by the inclusion of an ACR slot as it is currently of little use to anyone. This is particularly galling as the reference design for Nforce Turbo includes an option called Soundstorm, which is an ACR card that offers full Dolby surround sound. We have yet to see Soundstorm in a retail package.

MSI gives the integrated audio a boost by including a bracket with surround sound mini jacks plus the better digital optical and coaxial S/PDIF outputs. Another bracket carries both regular and mini Firewire ports. On top of all of this there is the MSI D bracket, which carries one USB2 port plus four LEDs arranged in a square pattern. If the PC experiences problems on start-up the bracket will indicate the Post error code visually, rather than as a series of beeps through an onboard speaker.

The D bracket could be of great help to inexperienced PC builders attempting a major upgrade as it removes a lot of guesswork from the diagnosis of faults.

DETAILS

PRICE £103.40 (£88 ex VAT)
CONTACT MSI
www.msicomputer.com
PROS The fastest Athlon board on test; three Parallel ATA controllers; diagnostic bracket
CONS Price; no 'must have' features
VERDICT
Impressive board but it doesn't distinguish itself from rivals

FEATURES	★★★★½
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

PENTIUM 4 BOARDS

Abit IC7-G

The Intel 875P chipset is a workstation product, and that means it should be used in reliable but dull products, much like the Intel D875PBZ board. No-one seems to have mentioned this to Abit however, and it has loaded the first of our Intel-based boards, the IC7-G, with some great desktop features. On the backplate you get four USB2 ports and a Firewire port plus a bracket with two more USB and a second bracket with two further Firewire ports. The six-channel integrated audio has five mini jacks plus optical S/PDIF input and output, and the Lan is Intel Gigabit.

Abit has specified the ICHR southbridge with Serial ATA Raid, rather than the basic ICH5, and has added a Silicon Image 3112A chip so all four Serial ATA connectors support Raid. You get an Abit Serillel adaptor too, so you could connect a Parallel ATA hard drive to one of those connectors.

Despite all those features, the IC7-G is beautifully laid out. The Parallel ATA controllers have been laid down for easy connection and the power sockets are in unusual locations but have plenty of room.

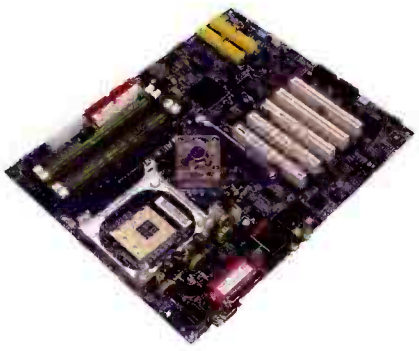
The AGP slot supports AGP Pro 50 graphics cards, which is a nod to the workstation market, but the Abit would also make a stunning games platform.

DETAILS

PRICE £161 (£137.02 ex VAT)
CONTACT Abit 01438 228 888
www.abit.com.tw
PROS Four Serial ATA connectors with Raid; loads of Firewire
CONS Price; fewer features than Gigabyte's 8KNXP Ultra
VERDICT
An affordable motherboard that impressed us with its quality

FEATURES	★★★★★
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★★

PENTIUM 4 BOARDS



Albatron PX865PR Pro II

Albatron went for the 865PE chipset, rather than the 875P, which means that the PX865PR ProII doesn't support ECC memory, but other than that it has the same features as you'd find on the 875P.

We were surprised to see that the Albatron performed very well in Sysmark, despite its 'inferior' chipset.

The Albatron has a lot in its favour. It has a Promise Raid controller, so that's four Parallel controllers, plus the two native Serial ATA controllers that connect to the ICH5 southbridge. That's good, but we've seen it before.

More unusually the audio chip is a Via Envy 24 that gives eight-channel surround sound. There are six mini jacks on the backplate, as well as a back bracket that supports optical and coaxial S/PDIF input and output. Another bracket has four USB2 ports and a third has two Firewire ports. A fourth bracket with one serial port and a gameport may be best ignored to give you some room for your PCI cards.

The layout is a bit odd, with the floppy controller right at the bottom, under the last PCI slot. It is next to the pair of Bios chips and the Firewire connectors, and the floppy cable could have to reach a long way in a medium sized case, let alone a tall tower.

DETAILS

PRICE £119 (£101.28 ex VAT)
CONTACT Albatron
www.albatron.com.tw
PROS Good value; eight-channel audio; Serial and Parallel Raid
CONS An unusual layout; only 2 USB ports on the backplate
VERDICT
A very fair, cheaper alternative to 875P boards

FEATURES	★★★★½
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★★
OVERALL	★★★★½

PENTIUM 4 BOARDS

Aopen AX4C Max

We're starting to expect 875P motherboards to be a bit special, and Aopen doesn't disappoint. There are three versions of the AX4C, and the Max is the one with the most goodies, just as the name suggests.

It has three Parallel IDE controllers and four Serial ATA connectors working through the ICH5R southbridge. On the backplate are six USB2 ports and there's a bracket with a further two ports (and a gameport), while another bracket carries two Firewire ports.

The Realtek ALC650 audio chip is enhanced by a bracket with optical and coaxial S/PDIF input and output. The ATX power connectors are sited particularly well and have loads of room.

The Gigabit Lan comes from Broadcom, and here we have to offer a word of caution. The Intel Gigabit Lan chip is able to communicate directly with the northbridge, whereas a conventional Gigabit chip has to communicate over the PCI bus, and that can cause other devices to have their data bandwidth hijacked.

If you're wondering about the blue PCI port at the bottom, it is the Hercules slot, which has a dedicated power circuit, recommended for Raid and SCSI cards.

DETAILS

PRICE £159.80 (£136 ex VAT)
CONTACT Aopen **www.aopen.com**
PROS Eight USB ports, plus stacks of Serial and Parallel ATA connectors
CONS It would be better if Aopen used an Intel Gigabit Lan solution
VERDICT
Quite a stiff price but very fair value

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

PENTIUM 4 BOARDS

Asus P4C-800 Deluxe

This is an expensive motherboard that is more appropriate for use in workstations than regular desktop PCs. One reason is that it has an AGP Pro slot, albeit with no form of graphics card retention device.

Secondly, the Soundmax audio is competent, if unspectacular, although it has coaxial S/PDIF on the backplate in place of a serial port. The integrated Lan is a 3Com Gigabit chip, which is certainly a top line brand, but we wonder if the Intel solution would be better for heavy network use. Below the fifth PCI slot is a header for a wireless Lan which will support 802.11b when the unit is available. This is a neat idea but we will reserve judgement for the time being, as we have yet to see an Asus card that uses the special blue PCI slots that appear on certain models from the same manufacturer, so this could fall under the same heading.

There are plenty of ports for hard drives with four Serial ATA ports and three Parallel ATA, but that's as good as it gets.

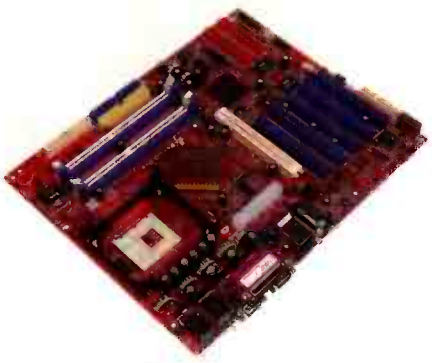
The real surprise is that Asus doesn't include any brackets with extra ports, and that is inexcusable at this price. Granted, all the PCI slots are available for use, but the P4C-800 Deluxe desperately needs to be about £30 cheaper.

DETAILS

PRICE £166.85 (£142 ex VAT)
CONTACT Asus 01908 518 000 **www.asustek.co.uk**
PROS Four Serial ATA connectors; AGP Pro; the PCI slots are all free
CONS Expensive; not enough ports
VERDICT
A quality motherboard that doesn't offer enough features for the price

FEATURES	★★★☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★☆☆☆
OVERALL	★★★☆☆

PENTIUM 4 BOARDS



Biostar P4TCA-Pro

Where Asus has promised wireless Lan, Biostar has delivered it. On the P4TCA-Pro there's an RTL8180 chip and in line with the CNR there's a slot for an aerial card, which is supplied; the two combine to give 802.11b wireless Lan with just the aerial sticking out of the back of the case. This is an elegant solution that adds decent value, yet the Biostar is almost priced the same as the Asus and MSI boards. You also get Intel Gigabit Lan to provide the full complement of networking options.

We like the fact that the wireless solution doesn't take up too much space on the board, as there are four IDE connectors to squeeze in, as well as a pair of Serial connectors, but that's true of most of the Intel boards on test here.

Biostar has used the ICH5R southbridge as well as a Via VT6410 chip to give the full range of Raid options but, other than that, the similarity to the Asus is all too apparent as you don't get very many ports. The audio is a fairly basic mini jack arrangement and there is no Firewire, although two ports are available as optional extras, as is S/PDIF.

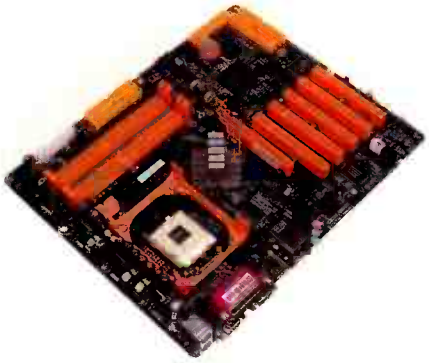
Although the feature list is a little short for a desktop PC, this board is well suited to the workstation market.

DETAILS

PRICE £164.50 (£140 ex VAT)
CONTACT Biostar 01952 461141 **www.biostar.com.tw**
PROS Wireless Lan; loads of Parallel and Serial ATA connectors
CONS Few USB ports; no Firewire
VERDICT
If your main priority is getting connected, then the integrated wireless Lan is a must have

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

PENTIUM 4 BOARDS



DFI Lanparty Pro875

The name Lanparty demonstrates that DFI isn't even paying lip service to the idea that this is a workstation product. Instead, networked gaming is where it's at. In the large box are the same accessories that are supplied with the KT400A model we've reviewed in the AMD section (FrontX panel, PC carrying strap, cables etc), but the board itself is the important part when you're paying £155. Using a combination of ICH5R and a Highpoint HPT372N chip, the Lanparty Pro875 supports plenty of drives.

There is a row of diagnostic LEDs to report startup error codes. Also included is a feature we have previously only seen on some Abit motherboards: micro buttons for power and reset that will make diagnostic work easier. They feel more flimsy than the corresponding Abit parts, though.

We don't like to dwell on cosmetics, but the colour of the Lanparty Pro875 is a little bright, albeit with good reason. If you install a cold cathode light inside your windowed case the PCI, AGP, IDE and memory slots will fluoresce. This is likely to appeal to anyone who plays Lan games.

We'd have been happier if the DFI had slightly fewer frivolous extras, but one thing's for sure, the performance of the board makes up for any minor criticisms.

DETAILS

PRICE £155 (£131.91 ex VAT)
CONTACT DFI 02380 407 072
www.dfi.com
PROS A total of six hard drive connectors; front panel mounted USB and Firewire
CONS A bit too expensive
VERDICT
Fewer gimmicks and a lower price would make it more desirable

FEATURES	★★★☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

PENTIUM 4 BOARDS

ECS Photon PF1

Although this is a decent 865PE motherboard, it is a little uninspired. There are only two Parallel ATA and two Serial ATA connectors, which a year ago would have been acceptable, but in this group six ports are quite common. The ECS has a full complement of six PCI slots and an AGP slot with a retention clip. On the backplate there are four USB ports, plus a Firewire and 3Com Gigabit Lan. There are two more USB sockets on a bracket, together with a mini Firewire port and a second bracket carries optical and coaxial S/PDIF.

The layout is good, but this isn't surprising as there are so few components to house. If flashing lights are your thing, the northbridge fan on the ECS Photon PF1 will be right up your street.

There is no Raid and no unique features and the board's performance is good but nothing spectacular. You can practically feel us building up to a critical conclusion, but you'd be wrong.

Thanks to its use of the cheaper 865PE chipset, ECS has delivered a cheap Pentium 4 motherboard that also performs well. It also costs just under £92 and that makes it a bargain. We love it and reckon it would be ideal for a huge number of PC builders or upgraders.

DETAILS

PRICE £91.65 (£78 ex VAT)
CONTACT ECS 01908 481 830
www.ecs.uk.com
PROS Price; USB ports; Gigabit Lan
CONS Only two Parallel ATA and two Serial ATA
VERDICT
If good value is the priority and you don't need loads of features, this is the motherboard for you

FEATURES	★★★☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

PENTIUM 4 BOARDS

Epox 4PCA3+

This is one of the cheaper 875P motherboards, but it'll still set you back £130 at list price. Once again the main feature is the hard drive side of things as this board has both the ICH5R southbridge and a Highpoint HPT374 chip. That means it supports two Serial ATA connectors, two IDE connectors for optical drives and four IDE controllers for hard drives that can be organised in almost any Raid configuration you fancy.

Packed in around all those connectors and chips is a diagnostic LED to report startup codes and, right at the bottom of the board, is the floppy connector. Epox has managed to place both power connectors with loads of space, so PC assembly couldn't be much easier.

The northbridge has a passive heatsink, and the southbridge has no heatsink at all. This adds to the spacious appearance and makes us wonder why more manufacturers don't do the same.

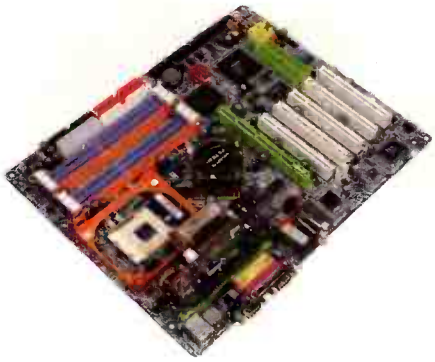
You get a decent number of ports with four USB2 on the backplate and two more on a bracket. There is a gameport on another bracket, in case you want to connect up some Midi kit. A third bracket has optical S/PDIF input and outputs to help maintain the quality of the C-Media audio, which covers all the essentials.

DETAILS

PRICE £130 (£110.64 ex VAT)
CONTACT Epox 02392 667 667
www.epox.org
PROS Loads of Parallel ATA Raid options; tidy layout; good value
CONS No Firewire; we'd prefer the Gigabit Lan from Intel
VERDICT
A very solid workstation motherboard at a decent price

FEATURES	★★★★★
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★★

PENTIUM 4 BOARDS



Gigabyte 8KNXP Ultra

Gigabyte has rather messed up our neat scoring system by submitting the 8KNXP Ultra, that has both a huge features list and an enormous price.

The Ultra tag refers to the integrated 3Com SCSI Ultra 320 controller, which explains about half of the £310 price. If you have no interest in SCSI for your workstation, then the Ultra has another interesting feature that may draw you in: six memory slots where every other 875P board here has only four. While we're limited to 512MB modules of PC3200 memory, it means the Ultra can run 3GB of memory, rather than 2GB, which should help image-editing users.

When the going gets tough, the Gigabyte dual-power module (it looks a little like a slot-based Pentium II processor) should ensure that your Northwood processor gets plenty of six-phase power to ensure rock solid stability.

It is very hard to find fault with a motherboard that has as many features as the Ultra but, realistically, the price will turn away 99 per cent of potential buyers. You will need a hefty power supply and a case with industrial cooling to run this motherboard and the hardware that it supports, but the resulting workstation should be impressive.

DETAILS

PRICE £310.20 (£264 ex VAT)
CONTACT Gigabyte 01908 362 700 **www.gbt-tech.co.uk**
PROS Six memory slots; SCSI Ultra 320; six-phase power for stability
CONS Price; no Firewire ports
VERDICT
An amazing amount of hardware, but it's expensive

FEATURES	★★★★★
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

PENTIUM 4 BOARDS

Intel D875PBZ

We are used to Intel motherboards that have few features and a restrictive Bios to prevent overclocking, and usually the emphasis is firmly on stability and reliability. The D875PBZ breaks new ground, though, as it is very competitive on price and appears near the top of our Sysmark chart.

Naturally it is more or less a reference design, and that means that the feature list is quite short. Intel has never been shy of competing with its customers, so no doubt in time we will see motherboards with flashing lights on the fans and multicoloured components, but not at the moment.

The D875PBZ has six USB2 ports on the backplate as well as the Intel Gigabit Lan. We feel sure that Intel will be happy to drop the legacy serial and parallel ports as soon as possible, but in the meantime you get one of each.

There's no Firewire, no audio and no brackets with extra ports, which shows you how Intel thinks a workstation should be specified.

On the other hand, you may think the addition of a sound card would make this into the basis of a fine desktop PC, and we would agree.

DETAILS

PRICE £117.50 (£100 ex VAT)
CONTACT Intel 01793 403 636 **www.intel.com**
PROS Good performance; cheap
CONS No Firewire; only supports two parallel and two serial drives
VERDICT
Intel finally seems to be getting the hang of motherboards that appeal to the retail customer

FEATURES	★★☆☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

PENTIUM 4 BOARDS

Mercury NDSMx

Everything about the Mercury NDSMx shrieks budget, including a price tag just shy of £43. The Mercury is a microATX motherboard with integrated graphics that makes use of the Sis650GL chipset but, as a result, doesn't support the new 800MHz FSB of Northwood C. We cheated slightly in our testing and used a 3.06GHz Northwood B and the results were surprising, getting to within 15 per cent of the mainstream.

It's unusual that the Mercury has two SD-Ram memory slots and two for DDR SD-Ram. However, you can only use one memory type at a time, and the maximum memory speed is PC2100.

The integrated graphics are rudimentary and not up to high-end gaming standards, but there is no reason you couldn't build a decent PC around this board with a view to doing office work. It supports AGP 4x so you could install a decent graphics card if you felt the need. Our tests with a Radeon 9700 Pro show that graphics performance was only limited by the slower CPU type.

There is so little room for upgrade with the Mercury that it would be a shame to waste a fast Pentium 4 on it. We recognise its limits and amazing price, and suggest you only consider the Mercury for a very basic, cheap PC.

DETAILS

PRICE £42.51 (£36.18 ex VAT)
CONTACT Light Computers 0870 787 800 **www.kobian.com**
PROS Very cheap; support for SD and DDR memory
CONS No support for 800MHz FSB; little upgrade potential
VERDICT
Despite its limitations it's an adequate, good value board

FEATURES	★★☆☆☆
PERFORMANCE	★★☆☆☆
VALUE FOR MONEY	★★★★★
OVERALL	★★☆☆☆

PENTIUM 4 BOARDS

MSI 875P Neo-FIS2R

As with the Athlon boards, MSI and Asus charge exactly the same price for their 875P products. The difference is that Asus has built a workstation product, whereas MSI has gone for the desktop route, so they are similar but easy to differentiate.

The 875P Neo-FIS2R has an AGP 8x slot, rather than AGP Pro, and a proper AGP retention device. MSI includes three bracket plates with a variety of extra ports. The D bracket has diagnostic LEDs and two USB ports; the S bracket has optical and coaxial output, while the Firewire bracket has three ports (two regular and one mini). That's plenty, but the brackets will restrict access to the PCI slots.

The onboard ADI audio chip is fairly basic, but MSI includes Soundmax software that boosts it to give full six-channel surround sound.

MSI has taken a similar approach to a number of manufacturers, by using the ICH5R with a Promise 2037 chip to give support for three Parallel ATA controllers and four Serial ATA connectors. As with every manufacturer, you also get a great big handful of connecting cables to help you plug the whole lot together.

This decent motherboard offers more options than the Asus at the same price.

DETAILS

PRICE £166.85 (£142 ex VAT)
CONTACT MSI
www.msicomputer.com
PROS USB and Firewire ports; loads of Serial and Parallel ATA
CONS Fairly pricey; no unique selling point
VERDICT
A very good motherboard but it is similar to others here

FEATURES	★★★★☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

PENTIUM 4 BOARDS

Supermicro P4SPA+

Supermicro makes workstation motherboards that crunch data, so it's a real surprise to see an 865G motherboard with the Supermicro brand – and at £119 it's dirt cheap by the company's usual standards. Sadly, it isn't by ours.

Although its feature list is relatively short it compares well to the Intel D875PBZ as it has integrated audio and graphics, so you would expect to have to buy very few components to build a workstation or desktop PC. Its Intel integrated graphics are aimed at desktop use, rather than gamers, but that's fine if your needs are few. There is a variant of this board, the P4SPA, that uses the 865PE chipset, minus the integrated graphics, which we would expect to be cheaper but at present we have no pricing information.

The absence of any form of Raid, including the ICH5R southbridge, shows that Supermicro is keeping the P4SPA+ straightforward, with performance that matches the ECS to within a fraction of a per cent. The same can be said for its lack of Firewire, as Supermicro has no expectation that you'll be plugging your DV camcorder or Apple Ipod into your workstation. You'll get a better deal by choosing our Highly Commended ECS as it offers slightly more features for rather less cash.

DETAILS

PRICE £119 (£101.28 ex VAT)
CONTACT Boston 08707 515 950
www.boston.co.uk
PROS Integrated graphics; decent performance
CONS No Raid; no Firewire; basic audio
VERDICT
Ideal if you want to build a basic, dependable workstation

FEATURES	★★★☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

vnu labs

How we tested

We tested the motherboards with an Intel P4 3GHz Northwood C (800MHz FSB) or AMD Athlon XP 3000+ (333MHz FSB) as appropriate, along with two 256MB PC3200 modules of Crucial memory, a 120GB Western Digital hard drive with 8MB cache and a Crucial Radeon 9700 Pro graphics card.

We ran our usual Sysmark 2002, 3Dmark 2001 and Unreal Tournament tests, but the results aren't as informative as we would like, as performance tends to be a function of the chipset. Because the majority of Athlon boards used Nforce2 (see AMD box, page 126) while the Pentium 4 products were almost exclusively from the 865 and 875 family (see Pentium 4 box, page 126), there is little to choose between many of the boards on performance grounds. This is particularly true when you consider that Sysmark has a margin of error of about three per cent. As a result the spread of test results is very narrow, but at least you can be reassured that the latest chipsets and motherboards offer stunning performance.

During our testing we discovered some serious memory compatibility issues. While the PC3200 is quite a new Jedec standard, there has been an unofficial standard for over six months. In testing we found that the first batch of PC3200 from Crucial worked fine in the Pentium 4 boards, but some of the Athlon products gave us problems. Occasionally, performance would be erratic, but more often than not the board would simply refuse to Post (power on self test) and wouldn't even get to the Bios.

After some intensive analysis we pinpointed the memory as the problem and Crucial shipped us its latest PC3200 (which uses different Samsung chips to the first samples).

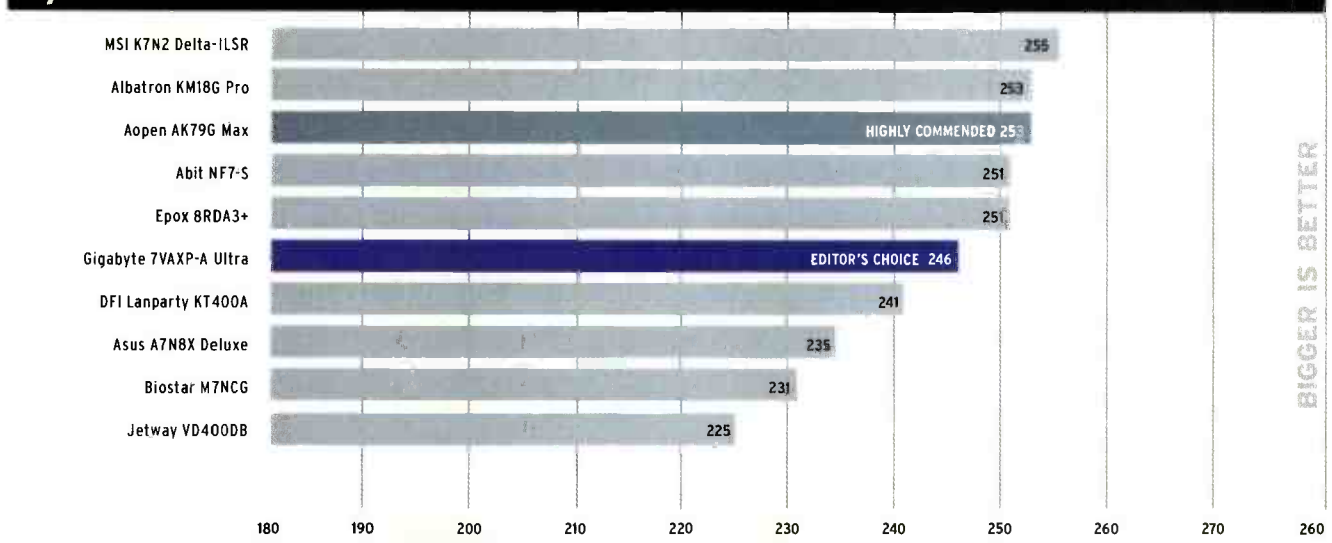
We tried a number of other brands of memory, just in case the problem was down to Crucial, but found that whether a given type of memory would work on a given motherboard was hit and miss. The upshot of this is that we strongly recommend you read the memory section of the motherboard manual very carefully and follow the recommendations. These will include the number of banks of memory that can be installed (ie single or double-sided modules, and how many modules) as well as the amount of memory and the speed. Also, you would be well advised to contact your preferred memory supplier to tell them which motherboard you are going to use to ensure compatibility.

Thanks to Crucial for supplying the memory (www.crucial.com).

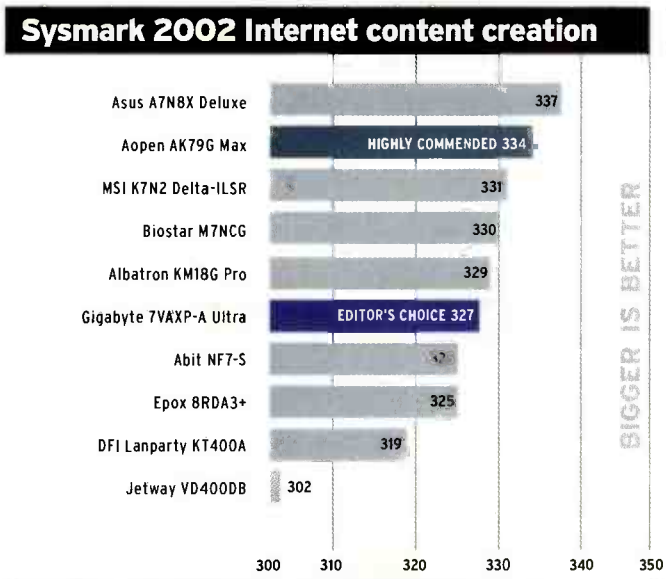
Lab results (Athlon boards)

vnu labs

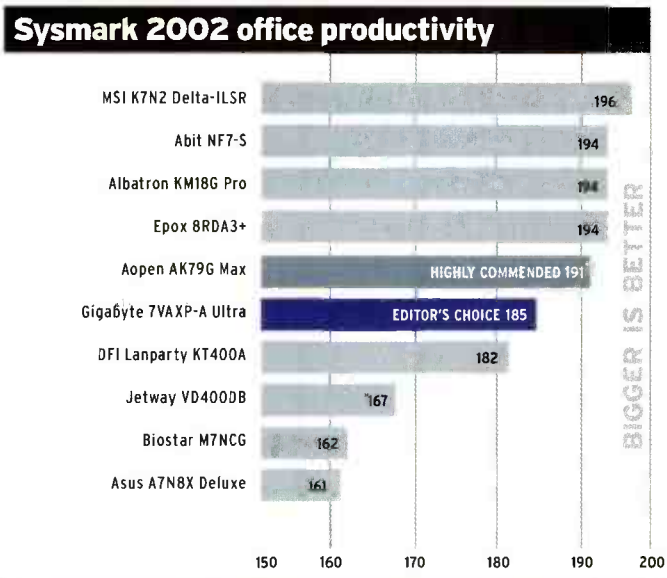
Sysmark 2002 overall



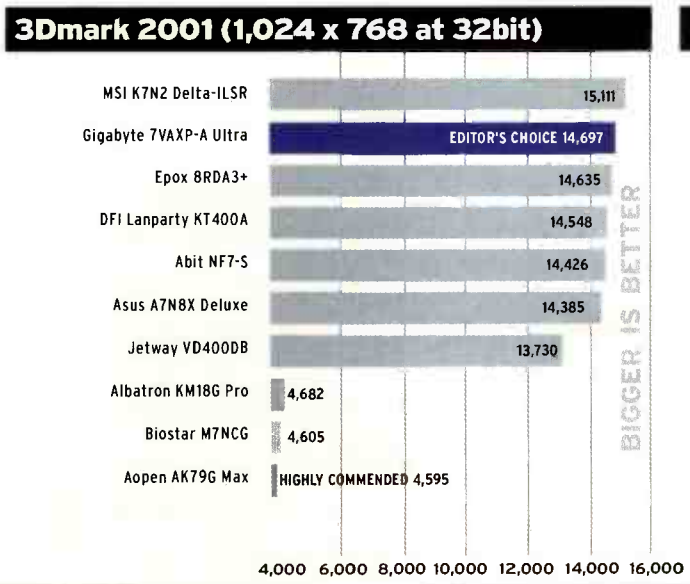
Sysmark 2002 Internet content creation



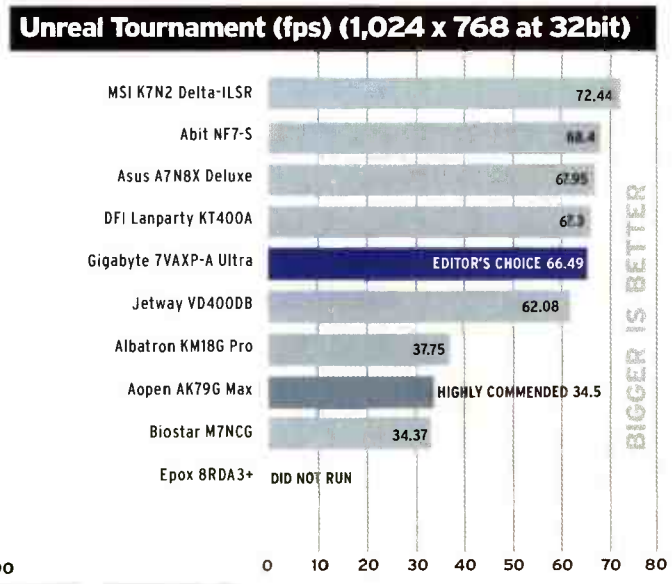
Sysmark 2002 office productivity



3Dmark 2001 (1,024 x 768 at 32bit)

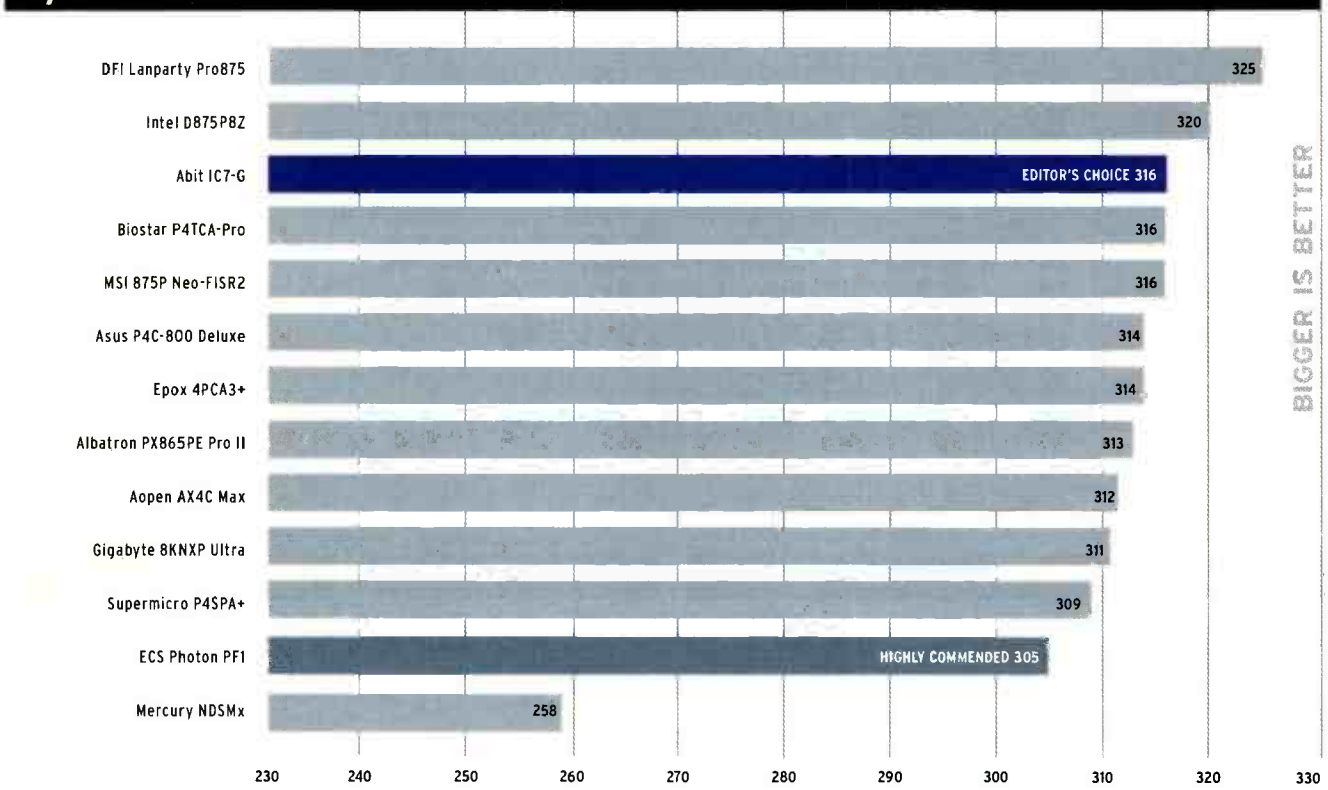


Unreal Tournament (fps) (1,024 x 768 at 32bit)

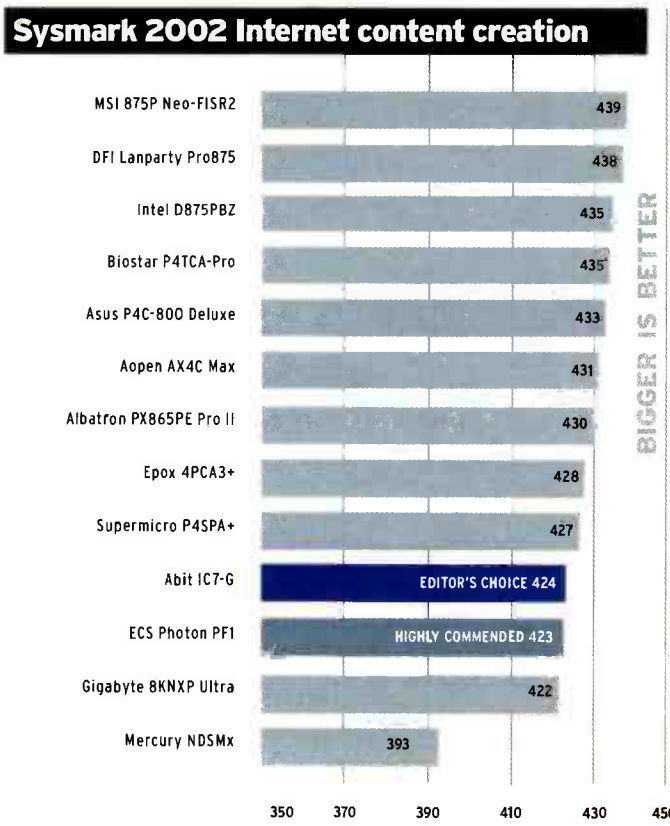


Lab results (Pentium 4 boards)

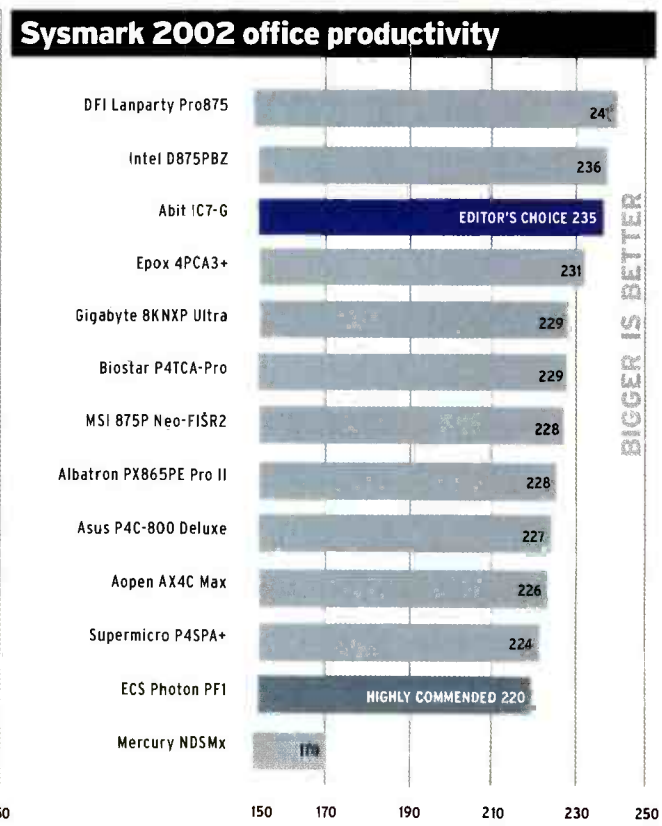
Sysmark 2002 overall



Sysmark 2002 Internet content creation



Sysmark 2002 office productivity



Please see page 122 for an explanation of how we tested the motherboards

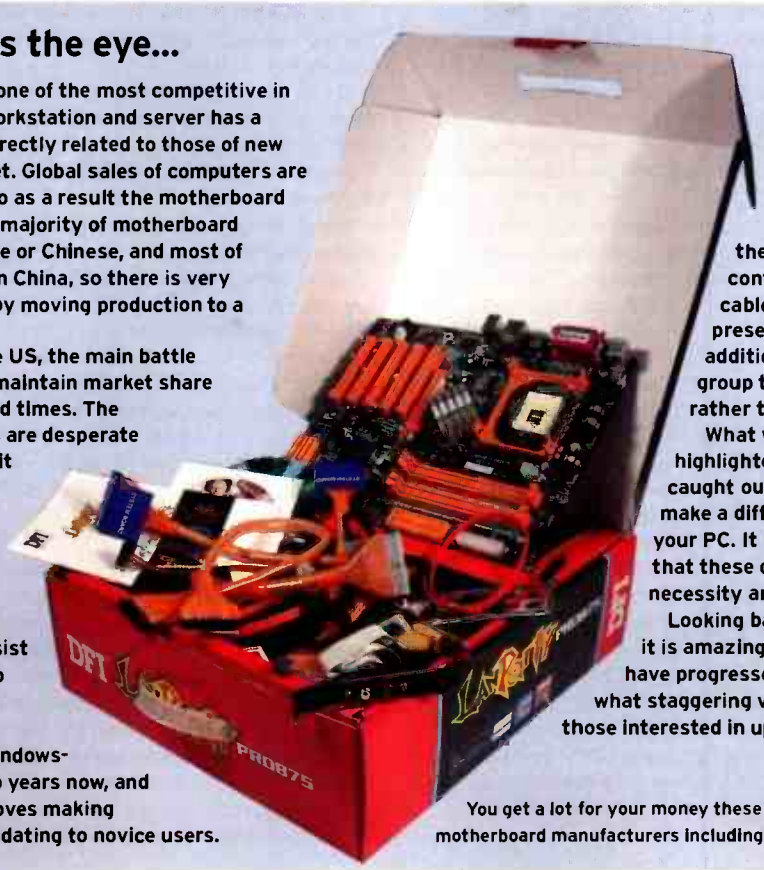
vnu labs

More than meets the eye...

The motherboard market is one of the most competitive in the IT industry. Every PC, workstation and server has a motherboard, so sales are directly related to those of new PCs, plus the upgrade market. Global sales of computers are essentially flat at present, so as a result the motherboard market is also flat. The vast majority of motherboard manufacturers are Taiwanese or Chinese, and most of their production plants are in China, so there is very little scope to reduce costs by moving production to a cheaper area.

In Western Europe and the US, the main battle for the manufacturers is to maintain market share and profitability in these hard times. The motherboard manufacturers are desperate to appeal to us, and our credit cards, so as a result we can get plum products with exciting features for reasonable prices.

For instance, these days most motherboard makers have included a utility to assist Bios flashing, so you have no need to fiddle about with a Dos prompt. Intel-branded motherboards have had a Windows-based flashing utility for two years now, and we feel these are positive moves making motherboards far less intimidating to novice users.

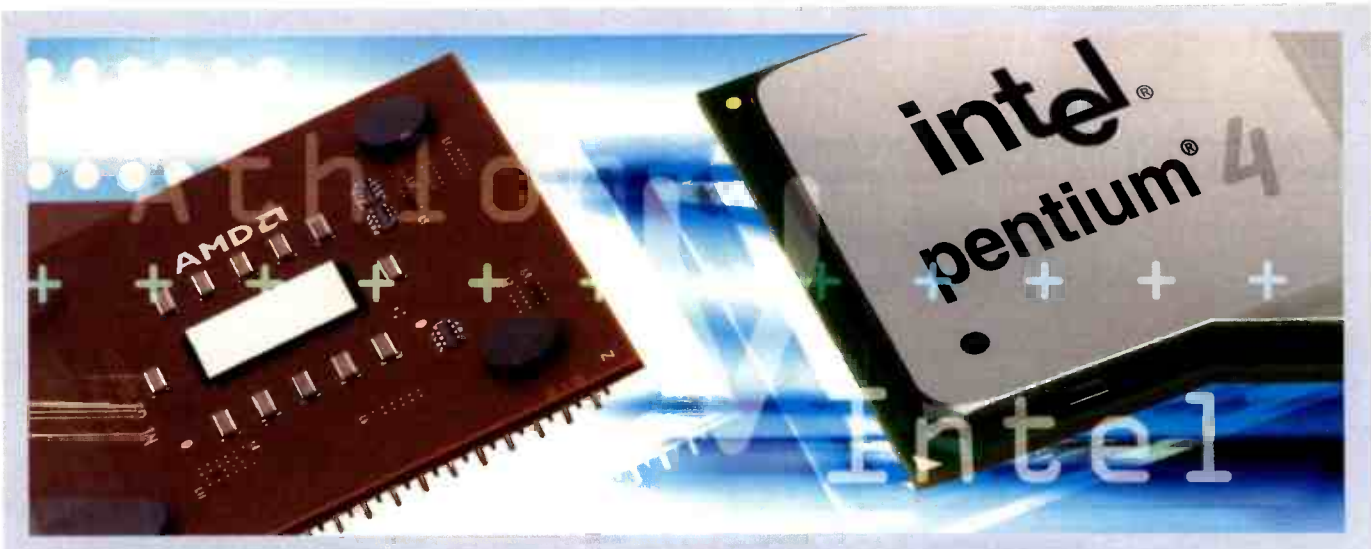


You get a lot for your money these days, with more and more motherboard manufacturers including great features for good prices

Throughout the reviews in this group test we've taken lots of things for granted to avoid excessive repetition. Our features table doesn't dwell on floppy controllers, the two native Parallel ATA controllers, driver CDs, manuals, cables or software, as these are present with every motherboard. In addition, every USB port in this group test is USB2 compliant, rather than USB1.1.

What we have focused on and highlighted are the features that caught our attention, and that will make a difference to the way you use your PC. It has truly come as a surprise that these days four USB ports are a necessity and six ports are ample.

Looking back on previous group tests it is amazing to see how far motherboards have progressed over the past few years, and what staggering value for money they offer to those interested in upgrading their PCs.



Battle of the chips

In this group test we saw both AMD Athlon and Intel Pentium 4-based motherboards. Here we strip down each processor so you can see what they're made of and make your own judgements about who will win the chip war.

Athlon appeal

In the invitation for this group test we specified that Athlon motherboards would be tested with an Athlon XP3000+. At that time the only XP3000+ processor was an Athlon with a 333MHz FSB (front-side bus), but subsequently AMD has announced a new Athlon XP3200+ that makes use of a 400MHz FSB, although there is bound to be an XP3000+ with 400MHz FSB support too.

This increase in FSB is significant, as the 333MHz model has a data bandwidth that is adequately served by PC2700 DDR SD-Ram memory, but the new 400MHz model will be limited by anything less than PC3200 memory.

Also, because AMD has announced it will release the 64bit Opteron as its next generation of desktop processor in September, development of new chipsets for the Athlon has been rather hesitant. This is understandable, as there will be a limited time for the chipset manufacturers to recoup their investment and, just as importantly, Pentium 4 currently offers far better performance than Athlon.

Although you can buy Athlon motherboards with Sis and Ali chipsets they are few and far between, and AMD has stopped supporting Athlon with its own chipsets. Presently, the two main chipset providers are Nvidia with its Nforce2, and Via with its KT400 and KT400A.

Nvidia offers a choice of two northbridges (one with integrated graphics, the other without) and two southbridges. The standard MCP offers USB2, 10/100 Lan and high-quality six-channel audio, while the MCP-T (for Turbo) adds a second Lan controller and increases the audio features. These choices mean that the motherboard manufacturers can offer a large range of products that all huddle under the Nforce umbrella.

By contrast Via took the existing KT333 and added support for the unofficial PC3200 memory standard. KT400 wasn't very impressive as PC3200 was a bit flaky and Athlon didn't really respond to the faster memory anyway. Once a real PC3200 standard was sorted out Via responded with the KT400A, which is very similar to KT400, but has enhanced memory controllers that boost performance. In our testing we found there is little to choose between KT400A and Nforce2.

Another feature of KT400A is its pin compatibility with KT400. Motherboard manufacturers can retain their existing designs and production processes, and simply drop in the new chip, which saves time and money.

Until a couple of months ago Nvidia had a significant edge on performance over Via, thanks to its dual-channel memory technology, however Via has now closed the performance gap.

Although Athlon is near the end of its lifecycle, it still has a future. The next version of Nforce2 will be called Nforce2 Ultra, and will add support for the new 400MHz FSB with dual-channel memory, while the recently announced Via KT600 chipset supports the 400MHz Barton with single-channel memory.

Pentium performance

On the Intel side, Northwood C is the latest version of Pentium 4, running on an 800MHz FSB (4 x 200MHz), rather than the 533MHz (4 x 133MHz) of Northwood B. We had expected Northwood C to run on a 667MHz (4 x 166MHz) FSB but it seems that Intel skipped straight over that speed to retain its performance advantage over Athlon. It launched in April at 3GHz, and is available at speeds down to 2.4GHz.

Also in April Intel launched the 875P chipset, previously codenamed Canterwood, and followed up with the 865 family (Springdale) in May.

If you want a Northwood C motherboard you have the choice of Intel or Sis chipsets, but the vast majority of the latest motherboards use either Intel's 865 or 875P. Effectively they are the same chipset, although they have slightly different features.

The 875P is a workstation product that supports the 800MHz FSB as well as ECC (Error Correcting Code) PC3200 memory, which tends to have a higher latency than non-ECC memory. To ensure its premium product is the fastest thing on the market, Intel tests each batch of the chipsets, and the fastest are designated as 875P. Next we have 865PE which doesn't support ECC, and then we get 865P, which only supports the 400, and 533MHz FSB and does not support Northwood C. Finally we have 865G, which is 865PE with the addition of integrated Intel graphics.

All four chipsets support AGP 8x and have dual-channel memory support for up to 4GB of PC3200, although the fact that the biggest modules are 512MB at present puts a lower effective limit on motherboards.

Intel has included a Gigabit Lan technology called CSA (Communication Streaming Architecture) that connects directly to the northbridge and avoids the problem of the Lan connection saturating the PCI bus. Intel emphasises the point that only its Gigabit solution uses the CSA technology and that other chips from the likes of 3Com and Broadcom won't give the same benefits, as they have to work through the PCI bus.

There are two versions of the southbridge, which has moved from ICH4 to ICH5 with added support for Serial ATA. As we explain in our box on Raid (see page 130), there is also a version called ICH5R that supports Serial ATA for two drives.

The search is over .....

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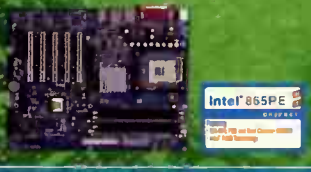
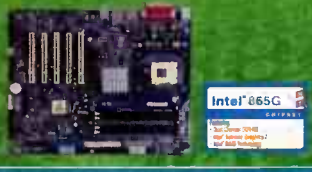




P4I865PEA
CPU: Pentium 4 (478 pins)
Chipset: Intel® 865PE/ICH5
FSB: 800/533/400MHz
Memory: Dual Channel DDR400/333/266
Form Factor: ATX /5PCI/1AGP 8X
Onboard: 5.1 Channel Audio (6CH_Bracket Cable optional)
USB/1394: 8xUSB2.0 (4x onboard, 4x optional), 2x1394a (optional)
QDI Innovations: Hyper-Threading Detector, Pro-StepEasy, Pro-RecoveryEasy*, Pro-LogoEasy, SpeedEasy, BootEasy, BIOS-ProtectEasy, Pro-UpdateEasy
* QDI will supply updated BIOS later on.

P4I865GA
CPU: Pentium 4 (478 pins)
Chipset: Intel® 865G/ICH5 (Integrated Intel® Extreme Graphics 2)
FSB: 800/533/400MHz
Memory: Dual Channel DDR400/333/266
Form Factor: ATX /5PCI/1AGP 8X
Onboard: 5.1 Channel Audio (6CH_Bracket Cable optional)
USB/1394: 8xUSB2.0 (4x onboard, 4x optional), 2x1394a (optional)
QDI Innovations: Hyper-Threading Detector, Pro-StepEasy, Pro-RecoveryEasy*, Pro-LogoEasy, SpeedEasy, BootEasy, BIOS-ProtectEasy, Pro-UpdateEasy
* QDI will supply updated BIOS later on.

P4I865PA
CPU: Pentium 4 (478 pins)
Chipset: Intel® 865P/ICH5
FSB: 533/400MHz
Memory: Dual Channel DDR333/266
Form Factor: ATX /5PCI/1AGP 8X
Onboard: 5.1 Channel Audio (6CH_Bracket Cable optional)
USB/1394: 8xUSB2.0(4x onboard, 4x optional) , 2x1394a (optional)
QDI Innovations: Hyper-Threading Detector, Pro-StepEasy, Pro-RecoveryEasy*, Pro-LogoEasy,SpeedEasy, BootEasy, BIOS-ProtectEasy, Pro-UpdateEasy
* QDI will supply updated BIOS later on.

Images shown may vary from the actual products

QDI COMPUTER (UK) LTD.
2/F, Seymour House, 186 High Street
Slough, Berkshire SL1 1JS
Tel: (44) 1753 486004 Fax: (44) 1753 550885

QDI WORLDCLASS MAINBOARD

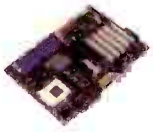
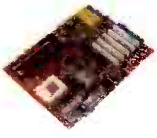
www.qdigrp.com
www.qdieurope.com

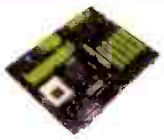
Pro-LogoEasy BootEasy Pro-StepEasy

Table of features

	ATHLON BOARDS		
MANUFACTURER	ABIT	ALBATRON	AOPEN
MODEL	NF7-S	KM18G PRO	AK79G MAX
Price inc VAT (ex VAT)	£95 (£80.85)	£68 (£57.87)	£123.38 (£105)
Contact phone number and/or URL	01438 228 888 www.abit.com.tw	www.albatron.com.tw	www.aopen.com
Chipset manufacturer and model	Nvidia Nforce2	Nvidia Nforce2	Nvidia Nforce2
Front-side bus speeds supported (MHz)	200/266/333	200/266/333	200/266/333
Memory speeds supported	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200
Memory slots /max Ram supported	3/3GB PC2700 or 2/2GB PC3200	3/3GB PC3200	3/3GB PC3200
AGP support	8x	8x	8x
PCI/CNR/ACR slots	5/0/0	3/1/0	5/1/0
Number of PS/2/serial/parallel/game/Lan ports	2/2/1/0/1	2/1/1/1/1	2/1/1/1/1
Number of USB2/Firewire/parallel IDE/Serial ATA ports	4/2/2/2	4/0/2/0	6/2/3/2
Onboard VGA/onboard sound	✗/Realtek ALC650 six channel	✓/Realtek ALC650 six channel	✓/Realtek ALC650 six channel
Onboard Raid and model	✓/Silicon Image Sil3112A	✗	✗
SCORES			
Features	★★★½☆	★★½☆☆	★★★★½
Performance	★★★★½	★★★★½	★★★★½
Value for money	★★★★½	★★★★½	★★★★½
Overall	★★★½☆	★★★½☆	★★★★½

Table of features

	ATHLON BOARDS		PENTIUM 4 BOARDS
			
MANUFACTURER	JETWAY	MSI	ABIT
MODEL	VD400DB	K7N2 DELTA-ILSR	IC7-G
Price inc VAT (ex VAT)	£46.94 (£39.95)	£103.40 (£88)	£161 (£137.02)
Contact phone number and/or URL	0870 745 6000 (Eclipse) www.jetway.com.tw	www.msicomputer.com	01438 228 888 www.abit.com.tw
Chipset manufacturer and model	Via KT400	Nvidia Nforce2	Intel 875P
Front-side bus speeds supported (MHz)	200/266/333	200/266/333	400/533/800
Memory speeds supported	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200
Memory slots /max Ram supported	3/3GB PC3200	3/3GB PC3200	4/4GB PC3200
AGP support	8x	8x	8x
PCI/CNR/ACR slots	5/1/0	5/0/1	5/0/0
Number of PS/2/serial/parallel/game/Lan ports	2/2/1/1/0	2/1/1/0/1	2/1/1/0/1
Number of USB2/Firewire/parallel IDE/serial ATA ports	2/0/2/0	5/2/3/2	6/3/2/4
Onboard VGA/onboard sound	✗/CMI9738 six channel	✗/Realtek ALC650 six channel	✗/Realtek ALC650 six channel
Onboard Raid and model	✗	✓/Promise PDC20376	✓/Intel ICH5R and Sil3112A
SCORES			
Features	★★☆☆☆	★★★★½	★★★★½
Performance	★★☆☆☆	★★★★½	★★★★½
Value for money	★★★★½	★★★★½	★★★★½
Overall	★★★½☆	★★★★½	★★★★½

	ASUS	BIOSTAR	DFI	EPOX	GIGABYTE
					
	A7N8X DELUXE	M7NCG	LANPARTY KT400A	8RDA3+	7VAXP-A ULTRA
	£103.40 (£88)	£86.95 (£74)	£122.99 (£104.67)	£95 (£80.85)	£106.92 (£91)
	01908 518 000 www.asustek.co.uk	01952 461 141 www.biostar.com.tw	02380 407 072 www.dfi.com	02392 667 667 www.epox.org	01908 362 700 www.gbt-tech.co.uk
	Nvidia Nforce2	Nvidia Nforce2	Via KT400A	Nvidia Nforce2	Via KT400A
	200/266/333	200/266/333	200/266/333/400	266/333/400	200/266/333
	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200
	3/3GB PC3200	3/3GB PC3200	3/3GB PC3200	3/3GB PC3200	3/3GB PC3200
	8x	8x	8x	8x	8x
	5/0/0	3/1/0	5/0/0	5/0/0	5/0/0
	2/1/1/1/2	2/1/1/1/1	2/2/1/1/2	2/1/1/1/2	2/2/1/1/2
	6/2/2/2	4/2/2/0	6/1/4/0	4/2/2/2	6/2/4/2
	✗/Realtek ALC650 six channel	✓/Realtek ALC650 six channel	✗/CMI9739A six channel	✗/CMI9739A six channel	✗/Realtek ALC650 six channel
	✓/Silicon Image Sil3112A	✗	✓/Highpoint HPT372	✓/Silicon Image Sil3112A	✓/Promise PDC20276 and Sil3112A
	★★★★☆	★★★☆☆	★★★★☆	★★★★☆	★★★★★
	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★☆
	★★★★☆	★★★★☆	★★★☆☆	★★★★☆	★★★★★
	★★★★☆	★★★★☆	★★★☆☆	★★★★★	★★★★★

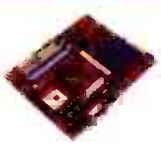
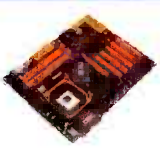
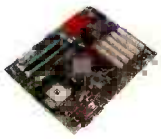
	ALBATRON	AOPEN	ASUS	BIOSTAR	DFI
					
	PX865PE PRO II	AX4C MAX	P4C-800 DELUXE	P4TCA-PRO	LANPARTY PRO875
	£119 (£101.28)	£159.80 (£136)	£166.85 (£142)	£164.50 (£140)	£155 (£131.91)
	www.albatron.com.tw	www.aopen.com	01908 518 000 www.asustek.co.uk	01952 461 141 www.biostar.com.tw	02380 407 072 www.dfi.com
	Intel 865PE	Intel 875P	Intel 875P	Intel 875P	Intel 875P
	400/533/800	400/533/800	400/533/800	400/533/800	400/533/800
	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200
	4/4GB PC3200	4/4GB PC3200	4/4GB PC3200	4/4GB PC3200	4/4GB PC3200
	8x	8x	8x AGP Pro	8x	8x
	5/0/0	5/0/0	5/0/0	5/1/0	5/0/0
	2/2/1/1/1	2/2/1/0/1	2/1/1/0/1	2/2/1/0/1	2/2/1/1/1
	6/2/4/2	8/3/3/4	4/1/3/4	4/0/4/2	6/1/4/2
	✗/Via Envy 24 eight channel	✗/Realtek ALC650 six channel	✗/ADI AD1985 six channel	✗/CMI9739A six channel	✗/CMI9739A six channel
	✓/Intel ICH5R and Promise 20276	✓/Intel ICH5R and Promise PDC20378	✓/Promise PDC20378	✓/Intel ICH5R and Via VT6410	✓/Intel ICH5R and HPT372N
	★★★★☆	★★★★☆	★★★☆☆	★★★★☆	★★★☆☆
	★★★☆☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
	★★★★★	★★★★☆	★★☆☆☆	★★★☆☆	★★★☆☆
	★★★★☆	★★★★☆	★★★☆☆	★★★★☆	★★★☆☆

Table of features

	PENTIUM 4 BOARDS		
			
MANUFACTURER	ECS	EPOX	GIGABYTE
MODEL	PHOTON PF1	4PCA3+	8KNXP ULTRA
Price inc VAT (ex VAT)	£91.65 (£78)	£130 (£110.64)	£310.20 (£264)
Contact phone number and/or URL	01908 481 830 www.ecs.uk.com	02392 667 667 www.epox.org	01908 362 700 www.gbt-tech.co.uk
Chipset manufacturer and model	Intel 865PE	Intel 875P	Intel 875P
Front-side bus speeds supported (MHz)	400/533/800	533/800	533/800
Memory speeds supported	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200
Memory slots /max Ram supported	4/4GB PC3200	4/4GB PC3200	6/4GB PC3200
AGP support	8x	8x	8x AGP Pro
PCI/CNR/ACR slots	6/0/0	5/0/0	5/0/0
Number of PS/2/serial/parallel/game/Lan ports	2/1/1/0/1	2/2/1/1/1	2/2/1/0/1
Number of USB2/Firewire/parallel IDE/serial ATA ports	6/2/2/2	6/0/6/2	8/0/4/2
Onboard VGA/onboard sound	✗/CMI9739A six channel	✗/CMI9739A six channel	✗/Realtek ALC655 six channel
Onboard Raid and model	✗	✓/Intel ICH5R and HPT374	✓/Gigaraid iTE8212
SCORES			
Features	★★★½☆	★★★★½	★★★★★
Performance	★★★★½	★★★★½	★★★★½
Value for money	★★★★★	★★★★½	★★★★½
Overall	★★★★½	★★★★½	★★★½☆

Raid explained

Officially Raid is an acronym that stands for Redundant Array of Inexpensive or Independent Disks, but we tend to use the term Raid to describe any array of hard drives.

A few years ago hard drive capacities were small, and they were slow, expensive and fairly unreliable. The only way to get databases running at a respectable speed was to join up hard drives in an array using a suitable controller.

The simplest form of Raid is Raid 1, which mirrors one drive to another. As the computer reads from or writes to the array, the operation is duplicated on the second drive. In the event of a drive failure the array reports the problem, but is able to keep on working with the other drive, hence the term redundant. Although the extra read and write operations lead to reduced performance, the important point is that data integrity is maintained.

Raid 0 stripes data across a number of hard drives (usually two) to improve performance by making maximum use of the cache on each hard drive. The controller writes to drive A, then drive B and then to drive A again. Raid 0 can boost data access performance from 45Mbytes/sec to around 60Mbytes/sec. The problem is that a failed drive wrecks the entire array and all the data is lost. This means that Raid 0 is statistically less reliable than using a single hard drive.

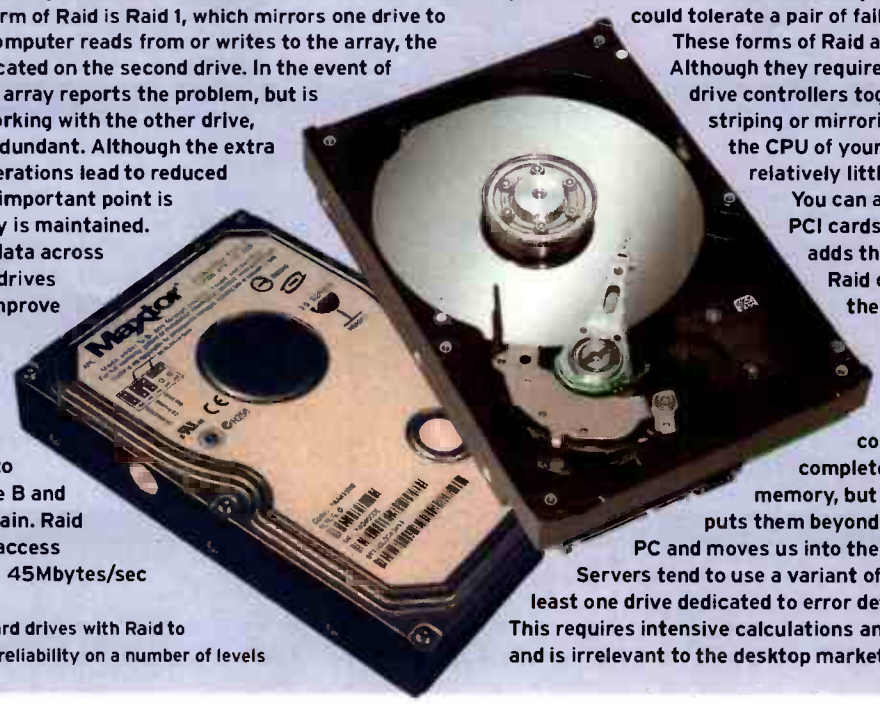
There is a way round this, although it is a little involved. With a suitable controller, and four hard drives, you can use Raid 10 which is a combination of Raid 0 and Raid 1 that arranges the drives in two pairs so that one striped pair is mirrored to the second striped pair. Raid 10 is fault tolerant of a single failed drive and with luck could tolerate a pair of failed drives.

These forms of Raid are known as software Raid. Although they require a Raid chip to link the hard drive controllers together, the workload of the striping or mirroring operation is handled by the CPU of your PC, and the Raid chip does relatively little.

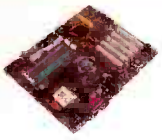
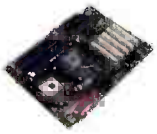
You can also buy software Raid PCI cards for as little as £15 which adds the function of an integrated Raid chip to a PC that lacks the feature.

The Raid workload can get quite intensive, which then requires a hardware controller. These usually come in the form of a PCI card complete with a controller chip and memory, but they cost over £200. That puts them beyond the scope of the desktop PC and moves us into the world of servers.

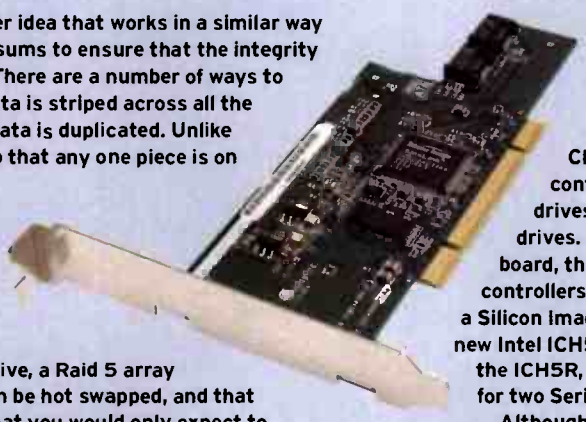
Servers tend to use a variant of Raid 5, which has at least one drive dedicated to error detection and correction. This requires intensive calculations and expensive hardware, and is irrelevant to the desktop market.



Store data across hard drives with Raid to improve access and reliability on a number of levels

	INTEL	MERCURY	 MSI	 SUPERMICRO
	D875PBZ	NDSMX	875P NEO-FIS2R	P4SPA+
	£117.50 (£100)	£42.51 (£36.18)	£166.85 (£142)	£119 (£101.28)
	01793 403 636 www.intel.com	0870 757 8800 (Light Computers) www.kobian.com	www.msicomputer.com	08707 515 950 www.boston.co.uk
	Intel 875P	Sis 650GL	Intel 875P	Intel 865G
	533/800	400/533	533/800	533/800
	PC2100/PC2700/PC3200	PC100/PC133/PC1600/PC2100	PC2100/PC2700/PC3200	PC2100/PC2700/PC3200
	4/4GB PC3200	4/2GB PC2100	4/4GB PC3200	4/4GB PC3200
	8x	4x	8x	8x
	5/0/0	2/AMR	5/0/0	5/0/0
	2/1/1/0/1	2/1/1/0/0	2/1/1/0/1	2/1/1/0/1
	6/0/3/2	4/0/2/0	8/3/3/4	6/0/2/2
	x/x	✓/CMI9738 six channel	x/ADI AD1985 six channel	✓/Realtek ALC650 six channel
	✓/Intel ICH5R	x	✓/Intel ICH5R and Promise 20378	x
	★★☆☆☆	★★☆☆☆	★★★★☆	★★★☆☆
	★★★★☆	★★☆☆☆	★★★★☆	★★★★☆
	★★★☆☆	★★★★★	★★★★☆	★★★☆☆
	★★★☆☆	★★☆☆☆	★★★★☆	★★★☆☆

This parity drive is a clever idea that works in a similar way to ECC memory with check sums to ensure that the integrity of your data is maintained. There are a number of ways to do Raid 5, but essentially data is striped across all the drives in the array and the data is duplicated. Unlike Raid 0 the data is split up so that any one piece is on at least two drives. A Raid 5 array is tolerant of a failed drive, but the really clever part is that the array can rebuild itself when a new drive is connected up to replace the failed unit. To be truly effective, a Raid 5 array requires hard drives that can be hot swapped, and that requires special hardware that you would only expect to find in servers.



A Raid controller, such as this PCI Adaptec Serial ATA Raid card can be added to the motherboard to support extra drives

At long last we are starting to see the introduction of Serial ATA drives that, in principle, work in the same way as Parallel ATA drives, except the interface is physically different and the connecting cable is much slimmer.

The next generation of Serial ATA will be different, as it will allow hot swapping of drives, much like a USB device. This is potentially of great interest for transporting large data files and repairing broken Raid arrays.

Controllers

Of course, the Raid controller is central to the whole equation. Generally the controller is an add-in chip on the motherboard from the likes of Promise or Highpoint, and generally it will only support Raid 0 and Raid 1.

A number of motherboard manufacturers use the controller to add support for extra drives, and aren't really fussed whether you use the Raid feature. Our Athlon Editor's Choice Gigabyte 7VAXP-A Ultra has two Raid controllers, with one covering the four Parallel ATA drives and the other serving the two Serial ATA drives. By contrast, our Editor's Choice Pentium 4 board, the Abit IC7-G, has two Serial ATA Raid controllers to manage four Serial drives. One controller is a Silicon Image 3112A chip but the other is integrated in the new Intel ICH5 southbridge. This comes in two variants and the ICH5R, that is so popular in this group, supports Raid for two Serial drives natively.

Although a native controller may sound very similar to an integrated controller, it has a couple of important differences. For one thing Windows will be able to find the hard drives attached to the native controller without having to first load up drivers. For another, manufacturers often use variants of Raid chips that are made to their specification. This requires proprietary drivers which can occasionally cause all sorts of problems. One benefit of the 875P and 865 chipsets with ICH5R therefore is that they won't vary from one motherboard to another.

Although we are great fans of Raid, we have one word of caution. A striped Raid array that uses an integrated controller is irretrievably linked to the chip, so you have to treat the hard drives and motherboards as a single entity to be sure your data is safe. The Bios for the Raid chip is included within the motherboard Bios, so there is a possibility that updating your Bios will wreck the Raid array, so be careful if you need a new Bios, perhaps to support a new processor.

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- IEEE Ports Max.8 USB ports

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P4G8X: RECOMMENDED ON SHOPPER HOTLIST – Computer Shopper
P4G8X: EDITORS CHOICE – AMD3D.com
P4T533-C: BEST PERFORMER – PC PLUS
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A7N8X: RECOMMENDED AWARD – PC GamePlay
A7N8X: RECOMMENDED ON SHOPPER HOTLIST – Computer Shopper
P4PE Black Pearl: Approved by – UK Gamer

ASUS®
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Editor's Choice

In our invitation for this group test we told the manufacturers we would be testing with an AMD Athlon XP3000+ (333MHz FSB) or an Intel 3GHz Northwood C Pentium 4 (800MHz FSB) processor, plus 512MB of PC3200 memory in two 256MB modules. The aim was to test the most likely options for upgrading to the latest processor and memory technology.

Most modern motherboards have a feature list as long as your arm, and it seems to get longer with each new generation. In time the legacy ports on the backplate will disappear and, just as we no longer have ISA slots, the serial and parallel ports will vanish, along with the gameport and all the mini jacks for speakers. Instead we'll have loads of USB2 ports, plus a few Firewire, a couple of digital S/PDIF audio connectors and things we haven't yet contemplated. Right now, that means you can find a motherboard with almost any combination of features, so it should be possible to find exactly the right one for your purposes.

'The Gigabyte will support more drives than you can cram in a case'

As we looked at each motherboard we wanted to see a good list of features, but most importantly these had to be appropriate to the end user and offer value for money. While there is no harm in having legacy ports, it is important to see an upgrade path, which primarily means support for the new hard drive interface, Serial ATA.

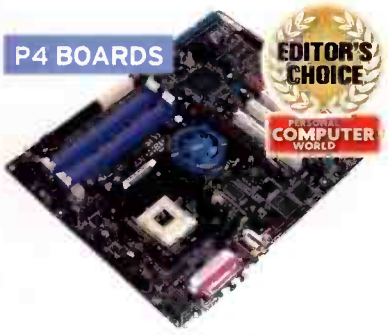
The winners

The group fell into two parts with 10 Athlon motherboards and 13 Pentium 4 boards. The Athlon boards ranged between £47 and £123 inc VAT, and you more or less get what you pay for in terms of features, however the question of value for money was far more difficult.

Our **Highly Commended** award in the Athlon group went to the **Aopen AK79G Max**. This is powered by the Nforce2 chipset and did very well in our performance tests. It was one of the most expensive Athlon motherboards at £123, but it has integrated graphics that are acceptable for gaming, as well as a stack of features on four back brackets. Three of them are the usual USB ports, Firewire ports and S/PDIF for digital audio, but the fourth adds TV-out options for the integrated graphics. The Aopen supports three Parallel ATA controllers as well as two Serial ATA connectors, so it offers a logical upgrade path as Serial ATA hard drives become more commonplace.

Gigabyte 7VAXP-A Ultra

Aopen AK79G Max



Abit IC7-G

ECS Photon PF1

Our **Editor's Choice** Athlon board is the **Gigabyte 7VAXP-A Ultra**, which is also relatively expensive at £107, however it is excellent value for money with its myriad features. In addition to four brackets with heaps of ports, the major strength of the Gigabyte is its support for a huge number of optical and hard drives. It has a Promise PDC20276 Parallel ATA controller chip as well as a Silicon Image 3112A Serial ATA chip, so it has four Parallel ATA controllers to which you could connect up to eight devices, plus a pair of Serial ATA connectors with the option of a Raid configuration. Realistically, that means the Gigabyte will support more drives than you can cram into almost any case, and it certainly gives you masses of options.

Moving on to the Pentium 4 side of the group, the **Highly Commended** award goes to the **ECS Photon PF1**. It's a relatively basic 865PE motherboard, but you still get almost every feature you could ask for. The most obvious deficiency is the absence of any sort of Raid, but the majority of PC users only have one hard drive, so in practice this is a luxury rather than a necessity. The ECS is loaded with six USB2 ports, two Firewire ports, six-channel audio and support for both Parallel and Serial drives.

We found that 865PE boards performed within five per cent of the more expensive 875P models, and that was certainly true of the ECS, but its major strength is the price – at just under £92 inc VAT, it is a bargain.

Finally, the **Editor's Choice** in the Pentium 4 group was the **Abit IC7-G**. Using the 875P chipset with ICH5R southbridge (see box on page 126), it also has a Silicon Image chip to give support for four Serial ATA hard drives. The backplate is full of audio connectors, USB2 and Firewire, and you get even more ports on two brackets.

Despite the huge feature list the design is very neat and Abit has made the IC7-G look attractive. It has Intel Gigabit Lan and an AGP Pro graphics card slot – some might say this is a workstation motherboard, but they're all wrong. The IC7-G is begging to be turned into a very high-end gaming PC.

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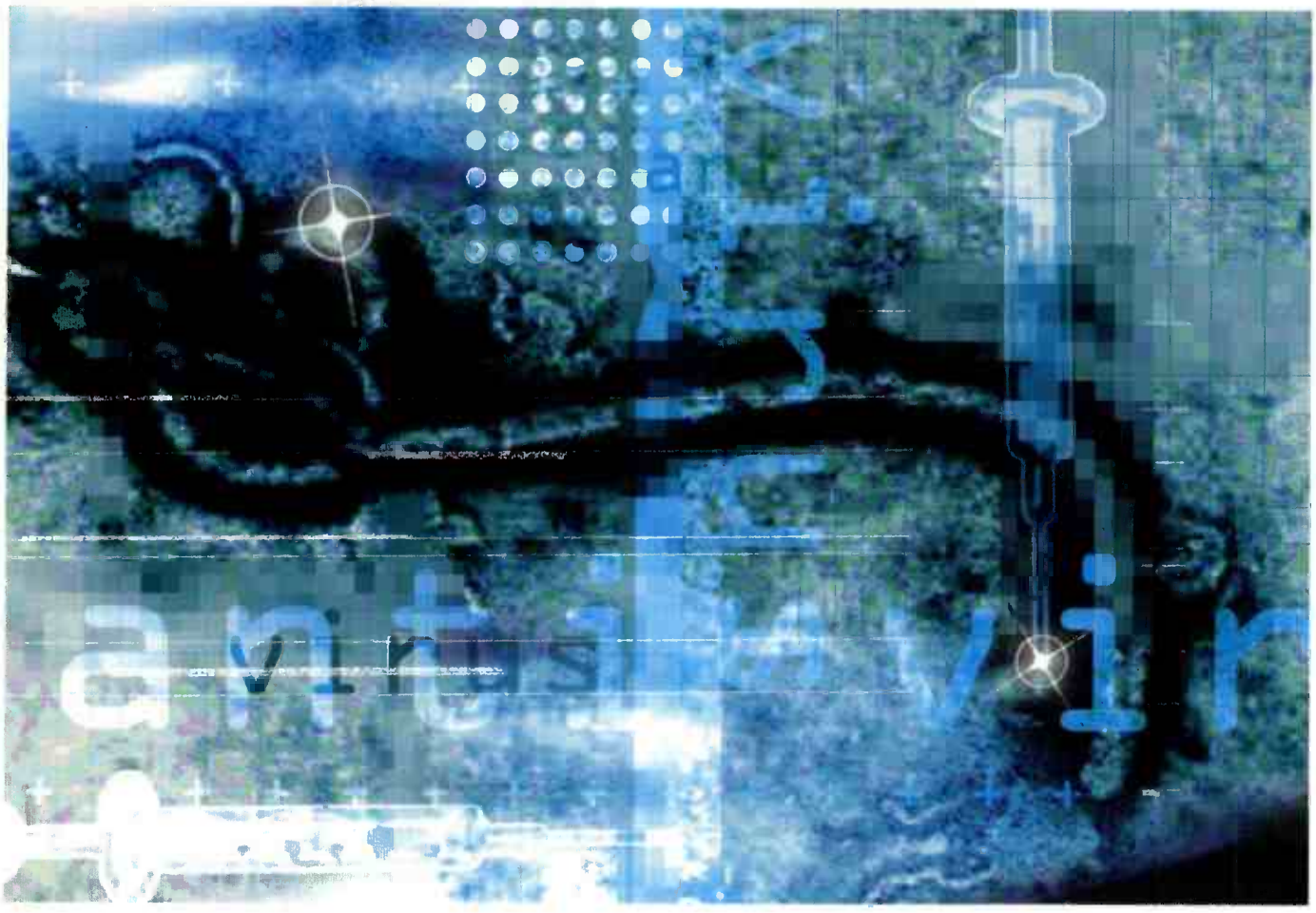

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Declare war on viruses

WORDS AND TESTING: NIALL MAGENNIS

Your data and your system could be at risk if you don't have the proper protection. We test 10 of the best anti-virus solutions around to help protect you from computer nasties

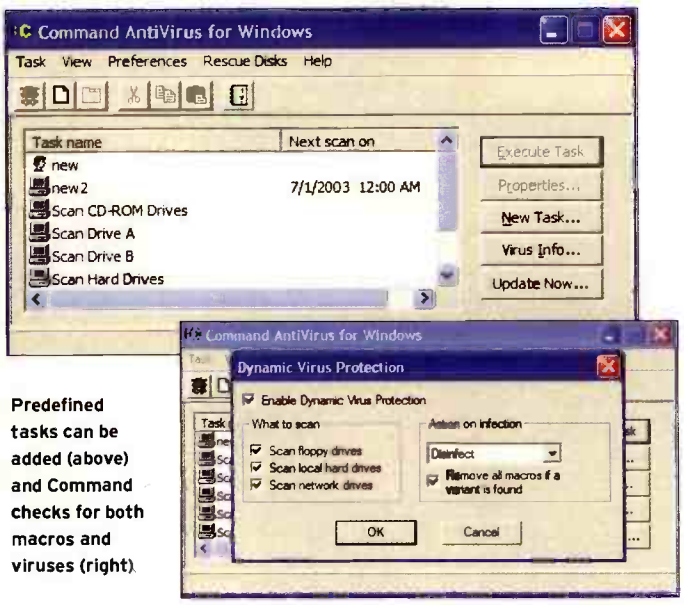
If you've got a cold you don't go around coughing in people's faces. Unfortunately, if you haven't got anti-virus software installed on your PC you could be doing the equivalent of this every time you send an email, transfer a file or give a floppy disk or burned CD-R to friends or colleagues. If your PC is infected you're pretty much guaranteed to pass on the infection, putting their data, as well as your own, at risk.

Now we're spending more time online the risks are even greater. We're using our computers more than ever because the net has such a huge influence on our daily lives, but the more we swap files and emails, the more we are at risk without the right protection. And always-on connections to the net leave us open to the threat of viruses 24 hours a day.

There's really no excuse for not having anti-virus software installed on your PC, as there is a huge range of products available, from full commercial offerings to free downloads. To help you pick the right product we've tested 10 of the very best for both the business and personal markets.

As a bonus, trial versions of four of these packages are on our cover disc, together with a full version of AVG Anti-virus.

Esafe offers four levels of protection (above) and the Sandbox controls access to system resources



Predefined tasks can be added (above) and Command checks for both macros and viruses (right)

Aladdin Esafe Desktop 3.1

Aladdin's Esafe product is really a full-blown enterprise security suite for corporates, but the company has also produced this desktop off-shoot aimed at home users. However, it isn't handled in the UK by Aladdin itself, but distributed as a download-only product by LCSG. Like many of the packages on the market, Esafe offers more than anti-virus protection. It also comes with a built-in firewall and Internet content-blocking features.

During the installation the software sensibly starts a scan of your entire system and then checks the Internet for updates, and installs them automatically if they are available. After a reboot the background protection applet is loaded. You can call up its interface by clicking on the icon in the taskbar. Here you will find a slider bar giving you access to four levels of protection, ranging from Off to Extreme. If you want to change any further setting, you can click on the config or anti-virus buttons that load the main configuration tool. This gives you full access to the controls for the firewall features and the anti-virus scanning settings.

The scanning settings allow you to create your own custom scans of drives, folders or files. You can schedule these on an hourly, daily, weekly or monthly basis or create a custom scan that can be accessed on demand. The firewall did a decent job of blocking off ports that shouldn't be showing on the net, but the Internet content filtering was poor. In fact it often wouldn't even block sites containing words and phrases that were present in the default list.

However, Esafe can protect you against nasty scripts when you're browsing the web and it can also look inside compressed files to check for viruses, as well as keeping an eye out for dangerous macros in office documents.

Nevertheless, the interface could do with an overhaul. The graphics look like they were just knocked together and the layout of the configuration menus is convoluted and confusing.

DETAILS

PRICE £49.35 (£42 ex VAT)
CONTACT LCSG
www.esafedesktop.co.uk
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 100MHz Pentium, 32MB of Ram, 15MB of free hard disk space
PROS Includes firewall protection feature
CONS Poor content-blocking; confusing interface; expensive all round
VERDICT
The poor interface lets Esafe Desktop down

FEATURES	★★★★☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★☆☆

Command Anti-virus

Command Anti-virus has really been designed for network users, but the company also offers it as a desktop solution, which is what we are looking at here.

Command used to be a tricky program to install because even the desktop version included network options, but the company has now got its act together and the current product is very easy to get up and running on your system.

Unfortunately when it's finished the install it doesn't offer to scan your memory or hard drives, which is a bit of an oversight, nor does the software initially check for updates. It pops up a message in the task bar to show you that updates are available, but it doesn't automatically download them. Instead you have to click on the warning bubble and enter a username and password for it to grab them from the Command server on the web.

Once everything is installed you'll be presented with the Anti-virus user interface, which is spartan and not exactly artistic in its presentation. There is a task window on the left showing different predefined scan setups for scanning all drives, network drives or individual drives. You can add to these using the new task button on the right that allows you to create a custom scan and schedule it on a daily, weekly or monthly basis.

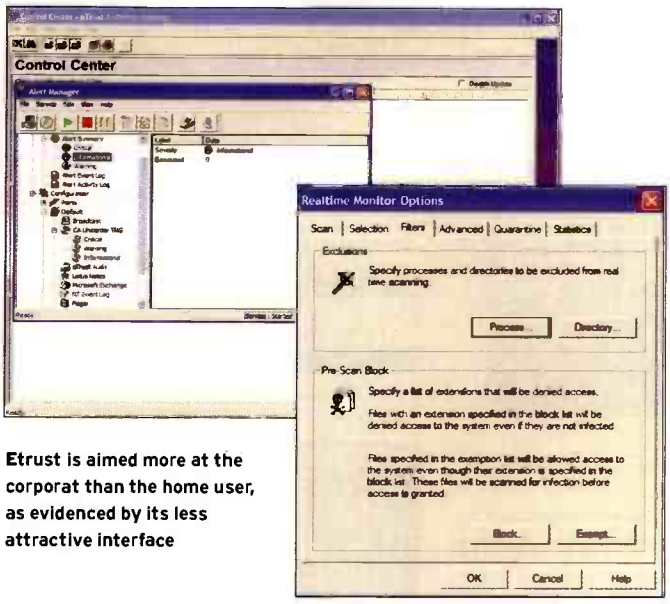
One of the negative points about Command's package is the way the update process is implemented. First of all you have to select which site you want to connect to for the updates and then enter your password. It's such an outdated and cumbersome system that it's laughable in comparison to the competition. On many occasions when we tried it we just couldn't connect to the server.

Overall, Anti-virus is just too outdated in the way it approaches the user interface and update process. In fact the only real upside is that it takes up so little space on your hard drive when it's installed. But that's hardly the most glowing praise you can heap on a product.

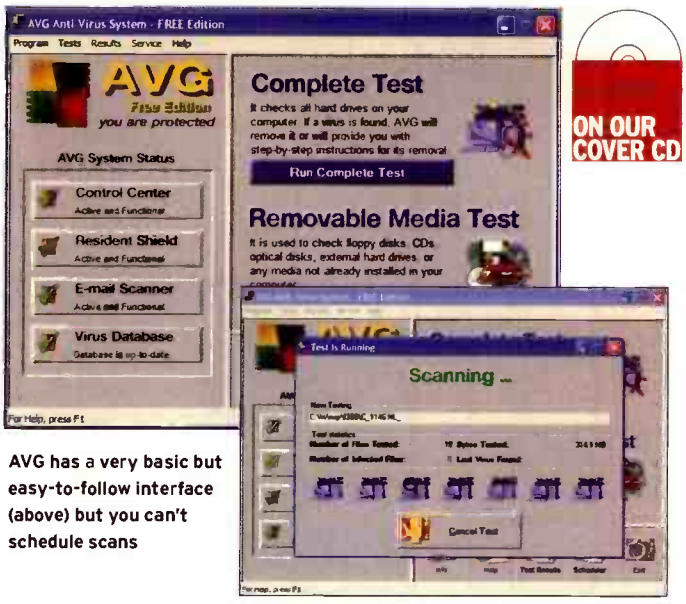
DETAILS

PRICE £35.19 (£29.95 ex VAT)
CONTACT Command
020 7931 9301
www.command.co.uk
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 100MHz Pentium, 16MB of Ram, 7MB of free hard disk space
PROS Small hard disk footprint for scanning applet
CONS Poor interface; inadequate update system
VERDICT
Command's interface and update system are too clunky

FEATURES	★★★☆☆
PERFORMANCE	★★★☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆



Etrust is aimed more at the corporat than the home user, as evidenced by its less attractive interface



AVG has a very basic but easy-to-follow interface (above) but you can't schedule scans

ON OUR COVER CD

CA Etrust EZ Anti-virus

Computer Associates' (CA) Etrust is an anti-virus product aimed at the business community, and as such it doesn't pander to the consumer world with flashy interface touches.

The software is split into two parts, with the desktop applet acting as an agent for the management console. The desktop software is an update of CA's InoculateIT software, and the company has retouched the interface to make everything look much cleaner.

However, as well as the InoculateIT scanning engine, Anti-virus now includes a second engine called Vet, which CA says has been developed by a team of coders working independently to those working on the InoculateIT engine. The thinking behind this dual-engine approach is that it will reduce the likelihood of a virus writer finding a way to circumnavigate both engines. Whether you trust this assumption or not is down to you, but both engines are very powerful, with the ability to scan within compressed folders and watch for macro viruses hiding in office documents.

When installed on a desktop and without locking the settings down with the management console, Etrust allows users to select drives, folders or files to scan. The interface is simple and doesn't use many graphics, so this keeps the footprint small.

When the management console is called into play you can lock down the settings on the desktop PCs to stop other users from disabling aspects that might leave the computer vulnerable to virus attacks.

The console also allows you to assign each user to a threat group and then set policies for these groups, covering areas such as the assigned virus scanning engine, signature updates and the course of action to be taken if a virus is found.

Overall, Etrust is a good anti-virus solution for those who need to protect networked users. The client software is neat and tidy and the management software is relatively easy to use for such a powerful package.

DETAILS

PRICE £23.50 (£20 ex VAT) per user (10 to 99 users), (£15.14) US download (1 user)
CONTACT CA 01753 242 679
www.1.my-etrust.com
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 100MHz Pentium, 32MB of Ram, 25MB of free hard disk space
PROS Powerful; two virus engines; easy to use
CONS Friendly user interface
VERDICT
CA's Etrust is a powerful but easy to use package

FEATURES	★★★★☆
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

Grisoft AVG Anti-virus 6

Nothing in life is free, except AVG of course. For the past few years Grisoft has been providing something of a public service on the Internet by offering a downloadable version of its AVG product for absolutely nothing.

First impressions of AVG are good. After you install the program, the software guides you through an online update, asks you to create a rescue disk and then scans your machine.

The interface is easy to follow, with a row of four buttons down the left-hand side of the screen depicting the status of the various scanning options. You can click on each of these to check the status of the module and whether it needs your attention. However, because the options are marked with a green tick when they're operating you can normally tell at a glance whether any user intervention is needed. Two large buttons take up the remainder of the window; one for starting a system scan and the other for scanning just removable drives.

The various dropdown menus across the top of the screen allow you to open the program's control centre or create custom scans. However, AVG sets up good scan policies by default so you shouldn't really have to mess about too much in here. We would advise, however, turning on Heuristic scanning which is not enabled by default.

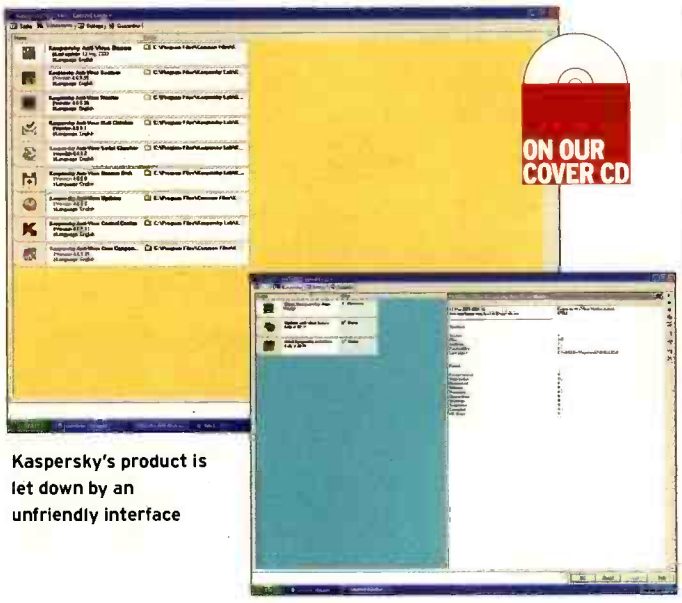
Naturally, being free, there have to be some limitations. In the case of AVG, the limitation is that you're stuck with the basic interface and can't use the advanced interface of the paid-for version. You also can't schedule custom-made scans and the single scheduled scan is set by default to scan your entire system every 24 hours. You can turn this on or off but you can't schedule it for a given date. The email scanning is also limited to protecting Microsoft Exchange and Outlook clients.

Overall AVG is a decent anti-virus scanner, but if you're going to use it long-term you'll have to be disciplined enough to manually scan your system at regular intervals.

DETAILS

PRICE Free
CONTACT Grisoft
www.grisoft.com
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 486 processor, 32MB of Ram, 20MB of free hard disk space
PROS Free; offers decent virus protection
CONS Can't schedule scans; stuck with basic interface
VERDICT
AVG is a great option if you can't afford a full commercial package

FEATURES	★★★☆☆
PERFORMANCE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆



Kaspersky's product is let down by an unfriendly interface

Virusscan's first job is to check for updates (above) after which it keeps track of your scans

Kaspersky Anti-virus Personal

As evident from the name, Kaspersky is a Russian company. It was founded in 1997 and has made good headway in the market for such a young operation, but the firm's anti-virus software has always had a reputation for sporting a somewhat overly technical interface. When we looked at the software last year things had improved slightly, but the product still looked dated in comparison to its more user-friendly rivals. We had hoped things would have moved on this time, but unfortunately this is still problematic.

For starters, rather than linking everything together, multiple programs are installed on your system, such as the background anti-virus monitor, the KAV control centre and the KAV scanner. It's therefore pretty confusing for the first-time user. The Control Centre acts as the main panel for the software, but is unclear. It's not easy to tell which anti-virus modules are loaded and which are in operation.

KAV also doesn't automatically ask to check the Internet for updates when you install it, nor does it ask you to create a set of backup disks. It does, however, automatically schedule a scan of your computer for a set time on the day you install it, but not straight away.

However, once you get to know your way around KAV it becomes obvious there are plenty of powerful features. There's a script blocker for protecting you against nasties on the Internet, and you can also schedule scans. The scanning engine is able to scan for viruses inside archives, which is not offered by all its competitors. Unfortunately, however, KAV only supports email scanning for Microsoft Outlook so if you use another mail program it's probably best to look elsewhere.

Overall, KAV is a good anti-virus scanner in need of an interface overhaul. At the end of the day, McAfee and Norton's products can match it for features but are easier to get to grips with.

DETAILS

PRICE £29 (£24.68 ex VAT)
CONTACT Kaspersky Lab
0870 011 3461
www.kaspersky.co.uk
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 100MHz Pentium, 32MB of Ram, 25MB of free hard disk space
PROS Powerful features
CONS Difficult to use
VERDICT
Despite its powerful features, this software is too fiddly to use to be a true competitor to the likes of Norton and McAfee

FEATURES	★★★★½
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★½☆
OVERALL	★★★★½

McAfee Virusscan Home 7

McAfee is another company throwing everything but the kitchen sink at potential customers, in an effort to persuade them of the benefits of its package. Not only do you get the usual Windows scanning software, but you also get protection for Palm, Epoc and Pocket PC devices.

Things got off to a good start, with the software asking us if we wanted to check for updates. After this Virusscan immediately started a scan of our entire PC to check there were no nasties lurking in corners of our file system. The software then dropped us back to the main interface screen.

McAfee has done a fine job on Virusscan's user interface. It's a web style affair with home, back and next buttons, and it's simple to use. The colour scheme matches that of Windows XP's default settings and everything has a very professional polish to it.

Like Symantec's Norton Anti-virus program, Virusscan's main screen clearly shows the status of each of the scanning modules so you can tell if anything needs your attention.

Virusscan includes email scanning for both incoming and outgoing mail, and this has been updated to work with Outlook Express and Eudora. There is also support for blocking malicious Active X and Java applets when you're surfing the web, and you can even set up this module to block access to specific sites. The package can now also scan files sent via instant messaging clients.

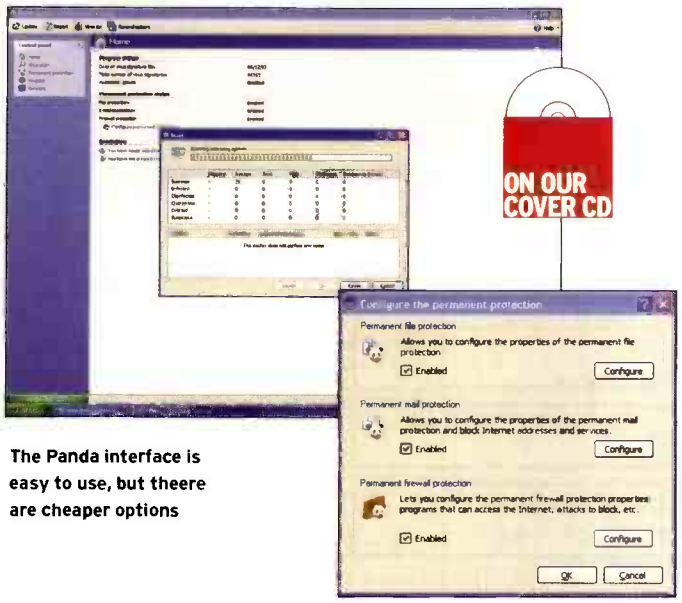
The PDA scanning software works slightly differently to that included with PC-Cillin, as the scanning is done during sync time with the PDA, which your computer actually scans. The advantage is the applet loaded on the PDA takes up very little memory. However, we're still not convinced you need PDA scanning yet as there are so few viruses on these platforms.

Virusscan is one of the best anti-virus products available. It's not only easy to use but it's also packed with features, and wins a Highly Commended award.

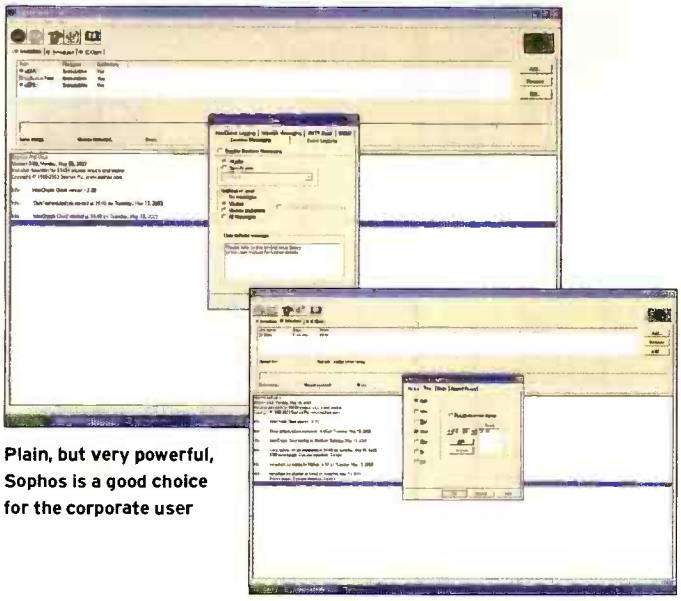
DETAILS

PRICE £29.99 (£25.52 ex VAT)
CONTACT McAfee
020 7949 0107 **www.mcafee.com**
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 100MHz Pentium, 32MB of Ram, 60MB of free hard disk space
PROS Great interface; excellent range of features
CONS PDA scanning not really essential
VERDICT
Virusscan is one of the best anti-virus packages currently on the market

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



The Panda interface is easy to use, but theere are cheaper options



Plain, but very powerful, Sophos is a good choice for the corporate user

Panda Anti-virus Platinum 7

Pandas are cuddly looking creatures but, as anyone who's ever watched a wildlife programme knows, they're not as friendly as they seem and can be very vicious indeed. Obviously Panda would like you to think of its software in much the same way, with a cuddly user interface on the outside and a ferocious virus-killing heart on the inside. So does the software live up to its slightly silly name?

Panda has made a good job of the installation process, as it scans memory for viruses by default and gives you the option of scanning your hard drive if you think you've been infected. Once you've rebooted after the install, it checks in the background for program updates and virus definition file updates and asks you to reboot if it has installed any patches.

Once everything is up and running the software is quite easy to use. Like many other companies, Panda has opted for a web-style interface with a row of buttons down the left-hand side of the main screen that give you access to the various configuration screens. An alert window fills the rest of the screen, showing the status of the software and highlighting any areas that need your attention.

It's very easy to set up your own scheduled scans thanks to the presence of a scan wizard to guide you through the process. In fact, it is packed with features, including support for monitoring email and scanning compressed zip files, although the latter isn't turned on by default. Panda Anti-virus also comes with a built-in personal firewall. This did put the correct ports into stealth mode on our machine, but it also bizarrely attempted to block its own virus scanner from accessing the Internet for updates, even though it is listed as having that privilege.

The main problem with Panda, though, is the price. It's more expensive to purchase initially than some of its competitors, and the cost of renewing your subscription to the virus definition files is also very high.

DETAILS

PRICE £47.99 (£40.84 ex VAT)
CONTACT Panda
0870 444 5640
www.pandasoftware.co.uk
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 300MHz Pentium, 128MB of Ram, 50MB of free hard disk space
PROS Good range of features; decent interface
CONS Pricey
VERDICT
Panda Anti-virus is just too expensive to compete with its rivals

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★☆☆☆
OVERALL	★★★☆☆

Sophos Anti-virus

Sophos is a name that probably won't be familiar to most home users, but the company has a good reputation in the business world for producing excellent networked anti-virus solutions. The firm's latest product is aimed at companies ranging in size from small businesses to large corporates.

Essentially Sophos Anti-virus is a networked tool. The piece that sits on the desktop, called Intercheck, is only one element. This utility scans all the local hard drives and creates a checksum for each clean file it finds. It then adds that to a database held on the machine. Files matched to the database don't have to be scanned again, only updated or new files cause the scanning engine to be called. The benefit of all of this is that the load on the client machine is kept low, so even aging machines can be protected without a performance hit.

Along with the Intercheck utility, the software also installs Anti-virus Sweep. This allows desktop users to scan drives or files they may believe are infected. Sweep has quite an old-fashioned interface (mainly because it hasn't been updated for quite some time), but is not difficult to use.

All the clever stuff, however, happens on the server side thanks to the SAVAdmin tool. This acts as a central point from which you can install and manage the client software on other machines on the network. New systems can be identified and have the software installed on them automatically. Unfortunately Windows 9x and ME systems need a small utility installed to allow the package to monitor them properly. However, its ability to download software and virus definition file updates from Sophos' secure site and push them to the desktop machines on the network is a real time saver.

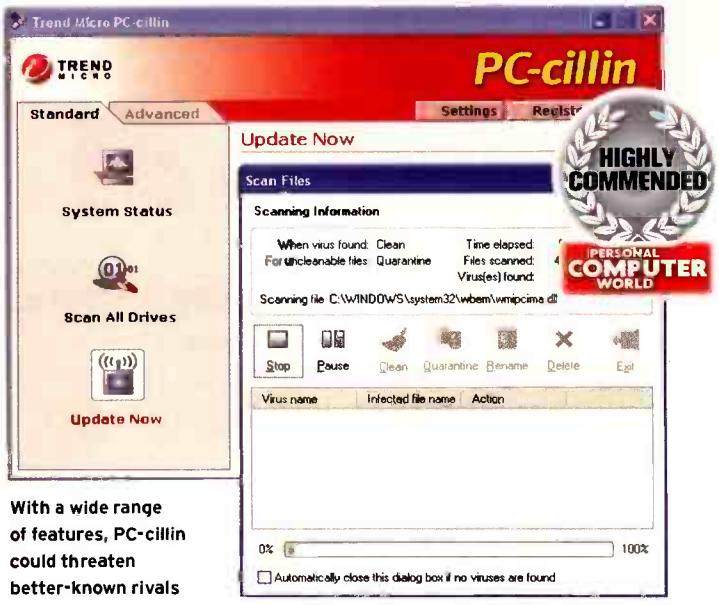
Sophos Anti-virus is certainly a good option for those in need of networked anti-virus protection. However, it works out quite expensive for those with small office environments to look after.

DETAILS

PRICE £70.50 (£60 ex VAT) per user for 5-9 users
CONTACT Sophos
01235 559 933
www.sophos.com
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 100MHz Pentium, 8MB of Ram, 10MB of free hard disk space
PROS Great auto update feature
CONS Can be expensive
VERDICT
A great networked anti-virus solution, but not economical for very small businesses

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

Colour-coded messages make it easy to see at a glance what might need attention



With a wide range of features, PC-cillin could threaten better-known rivals

Symantec Norton Anti-virus 2003

Norton has always been a name to associate with top-notch virus busting. Over the years its products have simultaneously added extra features and become easier to use.

Right from the outset Anti-virus 2003 does a good job. As soon as you install it you are asked to connect to the Internet to download the latest update and virus definition files. It then scans your computer and sets up a weekly scheduled scan.

But it's the user interface that deserves special mention. Just by looking at it you pretty much instinctively know how to use the software. It's unsurprising really because everything is colour coded. Not only can you tell at a glance which modules are in operation and how you are being protected, but it's also easy to see when the software needs your attention. Items that require user input are highlighted in red, and when everything is running smoothly things are displayed in green – it couldn't be simpler.

It's also incredibly easy to schedule your own scans, as there are wizards to guide you through the process. It's a similar story when it comes to configuring the other elements, such as turning script blocking on and off or configuring it to only scan incoming, not outgoing email.

The software automatically integrates with Microsoft Office to scan all files for macro viruses that can infect documents such as Word files.

However, not much has changed since last year's installment. The only big addition is that Anti-virus 2003 can now monitor instant messaging file transfers on Aim, Yahoo and MSN clients. Unfortunately, it still can't detect viruses in archived files – it can only grab nasties when they are being extracted. However, it can scan both inbound and outbound email from Outlook, Outlook Express and Eudora.

Overall, this package is difficult to beat. It's got loads of features to keep you safe from computer nasties and it's extremely easy to use.

DETAILS

PRICE £39.99 (£34.03 ex VAT)
CONTACT Symantec
020 7616 5600
www.symantec.com
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 150MHz Pentium, 32MB of Ram, 55MB of free hard disk space
PROS Great interface; excellent range of features
CONS Can't scan compressed files
VERDICT
Still ahead of the pack when it comes to virus busting and a great choice for first-timers

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

Trend Micro PC-cillin 2003

Trend Micro's PC-cillin has been around for what seems likes aeons. The package has never enjoyed the popularity of rivals such as McAfee or Norton, but it's always been knocking on the door of such success. In an effort to propel the software into the hearts and minds of users, Trend has thrown in plenty of extras with this 2003 version.

Not only do you get the usual anti-virus protection for Windows, but a firewall and scanning software for handheld Pocket PC and Palm operating systems are also included.

Obviously most people would be interested in the Windows scanning software first, and here Trend has done a very good job. The company has seriously tweaked the user interface for 2003 and the results are very good. In fact the software is now on a par with the likes of McAfee and Norton in this department, it's so easy to use. There's a soothing colour scheme and a logical layout to the main screens.

But underneath the surface lies a deadly virus hunter. On top of the scheduled scanning and background AV monitor there's also scanning for incoming attachments from Instant Messaging clients and email, and you also get the web trap module that keeps you safe from malicious scripts when surfing the Internet.

The firewall will be a welcome addition for many people. Personal firewalls have become an essential utility for those with always-on connections, so it's good to see one here. It did a good job of putting all the most vulnerable ports on our test machine into stealth mode so they were hidden when we were connected to the net. Less useful are the PDA scanning features and web-blocking option, which requires you to enter sites by hand if you want to block them. With millions of pages on the Internet this is a task similar to writing the Domesday Book solo.

Nevertheless the core desktop potential of the main package makes PC-cillin a good buy for the average user.

DETAILS

PRICE £37.95 (£32.30 ex VAT)
CONTACT Trend Micro
01628 400 500
www.antivirus.co.uk
SYSTEM REQUIREMENTS
Windows 95/98/ME/2000/NT/XP, 166MHz Pentium, 32MB of Ram, 25MB of free hard disk space
PROS Great interface; good range of features
CONS Web-blocking module is poor
VERDICT
A good buy for the average desktop user who is after more than just virus checking

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★½
OVERALL	★★★★★

Table of features

MANUFACTURER	ALADDIN	COMMAND	COMPUTER ASSOCIATES	GRISOFT AVG	KASPERSKY LAB
MODEL	ESAFE DESKTOP 3.1	ANTI-VIRUS	ETRUST ANTI-VIRUS 7	ANTI-VIRUS 6	ANTI-VIRUS PERSONAL
Price inc VAT (ex VAT)	£49.35 (£42)	£35.19 (£29.95)	£23.50 (£20) per user (10-99 users), £15.14 for 1 user (US download)	Free	£29 (£24.68)
Subscription price inc VAT (ex VAT)	£23.50 (£20)	£35.19 (£29.95)	£9.40 (£8) per user (10-99 users), £7.86 for 1 user	Free	30 per cent of the price at time of renewal
Telephone	0151 343 0077	020 7931 9301	01753 242 679	None	0870 011 3461
URL	www.esafedesktop.co.uk	www.command.co.uk	www1.my-etrust.com	www.grisoft.com	www.kaspersky.co.uk
Heuristic analysis	✔	✔	✔	✔	✔
Macro scanning	✔	✔	✔	✔	✔
Script blocking	✔	✔	✔	✔	✔
Instant messaging file transfer monitor	✗	✗	✗	✗	✗
PDA scanning	✗	✗	✗	✗	✗
Firewall	✔	✗	✗	✗	✗
Web blocking	✔	✗	✗	✗	✗
SCORES					
Features	★★★½☆	★★★½☆	★★★★½	★★★½☆	★★★★½
Performance	★★★½☆	★★★½☆	★★★★★	★★★★½	★★★★½
Value for money	★★★½☆	★★★½☆	★★★★★	★★★★★	★★★½☆
Overall	★★★½☆	★★★½☆	★★★★★	★★★★½	★★★★½

Table of features

MANUFACTURER	MCAFEE	PANDA	SOPHOS	SYMANTEC	TREND MICRO
MODEL	VIRUSSCAN HOME 7	ANTI-VIRUS PLATINUM 7	ANTI-VIRUS	NORTON ANTI-VIRUS 2003	PC-CILLIN 2003
Price inc VAT (ex VAT)	£29.99 (£25.52)	£47.99 (£40.84)	£70.50 (£60) per user for 5-9 users	£39.99 (£34.03)	£37.95 (£32.30)
Subscription price inc VAT (ex VAT)	£10.61 (£9.03)	£39.99 (£34.03)	£70.50 (£60) per user for 5-9 users	£12.34 (£10.50)	£19.95 (£16.98) (upgrade to new version)
Telephone	020 7949 0107	0870 444 5640	01235 559 933	020 7616 5600	01628 400 500
URL	www.mcafee.com	www.pandasoftware.co.uk	www.sophos.com	www.symantec.com	www.antivirus.co.uk
Heuristic analysis	✔	✔	✔	✔	✔
Macro scanning	✔	✔	✔	✔	✔
Script blocking	✔	✔	✔	✔	✔
Instant messaging file transfer monitor	✔	✗	✗	✔	✔
PDA scanning	✔	✗	✗	✗	✔
Firewall	✗	✔	✗	✗	✔
Web blocking	✗	✗	✗	✗	✔
SCORES					
Features	★★★★★	★★★★½	★★★★½	★★★★★	★★★★★
Performance	★★★★★	★★★★½	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★½☆☆	★★★½☆	★★★★★	★★★★½
Overall	★★★★★	★★★½☆	★★★★½	★★★★★	★★★★★

Editor's Choice

It seems that pretty much every month there is a major virus scare. Large outbreaks used to happen once, maybe twice a year, but have since become more common for a number of reasons.

First, before the popularity of the Internet, viruses could only really be spread on floppy disks and other removable media. But now we have wide access to email and higher bandwidth links, it means attachments are easier to send from one place to another.

The growing use of broadband also means people are downloading more programs simply because they can, and file sharing services are beginning to be seen by virus writers as ideal breeding grounds for mass outbreaks. Simply put, there are more people at risk from more viruses and from more sources than ever before. So bearing this in mind it would be almost criminal not to protect yourself on the Internet.

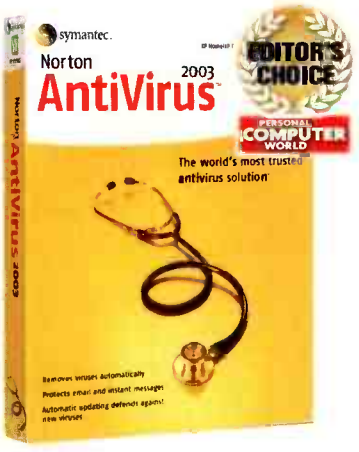
The best approach, then, is definitely to get yourself a decent scanner, set up sound scanning policies and keep the software as up-to-date as possible, with the latest fixes and virus definition files. To encourage you to do this, you need software that is not only easy to use, but also automates most of the hard work, and these were the main points we were looking for in the packages we examined.

'Symantec Norton Anti-virus is very easy to set up and manage'

It has to be said that many of the products we looked at now sport inviting interfaces that are easy to get your head around without having to delve into the manual. Overall, though, we felt there were three packages that deserved special praise.

The winners

Our first **Highly Commended** award goes to **Trend Micro's PC-cillin 2003**. Although the software has never been quite as popular as McAfee or Norton, it has always been knocking on the door of such success. However, with this latest version, Trend has come up with a redesigned interface that is an absolute beauty. It's so simple it's doubtful you would ever have to refer to the manual.



Symantec Norton Anti-virus 2003

McAfee Virusscan Home 7

Trend Micro PC-cillin 2003

The company has also packed this version with features including a built-in firewall and scanning software for handheld Pocket PC and Palm operating systems. Trend has even managed to add scanning for incoming attachments from instant messaging clients.

But Trend wasn't the only company to bag a Highly Commended award. **McAfee Virusscan Home 7** has been consistently getting better and better over the years, and we felt this year's offering certainly deserved of our second **Highly Commended** award. McAfee certainly offers value for money, with both desktop and PDA scanning included. The software can scan outgoing as well as incoming mail, and can keep tabs on file transfers travelling through instant messaging clients. There's also support for the blocking of malicious ActiveX and Java applets that might spring out when you are surfing the net.

More importantly, Virusscan has consistently scored good marks in independent virus detection tests.

However, Virusscan still couldn't persuade us away from the benefits of Symantec Norton Anti-virus. This product has been around for donkey's years but since taking over the reins, Symantec has done a fine job of keeping Norton Anti-virus at the forefront of this area of technology.

Symantec Norton Anti-virus wins our **Editor's Choice** award for many reasons. First, the interface is still the best of any of the products around. Just by taking a quick look you instinctively know how everything works. This is partly because most aspects of the interface are colour coded. Anything needing your attention is in red, while items working as they should are in green.

It's also very easy to set up and manage your own scans and schedules because there are wizards to guide you through the process. The same applies to setting up the various components, such as turning on or off script blocking or email scanning. The software even seamlessly integrates with Microsoft Office to scan documents in case they contain macro viruses.

For first-time users, Norton really is the most sensible choice, as it is the only one reviewed here that you can expect to have up and running within minutes, without any reference to the manual. Therefore, in spite of its similarity to McAfee, Norton has the edge. This, coupled with the fact that Norton has consistently scored excellent marks in independent tests, gives us every confidence in recommending it as a top-notch anti-virus package.

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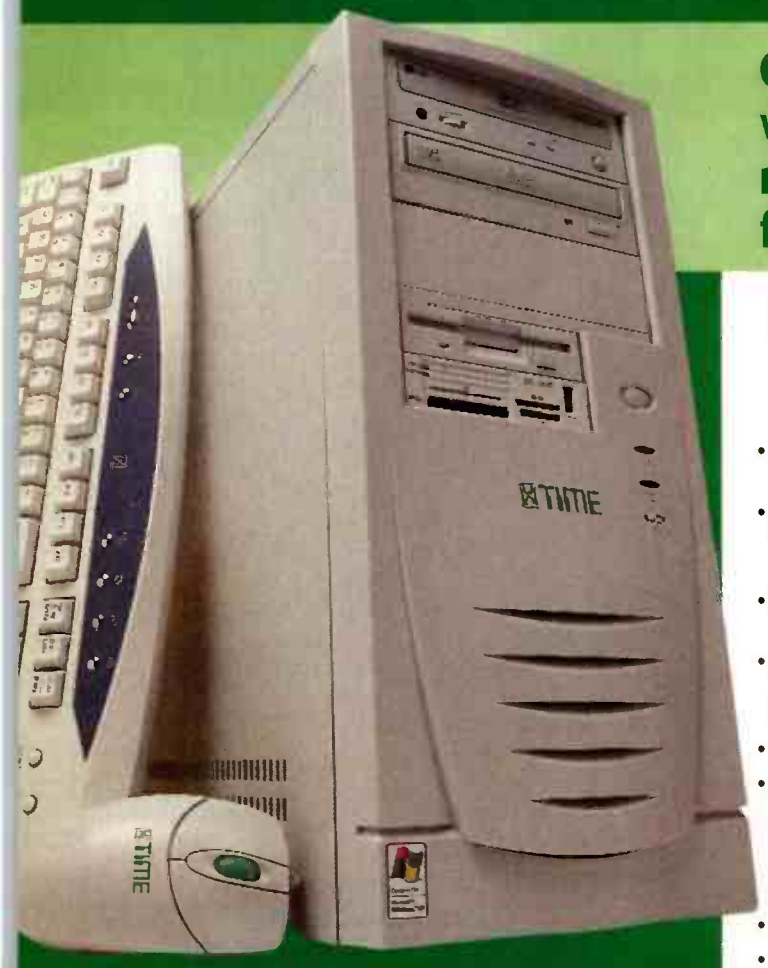

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- Hayes 56K V92 modem
- Multimedia power keyboard with hot keys
- Logitech wheel mouse
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- USB 2.0 capability with 5 ports available (4 rear and 1 front)
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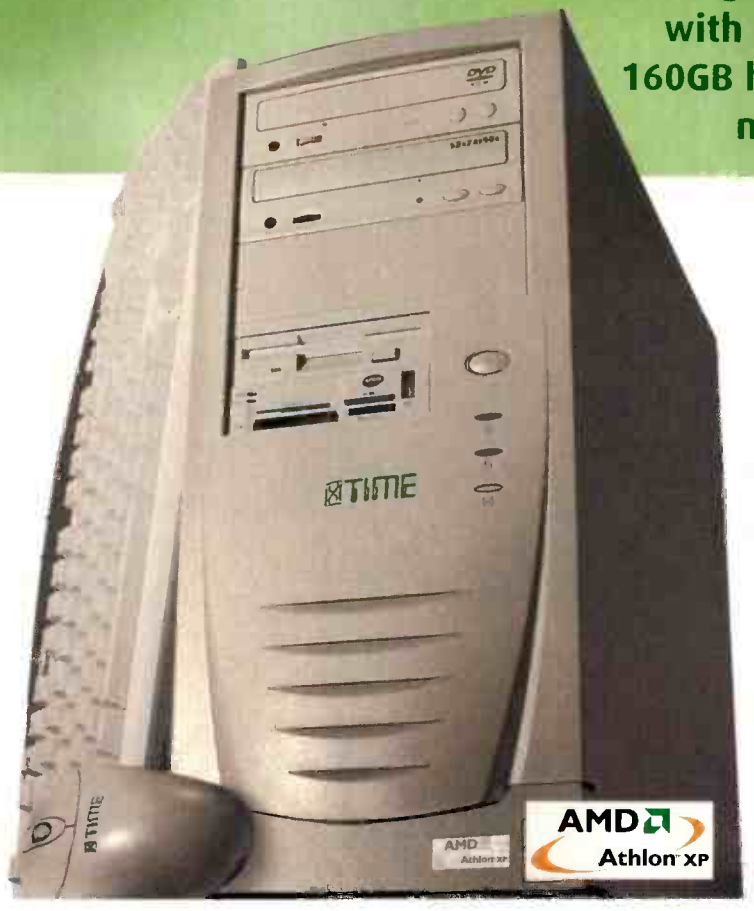

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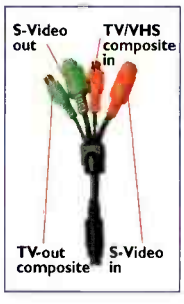

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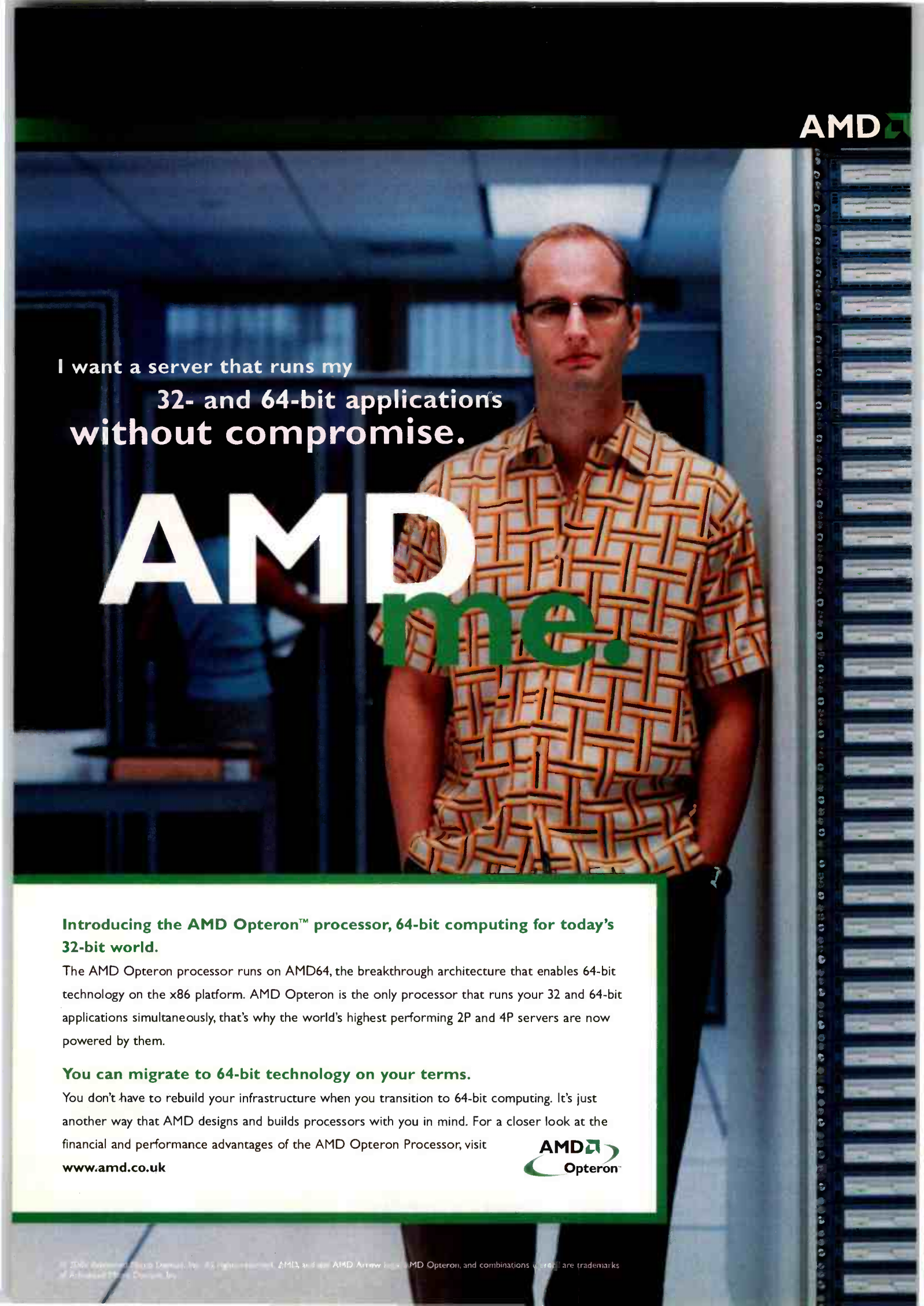

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Network

WRITTEN BY ALAN STEVENS

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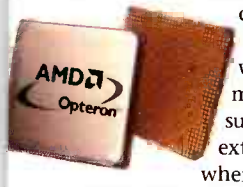
We look at eight devices and check out the technology

AMD eyes servers

If you've bought an industry-standard server recently, it's almost bound to have an Intel processor. However, April saw the release of Opteron, the 64bit processor which AMD is hoping will break Intel's stranglehold on the lucrative server market.

The big difference compared to Intel's Itanium 2 is the ability to run existing IA-32 (32bit) applications natively on the Opteron silicon. It offers performance advantages compared to 32bit chips, with large memory support and extra instructions when running 64bit code using simple IA-32 extensions. Opteron will enable companies to port applications to 64bit servers straight away, without having to recompile or sort out compatibility problems that can arise when porting to the 64bit Itanium 2 architecture.



Improved multiprocessing is also a claim, with much of the SMP 'glue' needed for processors to work together built into the AMD chip. With better support for AMD's Hypertransport bus technology, servers can be built with up to eight Opteron processors, compared to two-way servers with 32bit Athlon chips.

64bit implementations of Linux for Opteron are available, and Microsoft has promised a Windows port. IBM and Fujitsu-Siemens have also pledged support, but it will be a while before we can gauge the impact on Intel's current position.

Wireless networking is the name of the game in our group test this month, with eight devices on test. Which one is best for you?

Wireless broadband on the horizon

Can't get ADSL? Satellite too expensive? Then announcements relating to long-distance wireless technology may be of interest to you.

The first is the release of an extended IEEE standard for wireless metropolitan area networks (802.16a or Wireless Man), to enable service providers to beam wireless broadband directly into homes and businesses. The second is broad support for the new standard from equipment manufacturers, including Intel and Proxim. The two companies have banded together as the Worldwide Interoperability for Microwave Access Forum (Wimax http://wimaxforum.org).

Under the new IEEE standard, data can be transmitted at 70Mbits/sec over distances of up to 30 miles. A variety of frequencies from 2-611GHz can be used, including the free-to-air 2.4 and 5GHz slots used for local wireless networks, although to reduce interference problems other licensed frequencies may be preferred.

Service providers are expected to build 802.16a base stations capable of delivering 2Mbits/sec services to end-user aerials, the price of which will depend on the frequencies. It's not clear if the use of standard hardware will drive costs down to those of fixed line ADSL and cable services, but they will be less than for alternative satellite solutions.

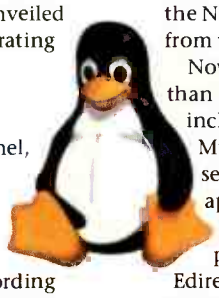
Wireless broadband services are on their way, endorsed by companies such as Proxim, which already sells long-distance wireless Ethernet products

Unfortunately the new wireless services aren't expected for at least 18 months, and are dependent on the availability of suitable frequencies. Power output restrictions and laws governing aerial location could also limit availability, with the 802.16a specification calling for near line-of-sight connectivity between service provider base station and end-user antennae.

Don't be surprised if, when it does appear, wireless broadband is priced toward big business more than home users. In the meantime ISDN and satellite look set to remain the only ADSL/cable alternatives, at least for a couple more years.

Netware plans to adopt Linux soon

Like buses, Novell announcements tend to arrive together. At the company's recent annual Brainshare conference in Utah, it not only unveiled its Netware 6.5 operating system but also its intention to support Linux.



A new Linux kernel, it seems, will be added in Netware 7.0, expected by the end of next year. However, according to Jack Messman, Novell chairman and CEO, it's entirely optional and the conventional Novell core will continue to be developed and supported. That said, the adoption of Linux makes sense as Novell has long been working towards separating the Netware operating system from the services it supports.

Nowhere is this more obvious than in Netware 6.5, which includes the Apache Web and MySQL database servers plus several other open-source applications originally developed for the Linux platform. Novell's NDS Edirectory and Zenworks management software can also run on Linux and there's continued emphasis on web and Java technologies with Extend, the Java 2 Enterprise Edition (J2EE) application server, which is now fully integrated into the Netware platform.

Which Linux implementation Novell will go for is unclear, but it's doubtful the company will develop its own. The effect on prices and licensing terms also has to be unravelled, but Novell customers have welcomed the announcement. Far from an admission of defeat the majority see it as a positive move, helping to distance the company from its proprietary past and making it better able to compete with Microsoft in the future.

STORAGE

Iomega Nas P415

Plug and go network storage offers less hassle than alternatives

Above: Management of the Windows-based Iomega Nas P415 is greatly simplified by the use of a straightforward browser interface

Below: The Nas P415 can be used to add an instant 720GB of storage space on a variety of Windows, Unix/Linux, Netware and Apple networks

Best known for its Zip, Jaz and other desktop storage devices, Iomega recently extended its product set with a range of network attached storage (Nas) devices. These single-purpose servers are aimed at small business and departmental networks, providing instant access to shared storage without the hassles of deploying and managing general-purpose server solutions.

There are several Iomega Nas models and capacities. The top-of-the-range Iomega Nas P415, featured here, ships in an ultra-slim (1U) case designed to be rackmounted and provides 720GB of storage. That's enough for quite large file-sharing networks in small to medium-sized companies. There's support for multiple network and file system protocols, enabling the P415 to be deployed on large mixed Apple, Novell Netware, Unix/Linux and Windows networks.

Web-based access using FTP and HTTP-based browsers is another option. Additionally, the Nas P415 can be integrated into NT domain and Windows Active Directory networks.

There shouldn't be any need to open the case of the Iomega Nas, but if you do you'll find a fairly conventional server motherboard with a single Pentium III processor and 512MB of ECC-protected memory. This isn't state-of-the-art, but then you don't need a lot of processing power to share files.

Lan connectivity is important, though, with two 10/100Mbits/sec Ethernet interfaces included to provide the bandwidth, with load balancing and failover facilities as standard. A Gigabit Ethernet port can be specified, and is expected to be provided as standard later this year.

An Ultra160 SCSI port can be specified to attach a backup tape drive, but the main storage is all EIDE, with room for four hard disks mounted in special carriers that slot into the front of the unit. These can be hotswapped just like SCSI disks, and the P415 comes configured as a Raid 5 array. The Iomega Nas can tolerate the failure of any one drive, rebuilding the lost data when the failed drive is replaced. The operating system is protected with a mirrored copy of the software on the second disk to facilitate disaster recovery.

The choice of 7,200rpm EIDE disks limits performance compared to SCSI options, and there are no facilities to expand the amount of storage supported – you just add another appliance when space runs out and you can't use all 720GB of disk space for data. Usable space depends on the Raid level selected, with the default Raid 5 setup offering 498GB, falling to just 166GB if Raid 1 (mirroring) is selected.

There are two versions of the Nas P415, differentiated by the operating system. The cheaper of the two, the P415u (£4,212 ex VAT) runs the FreeBSD implementation of Unix, while the P415m we tested is Windows-based, running an implementation of the Microsoft Windows 2000 Server Appliance Kit (SAK).

Developed by Microsoft for appliance servers, the Iomega implementation is effectively Windows 2000 Advanced Server optimised for file-sharing and preconfigured with all the necessary add-ons to support NFS access, Apple Mac connectivity and so on. However, there's no local console on the Iomega Nas. Instead, what little management is needed is done via a simple remote browser interface, making the Iomega appliance quick and easy to deploy. Plus there's simple client software to map drives to the shared server storage and utilities to take client backups – one of the main reasons companies buy Nas devices.

The other is general file sharing, and the browser interface can be used to configure most of the basic sharing options. For more advanced tasks it's also possible to use the built-in Windows 2000 Terminal Services to remotely access the server using the standard desktop GUI. You also get extra tools to plan and manage the Nas storage, take snapshots for data protection and back up data to tape.

The price seems a little high compared to a similar general-purpose server running Windows 2000. However, you don't have to buy any additional client access licences, which can increase the cost of deploying a conventional server. But then you can run other applications on a general-purpose platform which, although possible in theory, isn't something Iomega encourages its Nas customers to do.

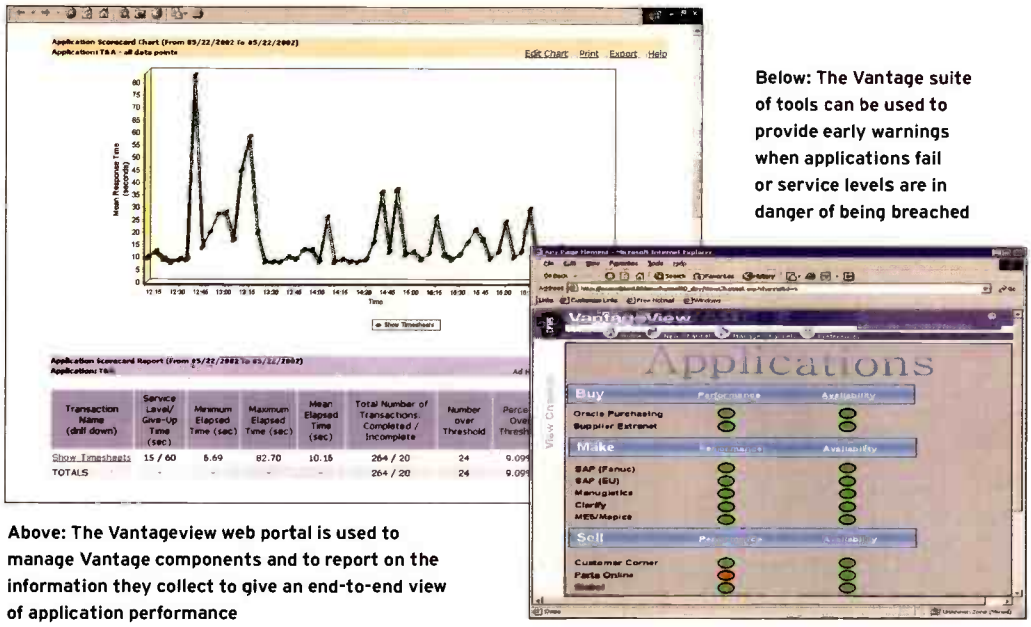
DETAILS

PRICE £5,600 (£4,766 ex VAT)
CONTACT Iomega 020 7216 0003
www.iomega.com/europe
SPECIFICATIONS
1U rackmount Nas appliance • Pentium III 1GHz • 512MB of Ram; four hotplug 180GB ATA-100 hard disks (Raid 5 protection in software) • Dual 10/100Mbits/sec Ethernet interfaces • External Ultra160 SCSI connector • Windows 2000 Advanced Server
PROS Simple to manage; hotswap disks; Raid support; mixed network capable; no client licences needed; backup and snapshot software
CONS Expensive; limited performance and expansion
VERDICT
Hassle-free shared network storage that will appeal to those with distributed networks
SCORE ★★★★☆

PERFORMANCE MANAGEMENT

Compuware Vantage

This comprehensive suite offers end-to-end application monitoring



Below: The Vantage suite of tools can be used to provide early warnings when applications fail or service levels are in danger of being breached

Above: The Vantageview web portal is used to manage Vantage components and to report on the information they collect to give an end-to-end view of application performance

Compuware Vantage is a suite of performance management tools that monitor the performance of distributed applications from the client interface, through the intervening network, to supporting database and other back office systems. A range of applications can be monitored, including web-based and client/server systems, along with SAP, Citrix thin-client and 3270 mainframe programs.

Primarily Windows-based, the Compuware software takes a client/server approach, with distributed agents that store collected data in a central SQL database. This can be hosted using Microsoft SQL Server or the cut-down Microsoft Data Engine (MSDE) implementation included on the Vantage CD-Rom. Agents are provided that can be used to work with applications hosted using a variety of operating systems, including popular Unix platforms as well as Windows, with built-in application templates, rules and wizards to handle the more common commercial applications.

A number of independent components make up the Vantage suite; they can be used on their own or mixed as required. This makes for flexible deployment, although it can be difficult working out what you might need – a task made harder by a degree of functionality overlap between modules and a few inconsistencies when it comes to integration. However, the latest release does include a new web portal (Vantageview) to help tie the components together, as well as to make life easier when it comes to viewing and reporting on the data.

Given the nature of the Vantage suite it wasn't possible to evaluate everything on offer, but we did install the main Clientvantage module on the *PCW* test network, a package that's used primarily to measure end-user response times. A Windows NT/2000 server is needed for this and the install takes around half an hour, including building the SQL database. When that's done, the Clientvantage software can be set to monitor application access in two ways using the agents provided. The simplest is passive monitoring – effectively timing real transactions as they occur, while the second approach – referred to as active monitoring – involves the generation of synthetic transactions.

Active monitoring requires additional hardware in the form of robot workstations to run the scripted transactions and takes a lot longer to set up. However, it gives a better picture of performance without the influence of operator pauses, interference from other desktop applications and so on.

The Clientvantage software also tracks workstation processor, memory, network and disk activity to help pinpoint bottlenecks. It can also be set to capture this and other point-in-time information when applications fail, at the same time generating email and other alerts. Similarly, it's possible to use Clientvantage to capture workstation data and issue alerts when service levels drop below pre-set thresholds. Clientvantage also includes facilities to collect baseline data to make sure the SLA (service-level agreement) thresholds are realistic.

Clientvantage is a useful tool for monitoring a range of applications, but only goes so far in determining where the performance bottlenecks are. For a more complete picture you need to add other modules such as Network Vantage (£28,400 ex VAT), which closely monitors network traffic between the application and its clients. It also issues alerts when service-level thresholds are breached and can be integrated into the Vantageview web portal to enable the information to be viewed and reported on.

Servervantage (£18,425 ex VAT, 20-server licence) uses the new Vantageview web portal to provide detailed information about what's going on at the server end. Application Expert (£16,350 ex VAT) will profile and predict performance before applications go live.

Clientvantage and the other Vantage tools require some technical expertise to deploy the software involved (although installation is straightforward) and to interpret the detailed information that's likely to be collected. Moreover, the Compuware suite is far from inexpensive and very much a large enterprise and service provider solution rather than one for the small to medium-sized business.

DETAILS

PRICE From £13,748 (£11,700 ex VAT) for main Clientvantage module with 25 agents
CONTACT Compuware 01753 444 000
www.compuware.com
SYSTEM REQUIREMENTS Windows NT/2000 server with Pentium II or above, 128MB of Ram; Windows agents require Windows 95 or later; Unix agents available for Solaris, HP-UX and AIX; Vantageview web portal requires IIS 5 or above
PROS Realtime monitoring of production systems; wide support; predefined application templates
CONS Some functionality overlap; expensive with all the modules
VERDICT
A comprehensive suite of performance monitoring tools
SCORE ★★★★☆

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Fast and wirefree

WORDS: ALAN STEVENS **TESTING:** VNU LABS **PHOTOS:** BRUCE MACKIE

Not all high-speed wireless network solutions are equal, so if you're looking to take your business wireless, this group test should help you make a few decisions

When building or extending a business network there's a lot to be said for using wireless technology, but there are also a number of drawbacks, one of which is security. Another is the lack of bandwidth on wireless Lans which, although not a big problem for home users, can be a real turn-off when it comes to business use.

The trouble is that current wireless technologies are limited to just 11Mbits/sec when, on a fixed network, 100Mbits/sec and, increasingly, 1,000Mbits/sec are now commonplace. Of course, real rates tend to be lower, but the differences are still significant. Archiving a typical 2GB Outlook .pst file, for example, takes around six minutes using Fast Ethernet, but over an hour across an 11Mbits/sec wireless link.

The good news is that new technologies and products are starting to appear that tackle this problem. The bad news is that the new wireless technologies don't all conform to the same standard.

Over the page is a quick summary of much of what you need to know. After that are reviews of some of the latest high-speed wireless products. The devices fall into three groups, starting with those that take existing 11Mbits/sec hardware and enhance it. Unfortunately the results from this type of equipment aren't that impressive, as we found in our labs tests (page 163). The real speed demons are those in the other two groups, which conform to the latest IEEE wireless standards – 802.11a and 802.11g.

Five-minute guide to wireless networking

Wireless networks are Ethernet based, just like fixed Lans, so they can carry the same communication protocols, such as TCP/IP, HTTP, and be used with Windows, Linux and other popular operating systems. However, instead of using cables to link devices they use radio waves.

Two frequency bands are currently used, the most popular being 2.4GHz, referred to as the Industrial Scientific and Medical (ISM) waveband. No licence is required to operate in this waveband but lots of other products make use of it, which can lead to interference problems. Dect cordless phones, for instance, use it, as well as wireless burglar alarms, video senders and Bluetooth devices.

The other frequency is 5GHz. Originally a licence was required to use this but that no longer applies and it's now referred to as the Unlicensed National Information Infrastructure (UNII) waveband. It only became freely available this year, so much less use is made of this waveband, leaving it less prone to interference.

Wireless practice

To build a wireless network, each PC, notebook server or other node requires its own wireless network interface card (Nic). These can be integrated into the device or implemented using plug-in adaptors, just like fixed Ethernet Nics, and communication can be peer-to-peer (referred to as ad hoc mode), although this is only to be recommended on small home networks and isn't supported by every vendor (see figure 1).

On most business networks wireless nodes are linked instead via a wireless access point (Wap), which will also provide a bridge to the fixed Ethernet Lan. In addition to dedicated access points some vendors also offer wireless routers, which combine the access point with an Ethernet switch for the fixed Lan and a router to connect both wireless and fixed users to the Internet via an external ADSL or cable modem (see figure 2).

Individual access points can support multiple users but there are limits which, together with range restrictions, mean that multiple access points are required to provide coverage in larger buildings. Roaming (like that on mobile phone cells) is usually supported, such that if a user moves out of range of one access point into another they should not lose their Lan connection.

Wireless standards

There are currently three main standards that apply to wireless networking products. Each is detailed below.

802.11b

The longest established, cheapest and most popular technology, 802.11b products started shipping in 2000. They operate in the 2.4GHz waveband with a headline data rate of 11Mbits/sec, although some manufacturers claim to be able to improve on this when only their own hardware is involved.

In practice, users can expect to get throughput rates of around 5-6Mbits/sec. Range varies but around 40-60m indoors is usual.

To guarantee interoperability, manufacturers of 802.11b wireless hardware have formed an alliance known as Wifi. Products carrying the Wifi logo should have no problem working together, regardless of vendor.

802.11a

802.11a products started to appear in 2002. They operate in the 5GHz UNII waveband and can support a bandwidth of up to 54Mbits/sec, although in practice 20Mbits/sec is likely to be what most users see.

The range of 802.11a is lower than for 802.11b (around 20m indoors is typical) and the signal doesn't travel through walls as well. However, it offers eight non-overlapping channels compared to just three with 802.11b, which allows more users to be accommodated per access point.

The use of the different waveband, together with a different modulation technology, orthogonal frequency division multiplexing (OFDM), makes 802.11a hardware incompatible with 802.11b networks. However, some manufacturers offer access points that incorporate both 802.11b and 802.11a interfaces (dual-mode) to allow the two to work together on the same network with no performance hit.

802.11g

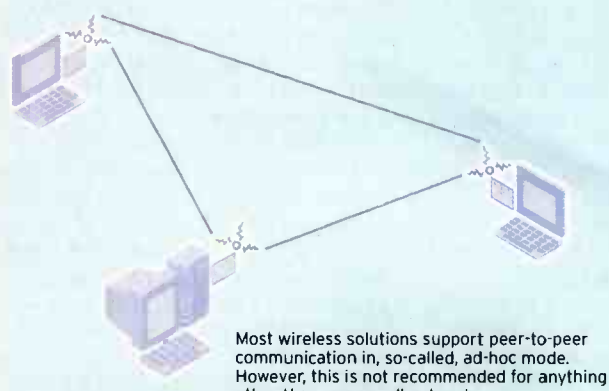
The most recent of the wireless standards, 802.11g hadn't been fully ratified at the time of going to press, but that hasn't stopped manufacturers shipping products that conform to the draft specification.

802.11g is an extension of the 802.11b technology with a different modulation scheme to enable 54Mbits/sec to be achieved using the same 2.4GHz radio frequency. Despite the different modulation, interoperability with 802.11b is supported – although if both types are mixed together, the maximum bandwidth of the 802.11g devices is significantly reduced.

On a pure 802.11g network users can expect throughput rates of around 20Mbits/sec. Range is the same as for 802.11b, around 40-60m indoors, and the technology offers the same three non-overlapping channels.

FIG 1

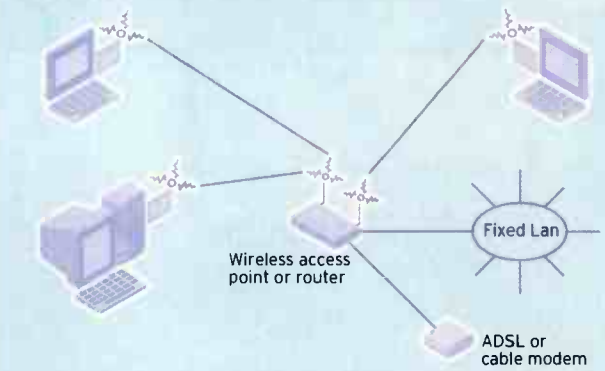
An ad hoc wireless network



Most wireless solutions support peer-to-peer communication in, so-called, ad-hoc mode. However, this is not recommended for anything other than very small networks.

FIG 2

An access point wireless network



On a large network one or more access points will be used to connect wireless nodes together and to the fixed network. Some vendors also offer wireless routers which, as well as an integrated access point, connect users to the Internet via ADSL or cable.

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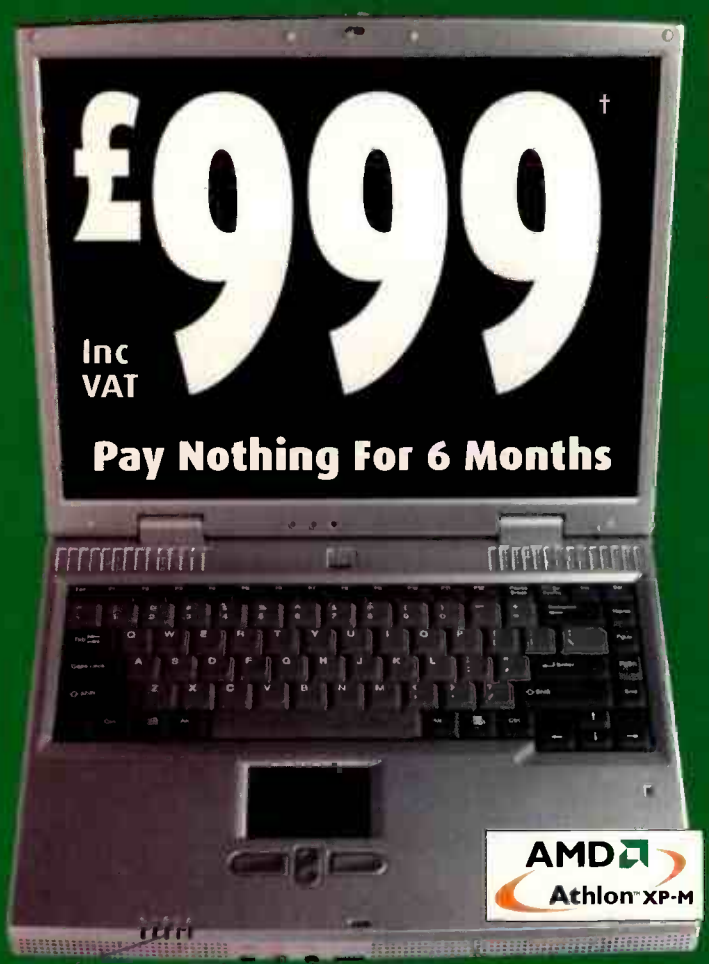

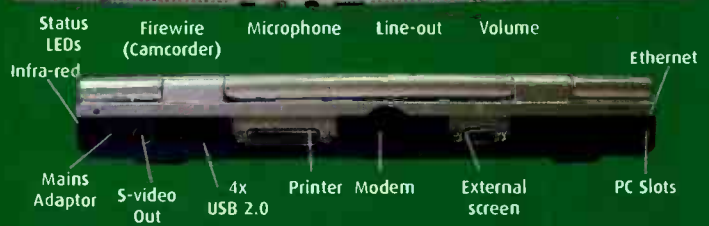

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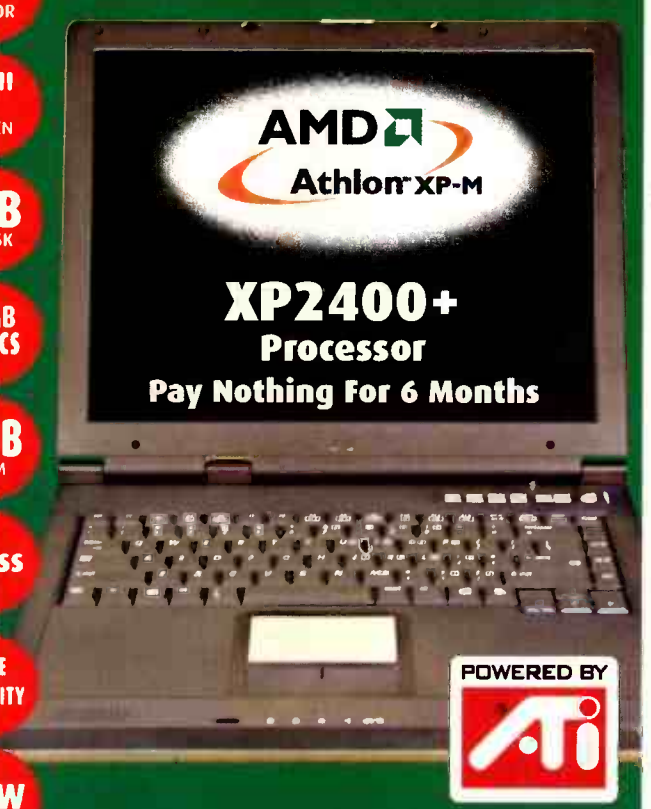

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[TM(08)06]

The Airstation G54 range is aimed at small businesses looking for fast wireless and fixed networking

It not only looks the part, but the elegant Cisco Aironet 1200 also delivers on both performance and functionality

Buffalo Airstation G54

This is an 802.11g solution, however at the time of testing the 802.11g standard wasn't fully ratified, so Buffalo promises to upgrade or replace equipment if any major changes become necessary when it's finalised.

Both PCI and PC Card adaptors are available, but a dedicated access point isn't. We looked at the 54Mbits/sec Broadband Router Base Station which, as well as an integrated Wap, incorporates a four-port 10/100Mbits/sec Ethernet switch for fixed networking. A 10/100 port is also provided for Wan connection, requiring a separate ADSL or cable modem with a suitable Ethernet port.

Very much a small business solution, the Router Base Station is installed and managed using the usual browser interface (Air Navigator) with options to configure it for conventional access point operation and as a wireless bridge. A DHCP server is provided to assign client IP addresses, with the router supporting up to 253 nodes.

WEP encryption comes as standard for wireless security, and support for WPA (Wifi Protected Access) is promised. The router includes Buffalo's packet filtering firewall, Intrusion Detector, which protects both wireless and fixed network users with email alerting when potential threats are detected. It can also be extended to provide IPSec-based Virtual Private Networking (VPN) facilities for remote Lan access.

In the labs the G54 was very capable, recording a throughput rate of 18.72Mbits/sec. That's down on what rival 802.11a products achieved, but it's a good result nonetheless and only beaten by one other 802.11g solution, from Linksys. On the downside, adding an older 802.11b client to the Lan almost halved the performance, which could be an issue if you're extending an existing 11Mbits/sec wireless Lan.

The G54 is a good solution for small businesses that want more than the 11Mbits/sec throughput of current wireless products.

DETAILS

PRICE Wireless router £162.15 (£138 ex VAT), PC Card adaptor £96.35 (£82 ex VAT)
CONTACT Buffalo Technology UK 01753 555 000 **www.buffalo-technology.com**
PROS Good performer in the labs; integrated router and four-port switch; firewall and VPN
CONS Mixed mode networking halves throughput
VERDICT
High-speed networking, router, switch and low price make this a good small business solution
SCORE ★★★★☆

Cisco Aironet 1200

Cisco's IOS-based wireless products have long been considered the standard against which others are measured, especially in the enterprise market. That remains the case with the Aironet 1200, which allows 2.4GHz and 5GHz wireless technologies to be mixed together using common access point hardware.

The Aironet 1200 is a superbly designed piece of equipment. Solidly constructed in cast aluminium, it features support for Power over Ethernet as standard, with options for desk, wall or ceiling mounting. The radio modules are on separate cards that plug into the base unit, along with a choice of antennae, enabling the 1200 to support 802.11b or 802.11a networks, or both.

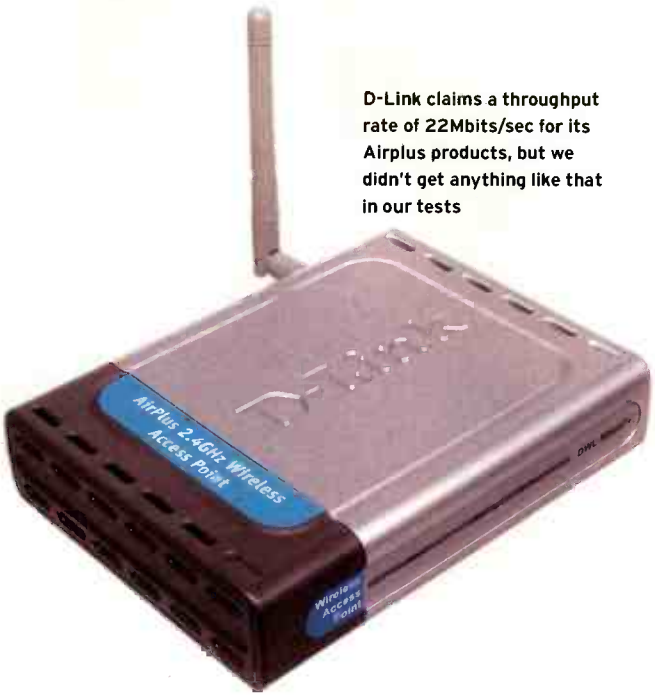
An 802.11g module is also expected shortly. The 1200 includes VLan support to, for example, segregate traffic from different departments. There's QoS support too, enabling voice traffic to be prioritised over data packets. And Cisco is at the forefront when it comes to security with its Cisco Wireless Security Suite, which includes 802.1x authentication facilities and Cisco's implementation of the Extensible Authentication Protocol (Leap).

Throughput and range both depend on the frequency used but, regardless of how it was configured, the Aironet 1200 came out top in all our throughput tests. There was also no degradation in performance when both radio modules were active. That was mainly due to the different frequencies used, but it's impressive nonetheless.

This isn't really a small business solution but a web interface does mean configuration of the access point is relatively straightforward, if tortuous in places. Alternatively, it's possible to use IOS tools, and there's SNMP support too. The only real drawback is price, but it's not excessively expensive and is a true enterprise solution that delivers not just on performance but also on functionality.

DETAILS

PRICE Access point £728.50 (£620 ex VAT), PC Card adaptor £185.65 (£158 ex VAT)
CONTACT Cisco Systems 020 8824 1000 **www.cisco.com/uk**
PROS Dual-mode access point; VLan and QoS support; security
CONS Expensive compared to some; browser interface not the easiest to use
VERDICT
The top performer in the labs, this very flexible wireless solution has lots to offer companies large and small
SCORE ★★★★★



D-Link claims a throughput rate of 22Mbits/sec for its Airplus products, but we didn't get anything like that in our tests

D-Link Airplus DWL-900AP+

D-Link has announced 802.11g products but these weren't available in time for our test, so we looked at its existing Airplus range which, the company claims, supports double the data rate of standard 802.11b solutions.

The 22Mbits/sec claims are the same as for other products based on Texas Instruments' (TI) ACX100 chipset. This Wifi-certified chipset is compatible with the 802.11b standard but, when communicating with other ACX100-based products, can boost throughput using PBCC (Packet Binary Convolution Code), a custom encoding technology.

PBCC is a non-standard technology but access points and adaptors from D-Link, US Robotics and others based on the TI chipset can all be mixed together and still take advantage of extra bandwidth. The end results, though, aren't as impressive as you might think. In our tests the D-Link Airplus DWL-900AP+ was faster than most ordinary 802.11b products, but it still only managed just over 6Mbits/sec, compared to almost 20Mbits/sec for the 802.11a/g solutions.

We didn't, however, encounter any compatibility problems when communicating with other 2.4GHz networks, including those using 802.11g.

Installation of the Airplus was straightforward; a wizard on the web interface guides you through the basic setup. That includes configuring the DWL-900AP+ as a wireless bridge as well as a standard access point to, for example, connect fixed Ethernet hardware to the wireless Lan or link separate wireless segments.

The flexible configuration options and low pricing make the Airplus a popular solution for small businesses. However, there are lots of other similarly priced 802.11b products, many based on the same TI chipset. None is as quick as claimed and if you're after maximum performance, look at 802.11a and 802.11g alternatives, such as the D-Link Airplus Xtreme g which we hope to review soon.

DETAILS

PRICE Access point £94 (£80 ex VAT), PC Card adaptor £39.95 (£34 ex VAT)
CONTACT D-Link UK 020 8731 5555
www.dlink.co.uk
PROS Low price; wireless bridge capabilities
CONS Not much quicker than standard 802.11b in the labs
VERDICT
A good 802.11b solution for the small business, but one of many and it's only marginally quicker than the rest
SCORE ★★☆☆☆

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Linksys Wireless-G

By including Linksys in this group test we're effectively reviewing two sets of Cisco products, as Linksys was recently acquired by the networking giant. However, the Linksys brand is being retained and, at the time of writing, the only 802.11g solution available from Cisco was this Linksys product.

Linksys produces a full range of wireless products, starting with 802.11b (Wireless-B) as well as 802.11a (Wireless-A) products and the 802.11g (Wireless-G) implementation we looked at. The company has also announced a dual-band 802.11a/g solution. At the time of writing the 802.11g standard wasn't fully ratified, which may affect final product specification and performance of all the Wireless-G solutions.

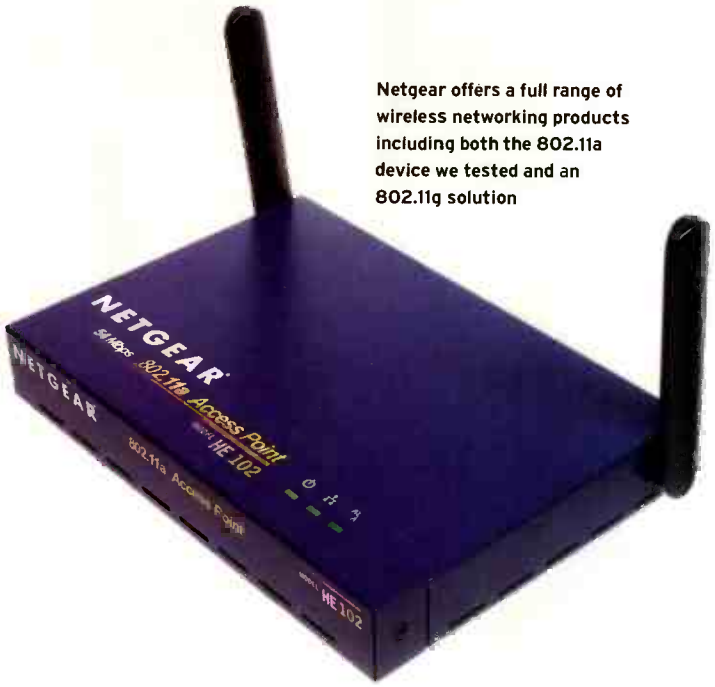
Dedicated access points and combined access point/broadband routers are available in each Linksys product set, and we were sent a Wireless-G access point (model WAP54G) for our tests. Linksys also submitted both a PCI and a PC Card adaptor, but we only used the latter to compare performance with other solutions.

The Wireless-G came top of the three 802.11g products we tested. The leading 802.11a solutions were faster, but not by a huge amount and if you want the best of both worlds the new dual-band solution is worth a look. Unfortunately, as with all the 802.11g products, adding legacy 802.11b devices reduces throughput but, in its defence, the Linksys product wasn't the worst culprit in this respect.

Wireless-G is reasonably priced and designed to be installed and supported by users with minimal technical knowledge. A simple graphical utility takes care of the initial setup, after which there's the usual browser-based interface for day-to-day changes. There's not that much to manage apart from the wireless setup and basic WEP encryption. That's all you really need for most small wireless Lans, while for greater enterprise functionality there's the Cisco Aironet.

DETAILS

PRICE Access point £129.25 (£110 ex VAT), PC Card adaptor £70.50 (£60 ex VAT)
CONTACT Linksys
0870 041 6624
www.linksys.com
PROS Top 802.11g performer in the labs; attractively priced
CONS Mixed mode networking reduces throughput; basic security options
VERDICT
An affordable small business solution that performs well and offers good value for money
SCORE ★★★★☆



Netgear offers a full range of wireless networking products including both the 802.11a device we tested and an 802.11g solution

Netgear HE102/HA12

Like Linksys, Netgear offers a complete set of wireless networking kit from 802.11b through to 802.11a and 802.11g. It also has dual-band (802.11a/b) products and recently announced a tri-band access point, which will use an Atheros chipset to support a combination of all three wireless standards.

The company sent us both 802.11g and 802.11a solutions, but lack of space meant that we had to drop the 802.11g solution, as it's more of a home user and small business product. However, there's no reason it shouldn't be bought by bigger companies and in some of our tests we found it to be a good solution, on a par with the other 802.11g implementations from Buffalo, Linksys and SMC.

Our main focus though was on the 5GHz products which we checked out by testing the HE102 Access Point with a Netgear HA12 PC Card adaptor. The results were very good, with this combination coming a close second to the Cisco Aironet 1200, which was our top performer overall. Similarly, the Netgear hardware was unaffected when we tested it alongside an 802.11b wireless Lan, although that's primarily due to the different waveband and modulation technology used by all 802.11a devices.

The HE102 doesn't support much more than standard WEP encryption, with no VLan facilities or external user authentication. Nor does it have the firewall or VPN option of the Buffalo Airstation G54, although that's a broadband router rather than a simple access point and a Nat-enabled (network address translation) wireless router is available as part of the Netgear 802.11a family.

We had no problems installing or managing the Netgear device, with a standard browser-based interface used to administer the access point. The same applies to the 802.11g device which is straightforward. Neither is really an enterprise product but both are suitable for small business use.

DETAILS

PRICE Access point £258.50 (£220 ex VAT), PC Card adaptor £135.13 (£115 ex VAT)
CONTACT Netgear 01344 397 021
www.netgear.com
PROS Good overall performance; easy to install; unaffected by 802.11b networks
CONS No VLan or QoS support
VERDICT
A good 802.11a solution but lacks some of the enterprise functionality supplied by the competition
SCORE ★★★★☆

The dual-band access points in the Proxim Orinoco family support mixed 802.11a/b/g networks

Proxim Orinoco

Proxim has three families of wireless networking products: Skyline and Harmony for home users and small businesses, and Orinoco for larger enterprises and wireless service providers. We looked at the Orinoco family, which supports 802.11a and 802.11g standards, concentrating our testing on the former.

There are two access points in this range, both equipped with dual slots to take plug-in PC Card adaptors. As such it's easy to configure them to handle mixed 802.11a/b environments, with 802.11g support also available. We tested the AP-2500, which features Radius-based user authentication and billing facilities; it also offers bandwidth management, making it ideal for use in public areas as well as large enterprises. Alternatively there's the AP-2000 (£396 ex VAT) which only supports 2.4GHz networks but can be upgraded to 5GHz for £169 ex VAT. Performance should be the same, but the AP-2000 is a better fit for private networks with VLan, Voice over IP and 802.1x security features.

We encountered a number of problems when testing the Proxim products. A lot of these were negotiation issues on the fixed network side, which were eventually resolved by fixing the port speed. More worrying was our inability to get the Orinoco hardware to work at much beyond 10Mbits/sec, despite help from Proxim itself and a lot of experimentation with different settings. We've no doubt the Orinoco can match the throughput rates of other 802.11a implementations – we just ran out of time getting it to do so on our test network, so can't vouch for anything beyond the results we obtained.

The Orinoco access points are very easy to manage, with a choice of a browser-based interface, Telnet or local serial port access. You also get SNMP support and Power over Ethernet as standard, and there are lots of other Proxim wireless products that can be used for a wide range of requirements.

DETAILS

PRICE Access point £622.75 (£530 ex VAT), PC Card adaptor £139.82 (£119 ex VAT)
CONTACT Proxim 01494 563 737
www.proxim.com
PROS Dual-band access point; Radius authentication; VLan support on the AP-2000
CONS Configuration problems leading to poor results in our lab tests
VERDICT
A good enterprise solution on paper, but failed to live up to expectation in our tests
SCORE ★★☆☆☆

The EZ Connect g products from SMC promise 54Mbits/sec throughput, but we found 15Mbits/sec to be a more realistic figure

US Robotics claims to quadruple the throughput of its standard 802.11b wireless hardware with a simple firmware upgrade

SMC EZ Connect g

SMC only sells 2.4GHz wireless solutions with a choice of both 802.11b and its recently launched 802.11g, EZ Connect g products, tested here. As with all 802.11g solutions, the products we looked at only conformed to the draft standard available at the time of our testing. As such performance and functionality could both change when the final standard is ratified later this year.

The SMC products are very much targeted at home and small business users and are easy to install and configure with the usual browser interface for setup and management. There's also no dedicated access point in the EZ Connect g line-up. Instead, the company sells the Barricade G Broadband Router which, as well as a Wap and router, incorporates a four-port 10/100Mbits/sec Ethernet switch for local networking.

A separate Ethernet port connects the router to an external cable/ADSL modem. There's also a built-in DHCP server and a stateful inspection firewall to protect both wireless and fixed users from common Internet threats. Email is used to send out alerts when a potential attack is detected and 802.1x authentication and URL blocking facilities are also included to bolster the standard WEP security. Support for Wifi Protected Access (WPA) is planned, although it is unclear when this might appear.

Things aren't so good on the performance front. The EZ Connect g came third of the three pre-ratification 802.11g products, 4Mbits/sec behind the leading Linksys Wireless-G. Throughput didn't tail off as much when a competing 802.11b node was introduced, but that's little compensation for users expecting 54Mbits/sec when our tests show 15Mbits/sec to be more realistic.

The low price goes some way to offset lack of performance, but the EZ Connect g isn't much cheaper than the faster Buffalo and Linksys kit, against which it will be compared.

DETAILS

PRICE Wireless router £124 (£105 ex VAT), PC Card adaptor £54 (£46 ex VAT)
CONTACT SMC
01234 831 415
www.smc-europe.com
PROS Low-cost 802.11g solution; integrated router and firewall
CONS The slowest of the 802.11g solutions tested
VERDICT
Affordable 802.11g solution for the small business, but doesn't match the performance of the competition
SCORE ★★★☆☆

US Robotics Xlerator

Although it plans to introduce 802.11g products later in the year, US Robotics didn't have any available in time for our test. However, we've included its standard 802.11b solution, as it has updated the firmware to more than quadruple the claimed throughput rate.

The company already claims 22Mbits/sec courtesy of the Texas Instruments ACX100 chipset which, when communicating with similar adaptors, achieves higher throughput via a custom packet encoding technology. The same chipset is used by others, but US Robotics goes one step further with a software upgrade called Xlerator, with which it claims to be able to match the rates of more expensive 802.11a/g kit.

We put this to the test using a US Robotics 22Mbits/sec Wap (USR012249) and an 802.11b PC Card adaptor (a USR812210). We downloaded the free Xlerator upgrade from the US Robotics website, and found that it did improve performance in our tests. However, the figures we obtained were much lower than those claimed, with only a marginal improvement compared to the same setup without the Xlerator upgrade. The US Robotics product is faster than other 'ordinary' 802.11b solutions but, even with the Xlerator upgrade, not much quicker than other ACX100-based products.

You'd probably get better results on a larger network than we used, and the Xlerator upgrade helps minimise the drop in performance on mixed 802.11g/b networks. There's also the low price to consider, and a new 256 encryption option included in the Xlerator upgrade.

On the downside you have to stick with the one vendor, and you don't get compatibility with other high-speed solutions, even 802.11g solutions operating in the same waveband.

For US Robotics customers it's an easy upgrade, but if you're after maximum throughput it's no substitute for 'proper' 802.11a/g solutions.

DETAILS

PRICE Access point £85.77 (£73 ex VAT), PC Card adaptor £54.05 (£46 ex VAT)
CONTACT US Robotics
01628 640 140
www.usr-emea.com
PROS Can be applied to existing 802.11b hardware; upgrade available free of charge
CONS Marginal improvement only in our tests; not 802.11g compatible
VERDICT
Only worth considering if you're an existing US Robotics user
SCORE ★★☆☆☆

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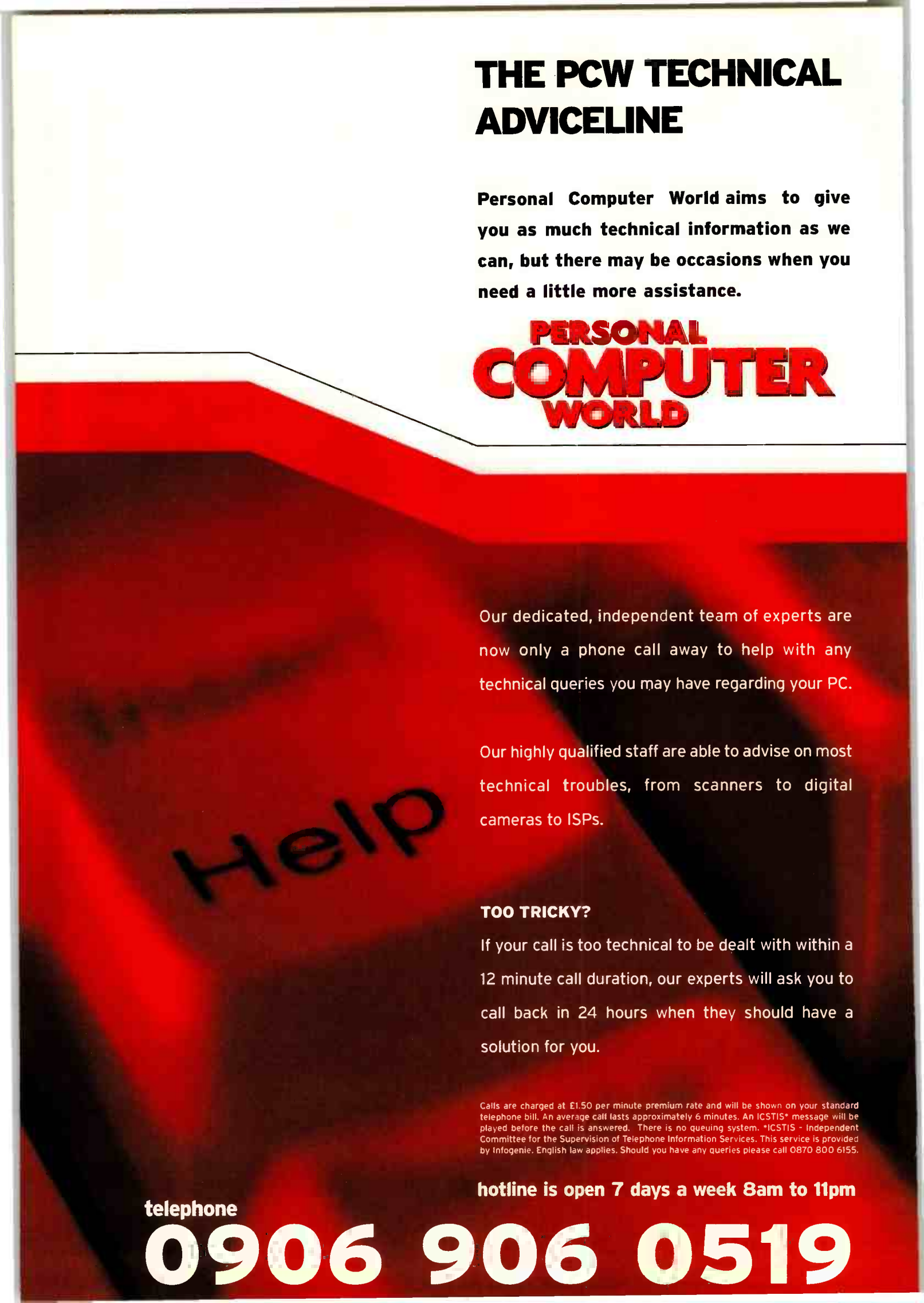

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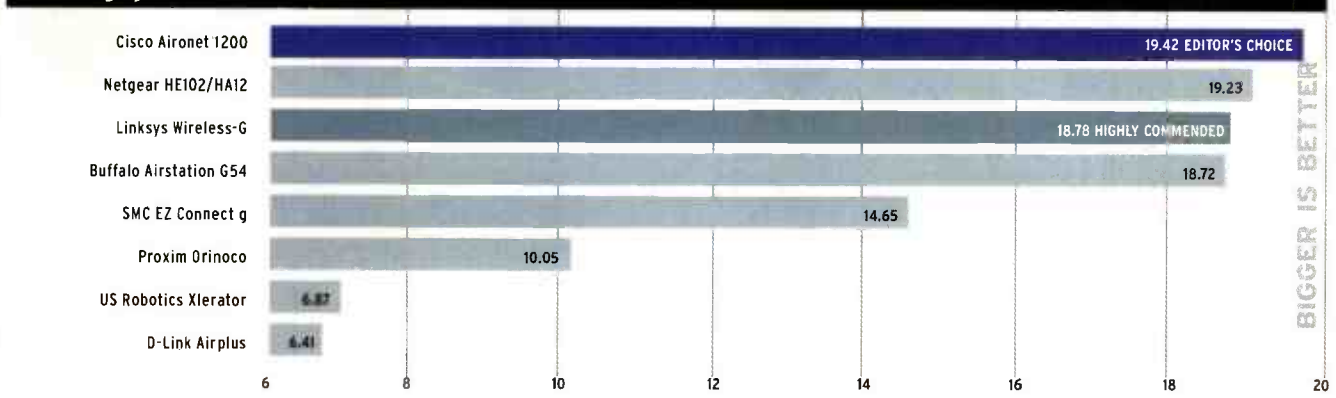
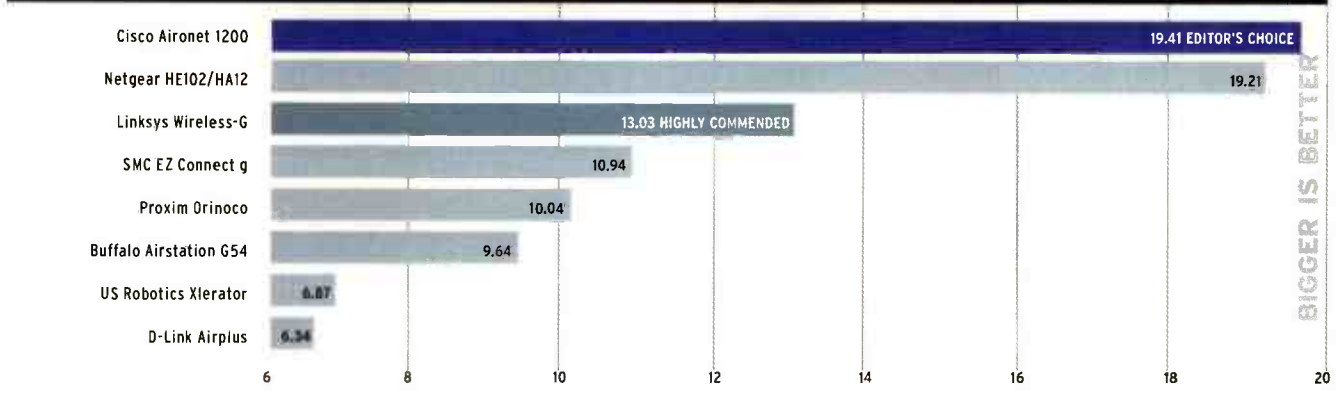
Lab results

vnu labs

Throughput in Mbits/sec



Mixed mode with 802.11b card in environment; throughput in Mbits/sec



How we tested

This group test is all about performance, so our labs setup was designed to optimise this. We attached each wireless access point or router to our standard test network using a 100Mbits/sec Ethernet switch port and configured the associated PC Card adaptor in a client notebook PC. We weren't interested in range so they were positioned alongside each other and a wireless Lan configured with no security encryption.

We then ran the Netbench benchmark. This is normally used to measure network throughput at the server end but equally records individual client throughput and, in this case, was run with just the one client configured. We used default software settings except where advised by the vendor to make changes. We also ran tests with a second client configured to use an 802.11b wireless Lan to see if this degraded throughput on the high-speed network.

The throughput figures were a lot lower than those quoted by the manufacturers. That might come as a surprise to those new to the technology. What the vendors quote are raw signalling or data link rates – effectively the speed at which signalling information can (theoretically) be transmitted between wireless nodes. Data rates will always be a lot lower, regardless of the manufacturer or technology involved. A good rule of thumb is to divide the claimed throughput figure by two to get closer to what you're likely to see.

The results are all a lot lower than we would expect to see on a fixed Ethernet network and especially on a switched network, where clients can expect to have a high percentage of the anticipated bandwidth available to them all the time.

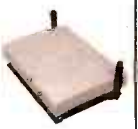
The worst performers were the enhanced 802.11b products which struggled to get beyond 6Mbits/sec. The underlying modulation technology isn't designed for high speed, but it's still disappointing given the claims made by the manufacturers. The figures are slightly better than for standard 802.11b, which usually comes in at around 5Mbits/sec, although it's not a big gain.

The 802.11g products fared a lot better, with the best performer here, the Linksys Wireless-G, managing 18.78Mbits/sec, closely followed by the Buffalo Airstation G54. Not quite up to the 100Mbits/sec common on fixed networks, but a good step in the right direction for companies looking for better wireless performance.

Top of the heap were the 802.11a solutions, led by Cisco's Aironet 1200 with 19.42Mbits/sec. The Netgear hardware was a whisker slower, but we had a number of problems with the Proxim Orinoco which took a lot of tweaking to get up to just over 10Mbits/sec. We've no doubt it could be made faster but, despite our efforts and Proxim support, we couldn't speed it up.

The 802.11a solutions were also the winners when we tested mixed mode performance with a second, 802.11b, network active. That was no big surprise, as 802.11a products operate in the 5GHz waveband, compared to 2.4GHz for 802.11b, and use a different modulation technology which should enable them to co-exist with few problems. The latest 802.11g devices use the same frequency which provides backwards compatibility, but competition from 802.11b can reduce throughput levels significantly. The biggest drop in our tests came with the Buffalo Airstation G54, where throughput was almost halved, with even the best performing Linksys Wireless-G recording a drop of more than 5Mbits/sec.

Table of features

MANUFACTURER	BUFFALO	CISCO	D-LINK	LINKSYS	NETGEAR	PROXIM	SMC	US ROBOTICS
								
MODEL	**AIRSTATION G54**	**AIRONET 1200**	**AIRPLUS DWL-900AP+**	**WIRELESS-G**	**HE102/HA12**	**ORINOCO**	**EZ CONNECT G**	**XLERATOR**
Access point price inc VAT (ex VAT)	£162.15 (£138) *	£728.50 (£620)	£94 (£80)	£129.25 (£110)	£258.50 (£220)	£622.75 (£530)	£124 (£105) *	£85.77 (£73)
PC Card adaptor price inc VAT (ex VAT)	£96.35 (£82)	£185.65 (£158)	£39.95 (£34)	£70.50 (£60)	£135.13 (£115)	£139.82 (£119)	£54 (£46)	£54.05 (£46)
URL	www.buffalo-technology.com	www.cisco.com/uk	www.dlink.co.uk	www.linksys.com	www.netgear.com	www.proxim.com	www.smc-europe.com	www.usr-emea.com
Phone number	01753 555 000	020 8824 1000	020 8731 5555	0870 041 6624	01344 397 021	01494 563 737	01234 831 415	01628 640 140
IEEE WIRELESS STANDARDS								
11Mbits/sec – 802.11b	✔	✔	✔	✔	✗	✔	✔	✔
54Mbits/sec – 802.11a	✗	✔	✗	✗	✔	✔	✗	✗
54Mbits/sec – 802.11g	✔	✗ **	✗	✔	✗	✔	✔	✗
CLIENT ADAPTORS								
Cardbus	✔	✔	✔	✔	✔	✔	✔	✔
PCI	✔	✗ ***	✔	✔	✔	✗ ***	✔	✔
ACCESS POINT/ROUTER								
Aerial type	Fixed	Fixed and removable	Removable	Removable	Removable	Fixed	Removable	Fixed
Number of aerials	1	3	1	2	2	1 per radio card	2	2
External aerial connector	✔	✔	✔	✔	✗	✗	✔	✗
Number of fixed 10/100 ports	4	1	1	1	1	1	4	1
Wan port	✔	✗	✗	✗	✗	✗	✔	✗
Serial/console port	✗	✔	✗	✗	✔	✔	✗	✗
Power over Ethernet	✗	✔	✗	✗	✗	✔	✗	✗
SECURITY								
40bit WEP encryption	✔	✔	✔	✔	✔	✔	✔	✔
128bit WEP encryption	✔	✔	✔	✔	✔	✔	✔	✔
152bit WEP encryption	✗	✗	✔	✗	✔	✗	✗	✗
WPA (Wifi Protected Access)	✗	✗	✗	✗	✗	✗	✗**	✗
MAC access control	✔	✔	✔	✔	✔	✔	✔	✔
802.1x authentication	✗	✔	✗	✗	✗	✔	✔	✔
Network address translation	✗	✗	✗	✗	✗	✔	✗	✗
Integrated firewall	✔	✔	✗	✗	✗	✔	✔	✗
Other security options	None	Pre-standard TKIP, Leap	256bit WEP	None	None	Radius authentication	None	256bit WEP
CONFIGURATION & MANAGEMENT								
HTTP browser interface	✔	✔	✔	✔	✔	✔	✔	✔
Other management interfaces	✗	✔ (IOS)	✗	✗	✗	✔ (Telnet, CLI)	✗	✗
SNMP	✗	✔	✗	✔	✗	✔	✗	✗
QoS support	✗	✔	✗	✗	✗	✔	✗	✗
WARRANTY								
Length of warranty (years)	2	1	5	3	5	3	Limited lifetime	2
SCORES								
Overall score	★★★★☆	★★★★★	★★☆☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆	★★☆☆☆

* Wireless router ** Will be available shortly *** 802.11b only

Editor's Choice

If there's one clear message to take away from this group test, it has to be not to believe the performance claims made by wireless vendors – at least not when it comes to the headline data rates which they all quote and which, without exception, are far beyond the capabilities of the products concerned.

The bottom line is that you simply won't get the advertised 54Mbits/sec or anything like it with the wireless products currently available. Indeed, the ceiling seems to be closer to 20Mbits/sec, even with the top-performing products. However, that is over three times what you get with the older 802.11b products, and if you can appreciate exactly what you're likely to get, you can at least make some sensible decisions on what to buy if performance is your aim.

The second message is that if it's a real performance advantage you're after, you should steer clear of the enhanced 802.11b products, such as those we looked at from D-Link and US Robotics. If it were possible to double or quadruple throughput with a special chipset or firmware upgrade there would be no market for the latest 802.11a or 802.11g products, and that isn't the case. If you're looking at 802.11b anyway you might as well go for one of the so-called '22Mbits/sec' products as they don't cost any more. But the gain is marginal and the newer standards are around three times as quick

Cisco Aironet 1200

'You won't get the advertised 54Mbits/sec with current products'

The winners

When it comes to those alternatives the most impressive has to be the 5GHz, 802.11a, products which in our tests had a clear edge in terms of performance over the 2.4GHz, 802.11g, solutions. They also suffer less from interference plus, with eight non-overlapping channels compared to just three with the 2.4GHz hardware, each access point can support a lot more users. Range isn't so good, but it was acceptable on the products we tried, especially the **Cisco Aironet 1200**, which receives this month's **Editor's Choice** award.

There are several reasons we chose the Cisco Aironet 1200, starting with the fact that it came out top in all our performance tests. It was also the best designed and engineered of the products we looked at, which may not sound like much of a reason for picking it, but remember that wireless access points are very visible and good design is increasingly important these days. More importantly the Aironet 1200 is one of the most functional wireless solutions around, with lots of features of interest to big companies, including VLan, QoS and advanced user authentication options, together with SNMP management and support for Power over Ethernet, all included as standard. Sure, it's not the easiest to install if you're new to the technology and it's more expensive than most. However, as an enterprise solution it has everything going for it and we have no hesitation in recommending Aironet 1200 to any company that is looking for a state-of-the-art high-speed wireless network.

At the same time it's pretty clear that the 2.4GHz 802.11g products look set to have a big impact on the home and small business market. Throughput isn't as good as with the 5GHz hardware, but prices are already starting to tumble, so much so that it won't be long before there will be little to be saved by sticking with the older 802.11b technology. In fact that's already started to happen in the US where, according to one of the vendors we talked to, 802.11g already accounts for around 30 per cent of its wireless sales. And that's before the final standard has even been ratified, although that looks like being a formality and should have happened by the time you read this.

Of the three 802.11g products we looked at the one that impressed us most was the Linksys Wireless-G. Now owned by Cisco, the Linksys solution was not only almost as quick as the Cisco Aironet but, as with all Linksys products, very easy to configure and competitively priced. On the minus side throughput did drop considerably when 802.11b devices were mixed on the Wireless-G network, but that happens with all 2.4GHz implementations. Similarly, although the access point we tested didn't have the functionality of the wireless routers submitted by Buffalo Technology and SMC, a wireless broadband router is available in the Wireless-G range. As such the **Linksys Wireless-G** solution receives a **Highly Commended** award as a great high-speed wireless solution for the smaller business or home network.

Linksys Wireless-G

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Hands on

EDITED BY NIGEL WHITFIELD

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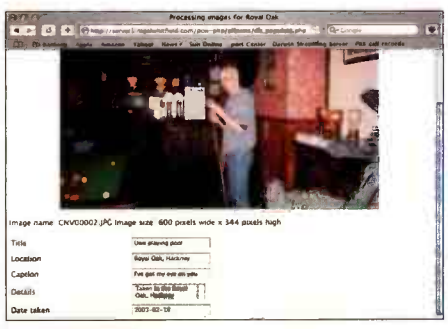
How to convert your vinyl collection to CD – all is explained in this month's Sound



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Web development shows you the simple way to add picture galleries to your website

Things change quickly in the computer world but, and regular readers will know, *PCW* has been here for the past 25 years keeping you up to date. This month marks 10 years of Tim Nott's monthly column about Windows. To mark the occasion, you'll find tips from each of the last 10 years – and they all work on later versions of Windows too!

Ten years ago, of course, many of us were still listening to music on vinyl or cassette – and this month Niall Magennis takes an in-depth look at how you can transfer your treasured LPs and 45s into digital form. Sticking with older technologies, Gordon Laing presents a detailed look at upgrading the hard drive on a bargain notebook, and explains the pitfalls.

There's plenty of up-to-date material in Hands on too, of course. In Visual programming, Tim Anderson looks at the Compact Framework, and how you can use it to create applications for Pocket PCs, while Ken McMahon revisits jpeg2000 in Digital imaging, and explains how to deal with rotated video clips from the latest digital cameras.

Email is important to us all and if you have lots of old messages, it can be a major consideration when upgrading your PC. So take a look at the Linux column this month, where Barry Shilliday explains how you can take all your messages with you when you make the move over from Outlook on Windows to an open-source operating system.

On the desktop, you'll find tips for the most useful Excel add-ins in Spreadsheets, and in the Word processing column you can read how to add automatic serial numbers to invoices or letters. We've also got information on optimising the performance of your database queries, setting up TCP/IP client workstations, and a bumper crop of simple solutions to common Windows 2000 problems, from Terence Green.

There's Web development too, with a system for organising photo albums on your site, the latest on Microsoft's Plus Digital Media Edition for Windows XP, and tips on wireless networking and PDAs. I hope you'll all find something useful inside. The email addresses for all the columns are listed at the end of Question time, so drop us a line if you have a problem you want us to solve.

Nigel Whitfield

Advice from our experts

Our Hands on experts answer your questions and solve your problems

Spreadsheets

Q When I try to open an Excel file I get an error message box saying Windows can't find the file. Even if I try to open an Excel file through Explorer it won't open. Other applications work OK. What has gone wrong?

John Hickle

A It sounds as though your files have become disassociated with Excel. Check File Types under Folder Options in the Control Panel. If you have a recent version of Windows which has System Restore under System Tools you're fortunate – just restore your computer back to a date when Excel files opened OK.

Q I have the total of hours and minutes worked by various staff members while they were away. How can I convert this to days, hours, and minutes?

Niamh Walsh

A Enter this formula in cell A2: =INT(A1) &" Days "& INT(MOD(A1,INT(A1))*24) & " Hours and " & MINUTE(A1) & " Minutes". Accept the default or give cell A2 the General format. Give cell A1 the Custom format [h]:mm and enter into it 125:5. It will display as 125:05. In A2 you should get the result:

Five days Five hours and Five minutes. These are 24-hour days. You won't be able to refer to cell A2 for other time calculations. For those, refer back to A1.

Q How can I quickly insert the name of each worksheet in an Excel workbook (the ones on the tabs) into cell A1 of each sheet?

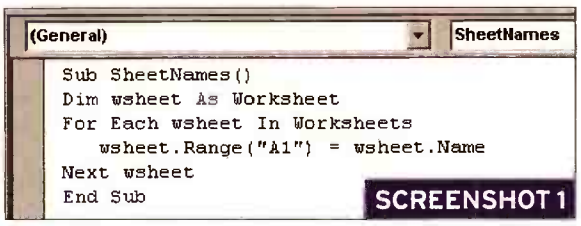
Rob Sargent

A Use a macro to do it (see screenshot 1). Press Alt & F11. Choose Module on the Insert menu and type in:

```
Sub SheetNames()
Dim wsheet As Worksheet
For Each wsheet In ✓
Worksheets
   wsheet.Range("A1") = ✓
wsheet.Name
Next wsheet
End Sub
```

(Key: ✓ code string continues)

Save the file and close the VBA window. Press Alt & F8. Click the



A macro to enter the tab name onto each worksheet in a file

Options button. Type a cap N and OK out. Now you can press Ctrl & Shift & n on any worksheet in your file and the correct tab name will appear in cell A1 on each sheet. You can add worksheets later and rerun the macro.

Q How can I calculate the date halfway between two other dates?

Janine Greener

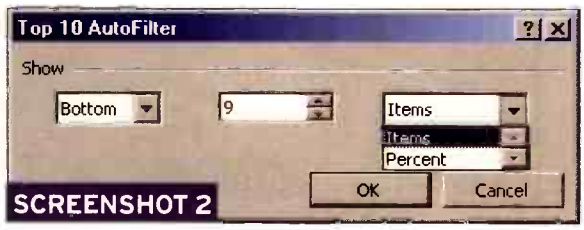
A Enter your first date in cell A2 and the end date in C2. Format the range A2:C2 in date format of your choice. In cell B2 enter the simple formula =A2+((C2-A2)/2). This tells Excel to add to the first date half the number of days between the two dates.

Q I want to create a spreadsheet which can recognise the nine smallest numbers in a series of 20 results and total them. I've the outcome of 20 races and I need to have nine of the best results to include. How can I do this in Excel?

David Chesworth

A Enter your headings in row 1 and your 20 results are entered in the range A2:A21. Click anywhere in this list then choose Filter, Autofilter, on the Data menu. This displays a dropdown arrow in cell A1. Click this arrow and choose Top 10. In the resulting dialogue box change Top to Bottom and 10 to 9 (see screenshot 2). Now 11 of the rows will be hidden. Highlight the remaining results and the total of those will be shown in the Status Bar at the foot of the screen. If that bar isn't there, choose Tools, Options, View and check the Status Bar box.

Using Autofilter you can find the bottom nine as well as the top 10 items in a list



Q How can I add my most frequently used spreadsheet file to the Start menu? I'm using Excel 2000 and Windows ME.

Lynne Dorson

A Look for your file using Search or Windows Explorer. Right-click on it and choose Send To; then, on the next menu, Desktop (create shortcut). Go to your Desktop. Drag the shortcut to the Start button. Hover and wait, then when the Start menu opens drag the displayed line up to where you want the name of your file to appear (see screenshot 3).

Databases

Q I need to be able to search a table for a particular string, 'eggs' say, within a text field and produce a count of the number of records that contain that text in that field.

I can 'filter' the records using the 'like' function as a criteria in 'QUERY', but I do not know how to translate that into a count value, either in the Query or directly in the Report.

John Sharland

A You are nearly there. The answer is to use one query (as you suggest) to find the records that contain the word egg, for example:

```
FindEggs

SELECT John.ID, John.Baa
FROM John
WHERE (((John.Baa) Like ✓
"*egg*"));
```

That produces this answer table:

```
FindEggs
ID
Baa
3
;lkj egg
4
Egg
5
;lsdfjgs;dlfkgj lkgj ✓
d;lfkgj;lg sd;flkjg s egg
6
lskfdjlskdfj sdf;lk egg ✓
sdlf;kj sfdlk
7
Egg
8
Qwereggqwer
9
Qweregg
```

Then run another query against this query:

```
CountEggs

SELECT Count(FindEggs.
ID) AS [Number of records
containing eggs]
FROM FindEggs;


CountEggs
Number of records
containing eggs
7
```

Digital imaging

Q I have a Sony DCR-TRV17E digital handycam, and I was wondering if I can use it as a webcam. I have USB ports and cable. Also do I need any software or hardware if it is possible to use my camcorder as a webcam?

Ronnie Zahra

A The new range of Sony cameras, including the TRV33 reviewed in our video group test (*PCW* July 2003 p142), can be used as webcams but, even though it has a USB port, as far as we are aware you can't do this with the TRV17E. If you really want to use your camcorder as a webcam, Orange Micro's webcam DV, (*PCW* April 2003 p142) turns your camcorder into a webcam via the supplied Firewire cable (see screenshot 4), but for the same price you could buy a good quality USB webcam.

Q We recently purchased a widescreen plasma display to show output from a network monitoring application. The display (42in) is capable of displaying at 853 x 480 (W-VGA) natively and 1,024 x 768 compressed, and accepts input from a standard VGA connector.

When running at 1,024 x 768 the display looks stretched, as it's trying to display a resolution designed for 4:3 at 16:9. How can I coax my display driver into allowing me to select 853 x 480 as a display resolution?

Is a new graphics card necessary, or is it possible to tweak a driver file into allowing this resolution? I am intending to run the screen from the server running the application, which is an HP Proliant DL360 with an embedded graphics controller. It is running Windows 2000 server.

Keir Snelling

A Make sure you're using the latest display driver for the onboard ATI Rage IIc graphics controller chip, which is available from **http://mirror.ati.com/support/drivers/win2k/win2k50021741.html**.

It's possible, though unlikely, that this driver will provide an 853 x 480 mode. Some graphics card manufacturers, such as Nvidia and Matrox, provide utilities that enable you to tweak the drivers to produce custom resolutions, but ATI isn't one of them and it's unlikely you'd get this kind of support from any manufacturer for a chip that's been around for six years.

The simplest solution would be to install a graphics card that supports 853 x 480 W-VGA mode. The Pixel Perfect GC-K2A-64 would be one option and is available in PCI as well as AGP versions, so you could fit it in the spare PCI slot on your Proliant server. You would also need to disable the onboard graphics controller. Details on the Pixel Perfect GC-K2A-64 are available from **www.steljes.co.uk/products_717.asp?redirectPage=/products_717.asp** and **www.imaginegraphics.co.uk/products/pricelist/pricelist.htm**.

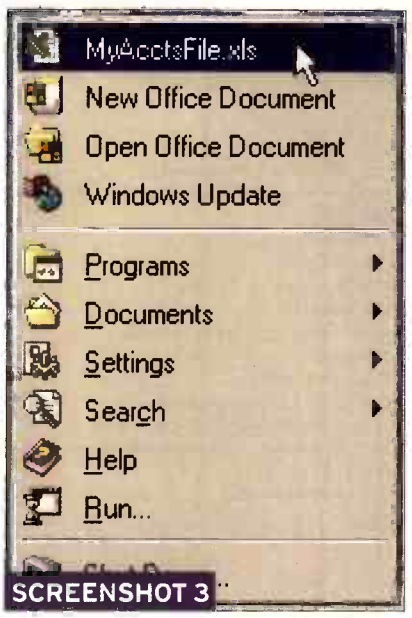
However, at around £250 ex VAT it's an expensive solution. A cheaper option would be to buy a suitable Nvidia, or Matrox card and tweak it. A good source of video driver utilities is **www.majorgeeks.com**.

Windows

Q On boot-up my XP machine is running with a CPU usage of 50-60 per cent or over. I have used Regcleaner to make sure minimum apps are loaded in boot-up and at the moment neither Kazaa or Zonealarm are launched – nor is much else. Looking at Processes in Task Manager there are three processes running under my user ID (avgcc32.exe, taskmgr.exe and prodsl.exe) but they are all showing 00 under 'CPU'. All the other processes running are system (again at 00) but the one that seems to be killing the CPU is 'System Idle Process' running at 96. Can you advise if it is System Idle Process hogging the CPU, and if there is anything I can do?

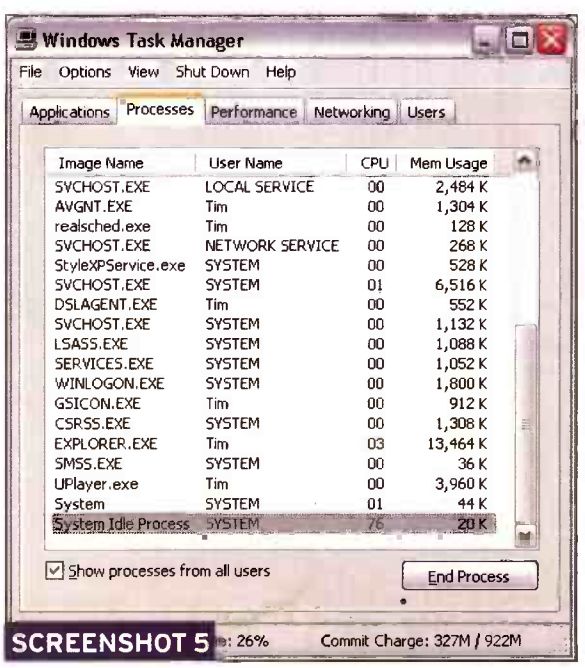
Graham

A Don't worry about it. In the words of Microsoft, the System Idle Process 'is a single thread running on each processor, which has the sole task of accounting for processor time when the system isn't processing other threads. In Task Manager, expect this process to account for the majority of processor time. In other words, a figure of 96 for the System Idle Process is a 'full tank' (see screenshot 5).

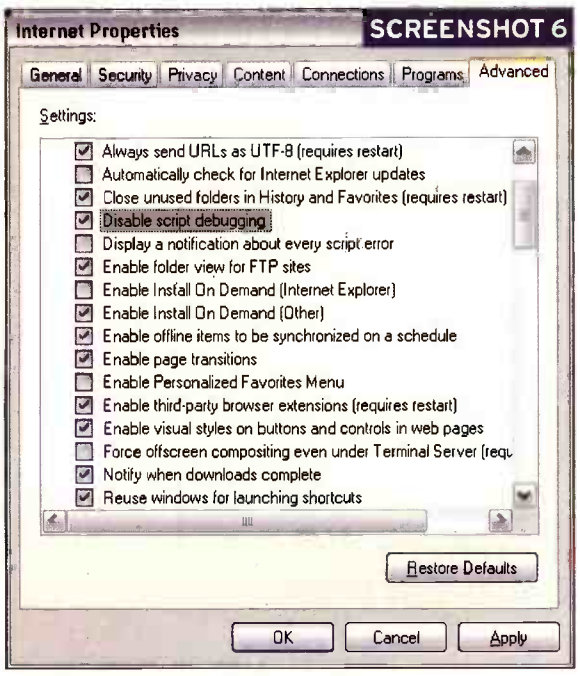


You can include an Excel file on your Start menu

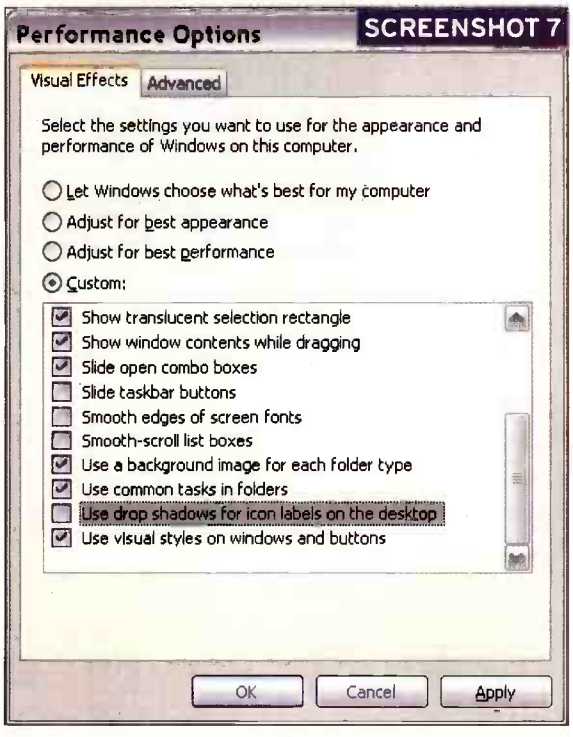
Use a DV camcorder as a webcam with Orange Micro's Webcam DV



Just ticking over – plenty of processor cycles to spare



Get rid of unwelcome Debug messages in Internet Explorer



Retrieve those transparent XP icon titles

Q I have just bought a Dell PC with Windows XP. When using the Internet I often receive various similar error messages which ask me if I want to Debug. Whatever I do it doesn't actually debug but either allows me to continue or frustrates me by not allowing me to continue. Any ideas on how to stop this please?

David Bithell

A If you go to Tools, Internet Options in Internet Explorer (or Control Panel, Internet Options) and turn to the 'Advanced' tab, you'll find an option to 'Disable Script Debugging' (see screenshot 6).

Q How can I create a symbol font like Wingdings, using symbols (numerals in circles, 1 to 99), which I can prepare using Photoshop?

Peter Moon

A Photoshop is not a good choice. First you need to create scalable vector outlines for your symbols so they appear equally sharp at any size and resolution. Second you need to export the shapes to a Truetype (TTF) file. Although Photoshop – which is primarily a bitmap-editing tool – has some vector drawing capabilities, it can't create font files. You need a specialist font creation program such as Fontographer or the shareware Font Creation Program (**www.high-logic.com/fcp.html**). Alternatively, if you have a copy of Corel Draw, you can export drawn symbols to a TTF file.

Q Would you please suggest a 'Zip' program for Windows 98 that is worth buying? I have had a trial version of Power Zip from Trident Software (Australia) which doesn't appear very user friendly. Your recommendation would be appreciated.

Ian McDonald

A The brand leader is Winzip (**www.winzip.com**), which you can try before purchase, but there are several free alternatives, such as Freezip, Zip Central and Coffeecup Free Zip Wizard, all of which you can find with a web search engine. Alternatively, you could upgrade to Windows XP or ME which has built-in Zip capabilities.

Q Can you tell me how to restore the 'transparency' around the titles of my Windows XP desktop icons. I have obviously fiddled with something and have no idea how to undo it. At the moment I have blocks of background colour around the icon titles.

Oliver Fuller

A This is indeed something of a treasure hunt. Go to Control Panel, System, and click on the Advanced tab. In the Performance – Visual effects, etc, section – click the Settings button. In the resulting dialogue scroll down the list of options and tick 'Use drop shadows for icon label on the desktop' (see screenshot 7).

Q Outlook Express has an Autocomplete function which completes the address as it is typed into the To: box. How can I configure this in Outlook?

George Mucho

A You need Outlook XP or later – previous versions don't have this feature.

Word processing

Q I have been reading about Auto correct in Hands on, June 2003. The word processor in my computer is Wordperfect 9 running under Window XP. I am a police interpreter and I write in six different languages. How can I use Autocorrect? Have I got it, or is it only for Microsoft Word and not for Wordperfect?

Carlo Amaini

A Autocorrect is a feature of Microsoft Word, but Wordperfect 9 has a similar feature for correcting common mistakes. It's called Quickcorrect and you'll find it in the Tools menu.

Q You wrote recently about Word switches. Don't ask why, but I have a batch file, one line of which opens Word for a specific purpose. However, it usually opens in a window rather than maximised as I want it. Is there a switch that will allow me to force it to open maximised? I have tried creating an appropriate shortcut (which opens maximised) and then putting the shortcut address in the batch file but this does not seem to overcome the problem.

Vivian Dunn

A The following line in your batch file should do the trick:

```
Start /max winword.exe
```

If this fails to work, then you'll need to supply the path to Winword.exe, in double quotes, eg:

```
Start /max "C:\
Program Files\Microsoft
Office\Office\winword.exe"
```

Q When I type a URL address in a Word document (Word 97 running under Windows 98) I get unwanted underlining and the colour is shown in blue rather than the default black. When I click for the first time on this URL the colour changes to violet and any undo will not change the colour.

I find it impossible to get this back to black and when I print, the violet colour shows and I do not want it.

Michael Makriyiannis

A This is Word trying to be helpful by automatically changing typed URLs to working links, which isn't much use in a printed document. Right-click anywhere on the blue underlined text, and select 'Hyperlink', then 'Edit Hyperlink'. Click the 'Remove Hyperlink' button to convert it back into regular text. To stop this in its tracks, go to Tools, Autocorrect and select 'Autoformat as you type'. Uncheck the option to 'Replace as you type' – 'Internet and network paths with hyperlinks'.

Q I use Word XP, and when I'm typing sometimes the 'Overtype' option comes on, so any text before the cursor starts disappearing. Is there any way to turn it off permanently, so even if I accidentally press the 'Insert' key, it won't come on?

Nick Bearman

A The quick solution is to go to Tools, Options, Edit and tick 'Use Ins key for paste', which does what it says. The master-of-the-universe way is through Tools, Customise, Keyboard. In the left pane select 'All commands', in the right pane select 'Overtype' (see screenshot 8). Highlight 'Insert' in the 'Current key' panel, and click 'Remove'. Ensure Overtype is off beforehand, or you'll be stuck with the option on, rather than off!

Hardware

Q I recently tidied up the interior of my PC with some new round IDE cables, but when my system starts up, it reports that it's detected a 40-pin cable. The original ribbon cable with my UltraDMA100 hard disk was 80-pin. Is there a performance benefit of using 80-pin cables?

Paul Ballard

A First things first: there's no such thing as an 80-pin IDE cable. All parallel IDE devices use 40-pin connectors, but their 40-pin cables are available in 40-wire or 80-wire versions. Doubling the number of wires allows faster data rates to be achieved, and is necessary to support UltraDMA66, 100 and 133 speeds. If you connect a 40-wire cable to an UltraDMA66 or higher drive, it will be limited to a maximum bus bandwidth of 33Mbytes/sec. Fortunately this is normally more than enough for the vast majority of single hard disks. If you have two or more high-performance drives in your system, though, you should always use 80-wire cabling to allow them to operate with the maximum potential.

Q Following *PCW*'s recent articles on DIY networking I would like to share my printer on my Ethernet network using a print server, but most print servers are designed for parallel port printers and my model only has a USB port. The only USB print server I can find is a pricey HP model with wireless facilities.

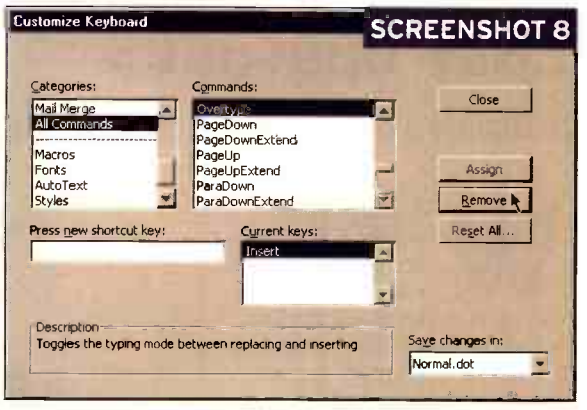
Alan Hillyer

A It's true that parallel ports currently dominate the print server market, but as this interface becomes increasingly rare on printers we can expect to see models with USB ports taking over. In the meantime there are some alternative affordable USB print servers. There's IO Gear's GPSU01 (**www.iogear.com**) or Linksys' Etherfast USB Print Server, the latter available from Insight for £58.99 ex VAT (**www.insight.com/uk**).

Q After reading your articles on over (and under) clocking processors I decided to give it a shot. I have an Athlon XP 2100+, but when I tried changing its clock multiplier in the Bios the PC displayed a warning at startup and would not proceed any further until the figure was returned to normal. Where am I going wrong?

John Sommer

A In theory you should be able to overclock a processor by increasing either its clock multiplier or the bus speed. Sadly for enthusiasts, Intel and AMD have long locked the clock multiplier on their CPUs to prevent overclocking and, despite there being the option to change it on most motherboards, it won't work. While there are tricks to unlock clock multipliers on some processors, the only real option is to increase the bus speed. Your Athlon is running on a 133MHz bus, so you could try increasing this in small steps. If your system fails to boot, reduce the bus speed to the last setting which worked. Note that overclocking may damage your components and will invalidate your warranty so we cannot offer any support should it go wrong.



Unhook the Insert key from overtyping

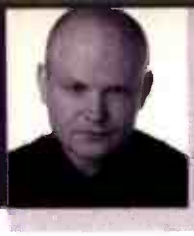
There's a growing number of USB print servers available for small networks

CONTACTS

All of our experts welcome your queries, simply respond to the appropriate address below:

Databases:	**database@pcw.co.uk**
Digital imaging & video:	**digitalimaging@pcw.co.uk**
Hardware:	**hardware@pcw.co.uk**
Networks:	**networks@pcw.co.uk**
Sound:	**sound@pcw.co.uk**
Spreadsheets:	**spreadsheets@pcw.co.uk**
Linux/Unix:	**linux@pcw.co.uk**
Mobile computing:	**mobilecomputing@pcw.co.uk**
Visual programming:	**visual@pcw.co.uk**
Web development:	**webdev@pcw.co.uk**
Windows:	**win@pcw.co.uk**
Windows 2000:	**win2000@pcw.co.uk**
Windows XP:	**xp@pcw.co.uk**
Word processing:	**wp@pcw.co.uk**

Please do not send unsolicited file attachments.



Gordon Laing
has been a hardware enthusiast ever since his first Sinclair ZX80 and, as a 10-year contributor and former editor of *PCW*, what he doesn't know about technology isn't worth knowing

Easy upgrades

Installing a bigger hard disk on your notebook isn't as scary as it seems – we show you how

With today's memory-hungry applications and media collections, you just can't have too much storage. While few PC enthusiasts would think twice about fitting larger or additional disks in a desktop, most steer clear of upgrading their notebooks. That said, despite the understandable fear of opening a portable, several upgrades are possible and well-worthwhile.

In the June issue we described the theory behind various notebook upgrades, but the one which generated more interest than any other was installing a bigger hard disk. This isn't surprising considering notebook hard disks are traditionally much smaller than their desktop counterparts at any given time, yet we end up wanting to use them for similar tasks.

Once you've installed a modern operating system like Windows XP, added several applications and built even a modest media collection, you're easily looking at 10GB, which, while laughable for modern desktops, can end up pushing even a brand new notebook close to its capacity. And you don't need to go back that far to find sub-5GB drives as the standard for notebooks.

Clearly there's a great justification for larger storage capacities in notebooks, so this month we've taken the plunge and upgraded the hard disk in an IBM Thinkpad 240X. While the fixtures and fittings described are specific to this particular notebook, the theory behind choosing the right disk and getting the required files onto it should be applicable to most models.

An IBM Thinkpad 240X notebook. Our model came fitted with a 12GB hard disk, which we're upgrading to a much roomier 40GB drive

Many considerations

Desktop computers with their many ports, plentiful resources and roomy cases are a dream for those wanting to upgrade. Fitting a new disk to a notebook, though, is a completely different proposition. There are many things you have to consider, from the physical and electrical requirements of the notebook, to getting the relevant files onto the disk itself.

Fortunately, after some considerable head-scratching, we're in a position to tell you everything you need to know. Thanks also to the many readers who emailed with their own notebook upgrade tips and stories, including Eric Taylor, David Fullarton, Greg Parker, Steven Graham and Andrew Ross-Skinner.

Physical compatibility

First, you need to find a disk which is physically suitable for your notebook. This isn't normally a concern for desktop PCs, as virtually any 3.5in disk will slide into a spare drive bay and work with existing power and data connections.

Notebooks, however, represent a considerably more challenging physical environment. Not surprisingly, their hard disks are smaller than desktop models, with the standard for most notebooks being 2.5in. While almost any 2.5in disk should squeeze into the required space, it won't necessarily be happy there. You must find a disk with power consumption and heat dissipation as close to the original disk as possible, or your notebook could easily end up with a flattened battery or overheating problems.

Fortunately, there are usually highly detailed specification sheets available online, which reveal everything you need to know. The disk in our Thinkpad 240X was a Travelstar 12GN from IBM. Since IBM Storage Technology merged with Hitachi Storage, the place to go for information on Travelstars is Hitachi Global Storage Technologies at www.hgst.com. There we found the spec sheet for the Travelstar 12GN, which listed its vital statistics, such as running at 4,200rpm and having a dissipation figure of 4.7w at a maximum startup peak.

To minimise heat and power issues, we needed a bigger disk that closely matched the Travelstar 12GN's specifications. Fortunately, the IBM Travelstar 40GN range had virtually identical specifications and was available in 20GB, 30GB and 40GB versions – we went for the 40GB model which cost £85 ex VAT from Dabs.com.

Data backup

When fitting a new disk in a desktop, most people opt for the easy life and install it as a slave to the original primary master drive. Sadly, there's no such luxury with notebooks. While a handful may be able to accommodate a second drive as part of a flexible bay scheme, the vast majority have room for just one hard disk. Upgrading to a new disk forces you to remove the old one, which means you're going to have to install a new operating system along with your applications.

Unless you're happy to lose your personal files, you'll also have to find some way to copy them from the old disk onto the new one – and remember that, unlike your desktop PC, it's unlikely you'll be able to run both disks on the notebook simultaneously and just drag the required files from one to the other.

Consequently, before even thinking about physically swapping the disks, you'll have to back up existing personal data onto some form of external or removable storage. As with desktop PCs, there are numerous solutions including PC Cards, external CD writers, networks, or even USB Flash memory keys. The important thing is to move everything you need from the original disk to a location or device where it can be accessed

Due to their constrained dimensions, notebooks use 2.5in hard disks, which are considerably smaller than the 3.5in models fitted in desktops. The 12GB IBM Travelstar disk pictured here may not look that small, but actually measures just 9.5 x 70 x 100mm. Note the lack of a dedicated power plug

by the new one. In terms of our Thinkpad 240X, a number of unique circumstances forced us to approach this problem from a different angle, as we'll explain later.

Fitting the new disk

Once you're happy you've got the required data off your old disk, it's time to remove it and fit your new one. This is clearly the part which can differ the most between various models of notebooks, but many have specific things in common. Realising a disk upgrade or replacement may be necessary, many notebooks hide their drives behind easily removed panels.

If you're lucky, the exact position of the disk and instructions for its removal will be in the manual for the notebook, or online at the manufacturer's website. Web searches on your notebook's model with the words 'disk upgrade' can also reveal handy tips from those who've been there before.

If you can't find any advice, though, it's normally quite easy to spot where the disk is hiding, as once the ports, card slots and batteries are taken into account, there are only a limited number of places a notebook designer can hide something the size of a thin pack of cards. The trick is to look for tell-tale screws or grooves which reveal an easily removed panel.

In the case of our IBM Thinkpad 240X, the underside revealed six Philips screws. Three were labelled with a chip icon indicating they were for accessing the memory slot. The remaining three were clearly securing a section of the notebook with the right dimensions for a 2.5in hard disk. Removing the screws allowed us to shift this panel 5mm to one side, which subsequently enabled it to be removed entirely.

The panel turned out to be one side of a small cage which housed the disk itself, while the sliding process disconnected it from the notebook. Unlike their desktop counterparts, 2.5in notebook disks have a single connector carrying power and data – despite having 44 pins in total, though, it's still a standard IDE device, just using the additional four pins to eliminate the need for a bulky power plug. That said, most notebooks will additionally employ a smaller, quicker-release type plug between it and the disk, thereby requiring an adaptor.

The cage from our Thinkpad 240X included this adaptor, which allowed the entire unit to easily slide in and out of the notebook chassis, connecting and disconnecting it in the process. Our old disk needed to be unscrewed from the cage, after which the adaptor could be independently removed. The new disk could then be put into the cage, screwed tight and have the adaptor pushed back on again. This complete unit could then be slipped back into the notebook.

One of the greatest challenges facing the notebook upgrader is figuring out how to get inside the unit. Most notebooks hide their memory slots and hard disks behind removable panels, which can normally be identified by looking for tell-tale grooves and screws on the underside of the case. In the case of our Thinkpad 240X, the hard disk is mounted in a cage in the lower left corner, and held in place by three screws

Boot worries

Since a new disk is blank, you'll need to install an operating system, and it's this process which traditionally causes notebook upgraders the biggest headaches. If your notebook has a built-in optical drive that it's happy to boot from, you shouldn't encounter many difficulties, but otherwise you'll need to think a little out of the box.

Notebooks without bootable optical drives (such as our Thinkpad 240X) will need to access the operating system files from another location. Traditionally, this would be from an external source like a separate optical drive or even across a network. The trouble is you'll still need to boot from something, in order to load the drivers for this external source, as well as be able to execute the operating system setup file.

In the case of our IBM Thinkpad 240X we'd got ourselves into a tricky position. It could only boot from its internal hard disk or optional floppy drive, which meant a basic bootable system and drivers for an external source had to be on one or the other. The real problem, though, was that the 240X had no network port and we didn't have an external optical drive. So while we could boot into something like Dos using the floppy disk, we had no means of subsequently accessing the 500MB or so of files required for a typical Windows installation. Interestingly, the solution to this catch-22 is one adopted by the vast majority of notebook upgraders.

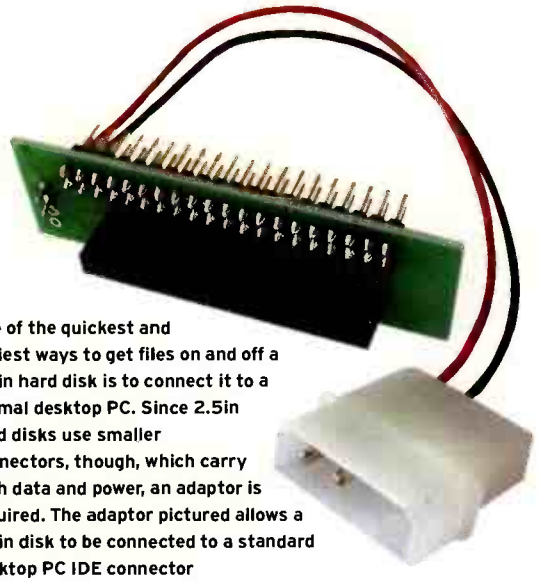
Desktop to the rescue

The solution was to connect the notebook hard disk to a desktop PC and simply copy the required operating system files onto it from a CD-Rom drive. With the hard disk later fitted in the notebook, you could then boot from a Dos floppy and run the Windows setup files directly from the hard disk. You could even go one step further and format the hard disk with basic Dos system files, allowing it to self-boot without the need for a floppy disk. While you're at it, you could also connect the old notebook disk to the desktop and use it to back up your personal data.

Connecting both the old and new notebook disks to a desktop certainly solves many problems, but in the world of notebook upgrades, nothing is ever quite that simple. As described earlier, 2.5in notebook drives do not use standard desktop 40-pin IDE data cables with chunky four-pin power plugs. Therefore, they simply can't directly plug into a desktop PC motherboard.

To connect a notebook hard disk to a desktop PC, you'll need an adaptor which has the mini 44-pin connector on one side, and a desktop 40-pin IDE and four-pin power plug on the other. The good news is that such adaptors are normally available for under £10, but the bad news is you may have a

Like many notebooks, the Thinkpad 240X mounts its hard disk in a cage which can then easily be slid in and out of the main unit. Note the single smaller connector on the cage which carries both data and power to the disk, allowing a quick release



One of the quickest and easiest ways to get files on and off a 2.5in hard disk is to connect it to a normal desktop PC. Since 2.5in hard disks use smaller connectors, though, which carry both data and power, an adaptor is required. The adaptor pictured allows a 2.5in disk to be connected to a standard desktop PC IDE connector

bit of a challenge on your hands finding a supplier. After much digging we found the adaptors at MCS (**www.mcsx.co.uk/products/ideadapter.htm**) and in the Periphery section of the Mini-ITX online store (**www.mini-itx.com**).

Preparing the disk

Once you've got your notebook disk connected to your PC, you'd be forgiven for thinking you need only partition and format it before copying across the required operating system files. Well, watch out, because if you're not careful you could be setting yourself up for a fall.

Windows 2000 and XP like to partition new disks with the NTFS format, which is fine, but unrecognisable by Dos. So if you were thinking of booting from a Dos floppy in order to execute the Windows Setup from an NTFS partition, then think again – Dos simply won't be able to see it.

Annoyingly, Windows 2000 and XP won't allow you to format a new large hard disk with anything other than NTFS, so if your desktop is running these operating systems, you'll need to restart and boot from something like a Windows 98 setup disc and format it with Fat32 from there instead.

If you're not bothering with a floppy drive and want the notebook hard disk to boot by itself upon startup, you should choose to format with the system files option. Once the disk is formatted, simply copy the entire contents of the appropriate operating system CD to a new folder on the disk and you're all set.

Well almost. For reasons we'll explain in a moment, you may also need the Smartdrive program on your disk to proceed with the OS installation. To play safe, search for the Smartdrv file on your desktop and copy it to your new notebook disk.

This is also a good time to check if your notebook's Bios requires an update to run the version of the operating system you desire. If so, download it and follow its instructions to create a bootable floppy disk.

Notebook hard disks may also need to be configured with special power management settings in order to perform well under battery power. Usually, the disk manufacturer offers a downloadable utility to make the required settings, so head to the appropriate website to see if one is available for yours. Like Bios updaters, these disk utilities are normally run from a bootable floppy.

Our Thinkpad 240X needed a Bios update from IBM's website to run Windows XP, and Hitachi's Storage website offered a downloadable 'Feature Tool' utility for setting up power management, temperature and acoustic options on Travelstar hard disks (see screenshot 1).

Powering up

With the new disk fitted in your notebook it's time to power up. If your notebook needs a Bios update, this is the time to do it. Similarly, the disk configuration utility should be run before installing the operating system. During all these updates and the operating system installation, though, you should be running your notebook from mains power.

Once these utilities are completed, you're ready to finally start the operating system setup. If you chose to format your disk with system files, your notebook should automatically start up with the Dos command prompt. If you're booting from a Windows startup floppy, you should choose the option for Command Prompt Only.

In theory, you should now only need to type in the path of the Windows setup executable file and run it to start the installation, but there's one last hurdle to overcome. If you're trying to install Windows 2000 or XP from Dos, you'll be told the setup program cannot be run from that environment. Before you scream with frustration, the solution is simple.

First, you'll need to run Smartdrive, which is why we advised copying it onto your hard disk earlier; you could alternatively run it from a floppy. Next, go into the i386 folder, which was copied across from the Windows installation CD, then simply type 'winnt' and press Return. The installation process should then kick off without any further hitches.

Finishing the job

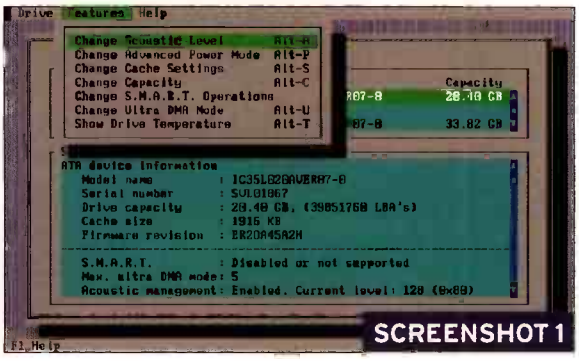
As with all computers, your notebook may require specific drivers for various components such as its display, graphics, audio and networking. If these aren't working properly after the operating system installation, simply download the appropriate drivers from the notebook manufacturer's website.

Windows XP Service Pack 1 featured everything we needed to get our Thinkpad 240X fully operational. IBM's website advised a couple of Registry tweaks, but they didn't seem necessary on our system. Out of curiosity, we ran Sysmark 2002 to see if the new disk had made any difference to performance and were pleased to see its overall score had slightly increased from 47 to 50.

Of course, the big difference was the increase from 12GB to 40GB of storage, and subsequently not having to worry about installing large applications or enjoying a decent media collection. The notebook upgrade may have involved considerably more effort than fitting a desktop hard disk, but overall it was a rewarding and worthwhile process.

As always, we'd love to hear from anyone who's performed a notebook upgrade and has any tips to share. As for our old 2.5in hard disk, we've got a low-power miniature PC project lined up for it which we'll reveal in the near future.

After fitting the new disk, it may be necessary to run a manufacturer-specific utility to configure the drive. IBM and Hitachi's tools for their hard disks allow you to adjust the power mode and acoustic level, along with monitor temperature



SCREENSHOT 1

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A touch of colour co-ordination

We add a bit of colour (profiling) to your lives, and reflect on a decade's work

One of the less talked-about features of Windows is its colour management. On the surface, colour in Windows is a very simple thing. If your display is set to use 24bit colour then in the Display Properties Appearance tab you can click on a Color button, choose Other, then use the Windows colour mixer to define custom colours.

You'll get the same mixer in Windows Paint, and you have the choice of defining colours by hue, saturation and luminosity, or by red, green and blue values. Sticking with the latter, each value can be between zero and 255 – a number that can be expressed in 8bits. And as there are three values, that makes 24bits – hence the name – giving a possible 16,777,216 (256 x 256 x 256) colours. Hence each pixel in an uncompressed 24bit colour file is stored in three 8bit bytes.

This elegant simplicity overlooks the fact that, while the maths looks fine, the reality of what you see on screen and paper is another matter. Different devices have different characteristics, rather like musical instruments. Although the pitch may be the same, a note on a violin sounds very different from the same note on a trumpet. In addition, the two instruments don't play the same range of notes.

In colour management the range of colours a physical device can output is known as the gamut: colour printers have a smaller gamut than monitors. Different devices may also have different 'white points', so a neutral grey colour on a photo may give a blueish scan, and a neutral scan may give a pinkish print.

There is also the 'gamma curve' of each device to consider, which is a measure of the non-linearity of input to output. Finally, the printer driver has to convert the RGB values of a screen image or file to amounts of cyan, magenta, yellow and black (and possibly other) coloured inks.

This wasn't really much of a worry for Windows users who weren't involved in professional imaging or design. If your letterhead logo colours looked slightly different on paper to their appearance on screen, this was something that you either allowed for or put up with. However, with the advent of cheap photo-quality printers, scanners and digital cameras, colour management becomes an issue. Anyone who has scanned a photo and then printed the scan will be aware of the alarming possible differences in colour.

Viewing colour profile properties

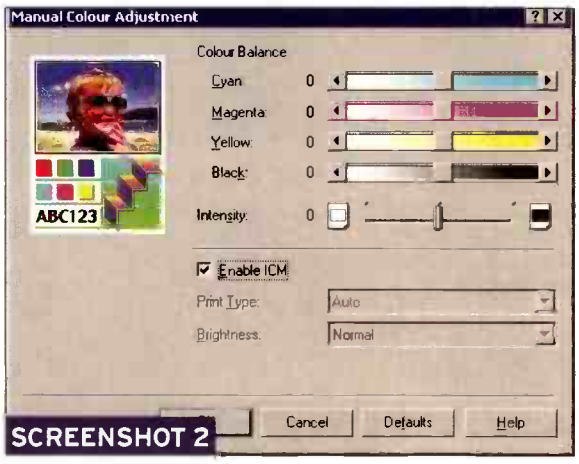
Colour management

Windows colour management uses technology developed with HP and Heidelberger Druckmaschinen to solve these problems.

The first step is the creation of a colour space – a language, if you like, which can be used to define the characteristics of various devices. Windows 98 and later versions use the sRGB colour space. The second step is the use of colour profiles to identify and compensate between devices.

Microsoft doesn't go overboard in terms of providing an interface here, but if you look in the folder Windows\System\Color you'll see a number of files with the ICC (International Colour Consortium) and ICM (Image Color Management) extensions. Right-click on one of these to access its properties and find out more (see screenshot 1).

Dig through printer settings to enable colour management...



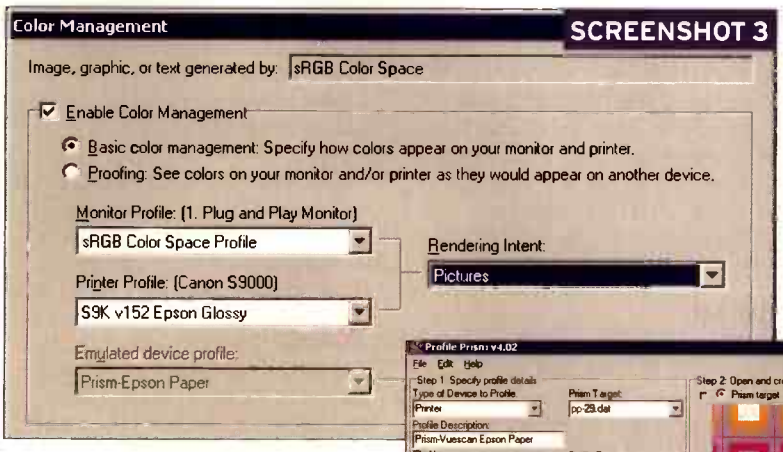
As well as some standard monitor profiles that come with Windows, if you've installed other devices, such as a scanner, digital camera or printer, you should see profiles for those. To be able to use a particular profile it needs to be installed (its icon will then change from grey to white) and associated with a device. Both of these actions can be achieved from the right-click menu.

You can also approach matters from the other end of the tunnel – go to the device properties via Control Panel and you should find a Colour Management tab. You can associate more than one profile with a device, and in the same dialogue set a default profile. You can also install profiles for devices you don't have – if you are sending files elsewhere for printing – but I'll leave that to the Digital imaging column to cover.

Having got the profiles in place, then how do you use them? Generally speaking, there should be an option in the device driver settings – you may have to burrow around to find it. When printing, for instance, you'll find it in the printer properties which you can access from the application print dialogue. Screenshot 2 shows the relevant dialogue for Canon printers – this will use the default profile.

The other way to use profiles is via software. If you are using Adobe Photoshop or Paint Shop Pro (see screenshot 3), you'll be able to access all profiles for a device – I'll explain why you'd want multiple profiles shortly. The important thing is not to 'double profile' – if a profile is correcting for a blue cast by boosting the yellow, then doing this both in the application and in the printer driver will produce a jaundiced result.

In a perfect world, you'd install the profiles that came with your hardware and that would be that. Unfortunately, it's not that simple. Even if your monitor came with a profile, still it may not be a good match. And your printer profile will only be good for the paper and ink



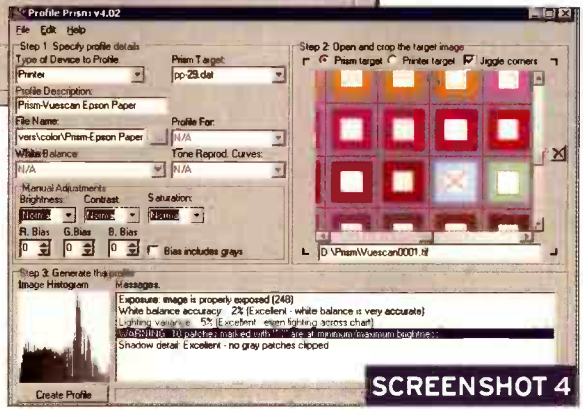
...or do it in the application

recommended by the manufacturer. If you are using third-party paper with a Canon or Epson printer for instance, you really need a specific profile.

The ideal answer is to have your system professionally profiled, including the monitor, which is done with a sensor that is stuck on the screen. This is not cheap.

Alternatively, you can get printer profiles by downloading test images, printing them, and sending the prints off for analysis. Companies such as Pixl (**www.pixl.dk**) will charge you around £150 ex VAT per profile. The rest of us may find that the paper manufacturer will have suitable profiles available on their website.

Finally, you can do the job yourself. Profile Prism, for example, consists of a printed target image and software, enabling you to create profiles for any number of combinations of scanner, printer ink and paper, as well as getting your monitor correctly set up (see screenshot 4). It costs $69 (£43), and you can find it at **www.ddisoftware.com/prism**.



Roll your own profiles with Prism

A decade of tips

Ten years ago this month saw the first appearance of my name at the top of this column, so I've decided to celebrate with a retrospective tip-fest. The challenge is to find a Windows tip (or two) for each year from 1993 to 2002 that is relevant to users today running Windows ME or earlier. So, going back in time...

1993

Just to show that Windows 3.1 wasn't quite as primitive as you might think, here's a longish tip concerning Object Linking and Embedding.

As you may know, you can drag a file into certain kinds of document, where it will 'embed' itself, and subsequently open in its associated program. The original tip involved getting a cow that moos into Windows Write, but this works just as well in Wordpad (see screenshot 5).

First catch your cow. In the spirit of the times we'll stick to the .bmp format. Open this in Windows Paint, or any other image editor. Next catch your moo. This is a lot easier today, as there's a site dedicated to sound clips at **www.findsounds.com**. Keeping with the 1993 theme, use a .wav file format. Start a new Wordpad document, type in whatever text you want, then go to the Insert menu and choose 'Object'. Make sure the 'Create New' option is selected and choose 'Package'. A new window titled 'Object Packager' will appear. This has two panes – Content on the right and Appearance on the left. Select the Content pane, go to the File menu and choose 'Import'. Browse to your .wav file and click open – the file name will appear in the Content pane. Now go back to Paint (or whatever the image is in) select all or part of the image and copy it to the clipboard. Go back to the Object Packager, switch focus to the left pane, then Edit, Paste. Finally, go to the File menu of the Object Packager and choose 'Update' – you should then see the image appear in the Wordpad document (see screenshot 6 overleaf).

Double-click on it and the .wav file will play. I noticed that the more recent the version of Windows, the longer this takes, as the ever-expanding Windows Media Player takes over the job of playing .wav files from the tiny Sound Recorder.

Before we leave 1993, let us not forget that indispensable Windows 3.1 utility – the Elvis Detector from Toggle Booleans. This uses 'reliable Elvis detection methods gathered from supermarket tabloids' to sense the presence of Elvis or his spirit in your vicinity. Despite a lack of updates, a web search will still find the original, and I'm very pleased to say it still works with Windows 95, 98, ME and XP. Such is the enduring power of the King (see screenshot 7).

1994

Finding still-relevant tips for Windows 3.1 is tricky, but here's one concerning the dreaded Blue Screen of Death (BSOD). There is no reason this has to be blue, and in December 1994 we explained how to use any of the 16 available colours in the 'local reboot screen'. This was what you got in those days by pressing Control & Alt & Delete – and which shared its colour scheme with the BSOD.

Open the file system.ini, which you will find in the Windows folder. This is a plain-text file and will open in Notepad. Scroll down to the section headed [386enh], and in that section add the following two lines.

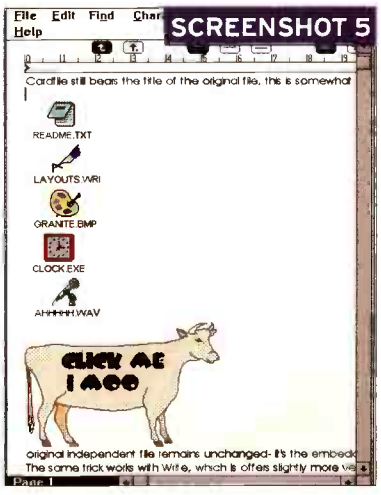
```
MessageTextColor=E
MessageBackColor=5
```

This will give you a Purple Screen of Death with yellow text. The hexadecimal values run from 0 (black) to F (white).

1995

The year that brought us a brand new 32bit operating system experience – marketed with the Rolling Stones song that contained the words 'you make a grown man cry' – also brought us these tips.

Holding down the Windows key and pressing M clears the desktop of all open windows. And as that's very short, here's another: if you have a lot of Windows open and your Taskbar buttons have their titles truncated, hovering the pointer over a button will produce a pop-up of the full title.



OLE as it was in 1993...

1996

Why spend money on an icon editor when you can do the job in Windows Paint? Go to 'Image/Attributes...' and set the height and width to 32 pixels. Go to 'View/Zoom/Custom...' and pick '800 per cent'. From 'View/Zoom' again, turn on the grid and the thumbnail view and design away. Here comes the clever bit. The top left pixel sets the 'transparent' colour – any part of the icon that is the same colour as this will let the background show through. When your tiny masterpiece is finished, save it with the extension .ico. It's not a Paint option so you'll either have to type it in or rename the file once saved. What you have then is not a true icon (.ico) file – it's still a .bmp. But you will be able to attach it to a shortcut from the latter's Properties dialogue.

Utility of the year was Moonphase – a tray icon showing the phase of the moon, for those who find this essential for scheduling rites such as backups and defragging. It's still going strong at www.locutuscodeware.com.

1997

You can open a free-range Explorer window from any application 'File/Open' dialogue, by right-clicking on a folder icon and choosing 'Explore' rather than 'Open'.

We also had the latest in virus hoaxes, of which I reproduce an abridged version. 'The CIA issued the following warning this morning. There is a computer virus that is being sent across the Internet. If you receive an email message with the subject line "free money", DO NOT read the message. DELETE it immediately; UNPLUG your computer, then BURN IT to ASHES in a government-approved toxic waste disposal INCINERATOR. Once a computer is infected, it will be TOO LATE... What is so terrifying about this virus is that you do not even to have to open the email for it to activate... "Free Money" can infect even minor HOUSEHOLD APPLIANCES. How it does this with straight ASCII code is, frankly, a matter of some debate, but BELIEVE US, if this weren't a SERIOUS situation, we wouldn't be discussing it in ALL CAPS.'

1998

This year brought us another new version of Windows and a letter from a reader describing how his accountants had eventually and reluctantly acquired an email address. He sent them an email, and seven weeks later received a letter from them saying: 'Thank you for your email, which arrived safely.'

It also brought us two tips for fans of the Windows search feature. First you don't necessarily have to type asterisks or question marks to do a wildcard search. Simply typing 'ABC' into the space will find any file whose name or extension contains that text. Obviously, you can use the symbols if you want to narrow down the search – 'ABC*.*' will only find files that start with those letters. You can also find multiple patterns by leaving a space in the filename field. ABC DEF, for example, will find all files with ABC or DEF in their names.

1999

Two satisfyingly frivolous entries from 1999. First, the 3D text screensaver Easter Egg. If you go into the settings and type the word Volcano in the text box, the text you get is not that word, but a changing selection from a list of American and Canadian volcanic mountains.

For those of an artistic, rather than literary bent, there's the 9pixel wallpaper. Create a .bmp file image in Paint with the Image Attributes set to 3 x 3 pixels. You'll need to crank up the zoom to a Custom 800 per cent to work with this. Colour the nine pixels with whatever choice of hues you want and save the file. Now go to Display Properties and set the file as your Desktop Background in 'Stretch' mode – you need to be in 16bit or 24bit colour. You should get a smooth blend of the colours in your tiny bitmap. Experiment with different sizes and colours to get various gradient, sunset and star effects.

2000

The millennium year brought us a version of Windows bearing that name, and the following tip, which also works in Windows 98 or 95 with the IE desktop update.

Drag any folder icon from Explorer on to the Taskbar at the end nearest the system tray. Right-click on the handle and make sure 'Show title' is checked. Grab its handle and drag it towards the system tray until just the title is visible, along with a double arrow. Now, click on the latter for a menu of the folder contents. This also works with the My Computer icon and Control Panel. It doesn't show hidden files or file details, but is a quick way to get to files or folders. To remove a menu right-click on it and choose 'Close toolbar'.

2001

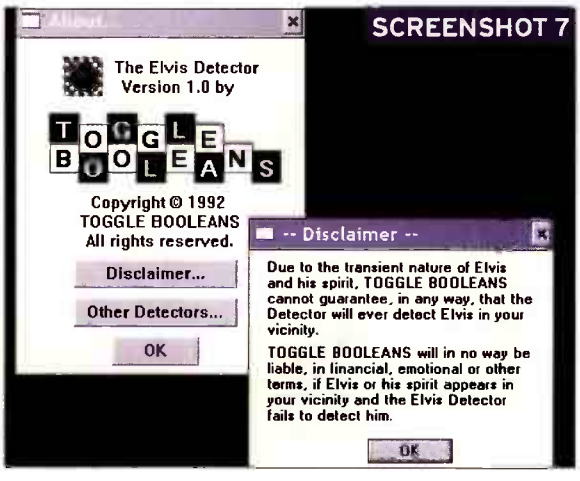
You can undo a file action such as move, delete or rename in several ways. Inside folders or Explorer windows you can choose 'Undo' from the Edit menu. In any folder or with focus on the Desktop you can press Control & Z, or right-click Undo. Windows 98 and ME remember the last 10 actions. If you delete or move a number of files at once, this counts as one action and can be restored with a single 'Undo'. Emptying the Recycle Bin however, will remove its contents from the reach of 'Undo'. The Undo list is also cleared when you restart Windows.

2002

If you open the Windows volume control, then press Control & S, this toggles a compact version of the display that still has all the controls. It's useful when desktop area is at a premium. Create a shortcut on your desktop with the command MAILTO: This will open a blank email message window without having to expressly start your default mail program.

...and OLE as it is now

Still detecting Elvis after all those years



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Media magic and top tweak tips

The best of the Microsoft Plus Digital Media Edition, and some useful Registry editing

This month the Microsoft Plus Digital Media Edition for Windows XP arrived on my desk, offering a welcome chance for some fun and displacement activity that could officially be described as work. One problem I've found with Microsoft calling a product Plus! is that it also produces a word processor that automatically capitalises the first letter of a word following an exclamation mark. So, the appending of 'Digital Media Edition' is a welcome, if wordy, advance to the reviewer.

I won't go into all the features but, predictably, you get more Media Player skins and a load more transitions and special effects for Windows Movie Maker 2. At this rate, you will soon be able to produce a movie consisting entirely of transitions and effects. There are Media Player plug-ins to send you to sleep, others to wake you up, and a Party Mode add-on that lets your guests choose music without having access to other programs and files on your computer. You can also restrict access to what the blurb describes as 'unauthorised music' so you won't get the party melancholic putting on Morrissey when everyone else wants to boogie to Abba.

The first of the two best features, however, is Analog Recorder, which uses technology supplied by Cooledit. Connect your stereo to your PC in a suitable manner and you can turn your tape and vinyl recordings into digital (wma) format, with automatic track splitting and click and hiss reduction. We fed it some vintage 1970s Stones vinyl, and it wasn't able to separate the tracks – probably because of the rather mature state of the record. However, it was easy enough to do this manually, and it did do a good job of cleaning up the noise. Once you've recorded, split, and named the tracks, Analog Recorder proceeds to clean, convert, and save them to a folder of your choice. This took a long time on our test album – longer than the recording – but again this was probably because of cleaning the rich patina of 30 years of rocking 'n' rolling. But as all this goes on in the background without further user intervention it's not too irksome. If you don't have Plus, incidentally, this month's Sound column (page 196) looks in more detail at how to digitise your old vinyl.

The Plus dancers strut their stuff – Amanda, Kenny, Jen and Dave

My absolute favourite is the Plus dancer. This puts a tiny, but perfectly formed dancer (or two) on your desktop, who will hop along to any music you happen to have playing through your PC – not just tunes in Media Player. You get a choice of dancers, and can download more – or larger versions – from Microsoft. Beware that the larger versions demand a lot of processor muscle – in fact if you have the Media Player with a visualisation going as well, this will account for pretty much 100 per cent CPU usage. Still – it beats working. For more on Plus see this month's Digital imaging and video column.

Tweaking the tweak

As regular readers will know, I'm a great fan of the TweakUI tool, but I'm puzzled as to why the XP version was released as an executable, rather than the customary Control Panel applet. You may, like me, have tried to drag a shortcut into the Control Panel, and found that you get the 'No parking' cursor. So here's a piece of Registry tweaking to get it in by legitimate means. If you are inexperienced in such matters, you may want to bone up on the Registry primer in June's column. Having taken the usual precautions, open the Registry editor and go to HKEY_CLASSES_ROOT\CLSID. Here you will see many sub-keys of the form: {FF09BBC2-5678-1234-6969-99EDBA778C4}

These are known as GUIDs, or Globally Unique Identifiers: 128bit numbers, usually expressed in hexadecimal and formatted as above, and in the current context known as CLSIDs (Class Identifiers). The idea is that there are so many possibilities, it is impossible for a machine to generate the same CLSID twice. Programmers use sophisticated algorithms involving a machine's network address, time and other variables to generate CLSIDs. We're going to pull ours out of the blue. I used the one above, as being near the end of the possible range it's easy to find in the Registry. So, step one is to open the HKEY_CLASSES_ROOT\CLSID key and create a new key named as above. You don't have to use my example, but it must adhere to the 8-4-4-4-12 hexadecimal format, be encased in the curly brackets, and not be in use.

Select your new key and double-click on its Default value in the right-hand pane. Change this value to TweakUI. Now create three new sub-keys under your new CLSID called DefaultIcon, Shell, and ShellFolder. Still with the new CLSID selected, create a new String Value and call it InfoTip. Double-click on InfoTip and type in a description – this is what you'll see in Control Panel classic view (see screenshot 1). Now select the DefaultIcon key, and change the Default string value to the path to TweakUI.exe – this should be:

```
%SystemRoot%\System32\↙
tweakui.exe,0
```

(Key: ↙ code string continues)

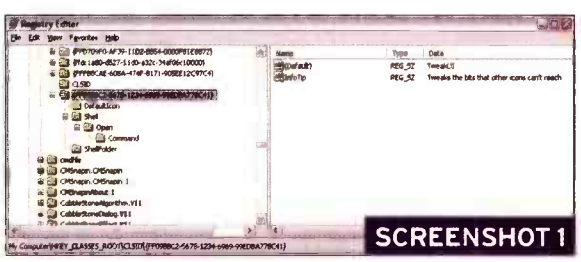
The zero at the end tells Windows to use the first icon it finds in the file.

Next, Select the Shell key, and create a sub-key of that called Open. Select the new Open key and create a subkey called Command. Select the new Command key, and change the default string value in the right-hand pane to tweakui.exe. Now select the ShellFolder key and create a new Dword value called Attributes. Give it a value of 00000030 (just type 30 in the box, it will do the rest).

Right – you are nearly there. Copy the name of your CLSID – you can do this by a right-click, Rename, Ctrl & C, and then click off the key without renaming. Navigate down the Registry to HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer\ControlPanel\NameSpace. Create a new key here and paste in the name of your CLSID. Change the key's default string value to TweakUI.

Now close the Registry editor, open Control Panel, and if you haven't made any mistakes, TweakUI should be back at home in Control Panel.

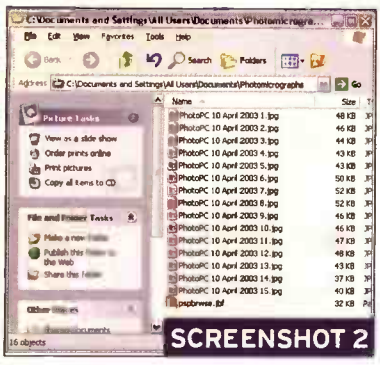
Adding TweakUI to Control Panel



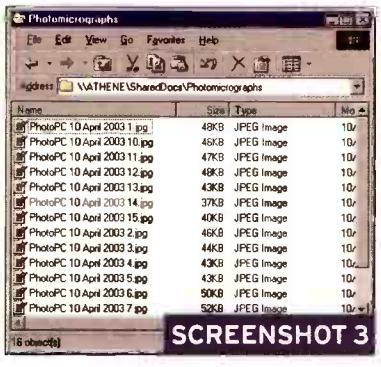
SCREENSHOT 1

Sort of sort

While we're in a Registry editing mood, there's one feature of XP that you will either love or hate. Explorer



Sorted by name



Spot the difference in the file order

now sorts files by numerical order – by which I mean numerical order as it is known to most reasonable people. So if you have a folder of files named '1 picture.jpg' through to '12 picture.jpg' they will be shown in that order, as will files named 'Picture 1.jpg' et seq (see screenshot 2). The traditional way such a list is sorted would be 1, 10, 11, 12, 2, 3, and so on, (see screenshot 3) and any geek worthy of the name made sure their numbered files had sufficient leading zeros so that 09 came before 10.

If you don't like this arrangement – and many people using complicated file names don't – then all it takes is a Registry tweak to revert to the old way. Go to HKEY_LOCAL_MACHINE \Software\Microsoft\Windows\ Currentversion\Policies\Explorer and create a new Dword value. Name this NoStrCmpLogical and give it a value of 00000001. Reboot, and you'll see files sorted in the traditional manner. Change the Dword value to zero or delete it to reinstate the XP sorting.

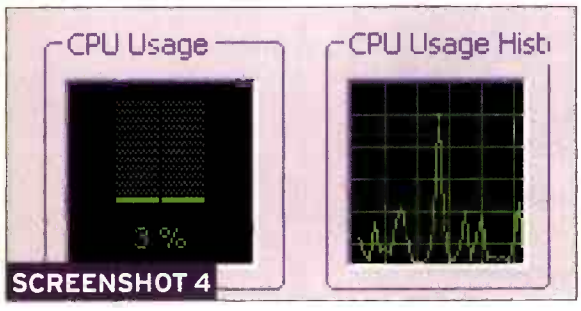
Shutdown stuff

Several readers have complained that the old incantations for shutting down or restarting Windows from a shortcut to rundll32.exe don't work with XP. That doesn't mean you can't shut down or restart from a shortcut, and in fact the magic word is the far simpler 'shutdown'. This is a command-line instruction and, if typed on its own at the command prompt, results in an explanation of the syntax and switches – exactly as if you had typed 'shutdown -?'. Since this information is already at your fingertips I won't go into too much detail, but here are the basics. A shortcut to 'shutdown -s' will shut down the system and 'shutdown -r' (don't include the quotes) will restart. There are many more options, but most of these are only relevant to administrators of a domain running directory services. However, if you want to test your reflexes, you can use 'shutdown -s -t 10'. This will give you 10 seconds to abort the shutdown by issuing the command 'shutdown -a'.

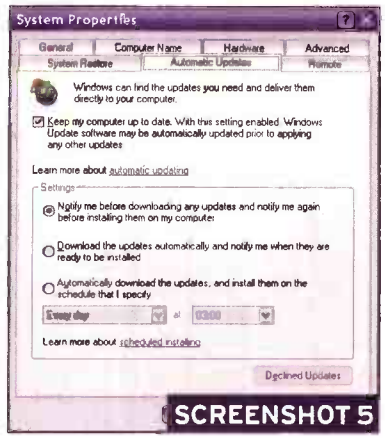
In June, I mentioned the strange case of the disappearing Task Manager tabs, with a double-click alternating between just the Application pane and the full tabbed version. Graham Hamwijk points out that this happens with any of the tabs. And since – unlike the full version – these are resizable, you can have a mini-CPU usage panel on your Desktop if you want (see screenshot 4).

Although the idea of Windows XP updating itself with all the latest patches is an attractive one, it can sometimes cause problems. As this is a monthly column, we can't offer you the latest news on potential problems, but to take a recent example, there have been reports that security patch 811493 can slow down XP systems when a virus scanner is installed. A good policy is to let someone else go first, and keep yourself informed of potential problems at tech sites such as the news section of www.pcw.co.uk. To stop XP self-medicating without permission, right-click on My Computer, choose Properties, and go to the Automatic updates tab. Select the 'Notify me before downloading any updates and notify me again before installing them' option. When an update is issued, a notification appears, and you can defer download or installation by selecting 'Remind me later'. This has a maximum postponement factor of three days, but you can always postpone for a further three days, and so on. That should give any bad news enough time to hit the headlines (see screenshot 5).

A resizable Task Manager Pane



Take control of updates



A while back in the Windows column we looked at cleaning up the list of disabled startup items that appear in MSConfig. If you are certain that you never, ever want to reinstate a particular startup program, then you can delete the entries from the corresponding 'negative' location: if, for example, the startup item was being loaded by the Registry key HKEY_CURRENT_USER\Software \Microsoft\Windows\CurrentVersion \Run, then disabling it in MSConfig would move it to a key of the same name with a minus sign appended. Things are different in XP: if you want to tidy up the MSConfig list you'll find there are no 'Run-' keys and there is no 'Disabled Startup' folder on the Start menu. Instead, Windows XP seems to have a central repository in the Registry for all the disabled startup items. If you go to HKEY_LOCAL_MACHINE \SOFTWARE \Microsoft\SharedTools \MSConfig you'll see a subkey named startupfolder containing details of the items that were in the Startup folder on the Start menu, and startupreg, which contains items that were started from the Registry. Deleting a sub-key from one of these will remove it permanently from MSConfig.

Finally, if you've been reading this month's Hands on Windows column and are wondering what happened to colour management in XP – it's still there. You'll find the profiles in Windows\system32\spool\drivers \color. Another difference – at least on my PC – is that you don't get the visual identification of icons that are installed.

CONTACTS

Tim Nott welcomes your comments on the Windows XP column. Email him at: xp@pcw.co.uk. Please do not send unsolicited file attachments.

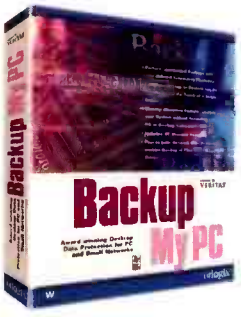
Terence Green
has tussled with computers ever since starting as an IBM mainframe operator in 1979. Since 1981 he has documented the gap between what PCs claim to do and reality

Simple summer solutions

Trouble-free tips to backing up, adding extra drives and streaming video

We perused, with some embarrassment, reader Gavin Hogan's response to our request in the June issue for suggestions on how Numlock might have been enabled at login. The problem affects laptops with numeric keys embedded in the standard keyboard. When Numlock is enabled it becomes impossible to log in if any characters in the password are on keys that Numlock remaps. A password of 'flock' for example becomes 'f36c2' with Numlock enabled. We waffled on about Default user accounts and Registry editing but Gavin's simple solution is: 'Boot up – Hit the Numlock key (on or off) – DO NOT LOG ON – restart the computer. I think you will find that the Numlock will be in whatever order you left it before restart.' And indeed Gavin is right. It doesn't definitively explain how Numlock came to be on in the first place unless the user arrived at the Logon screen, accidentally enabled Numlock, and then shutdown or restarted – but this is mere carping to hide our blushes!

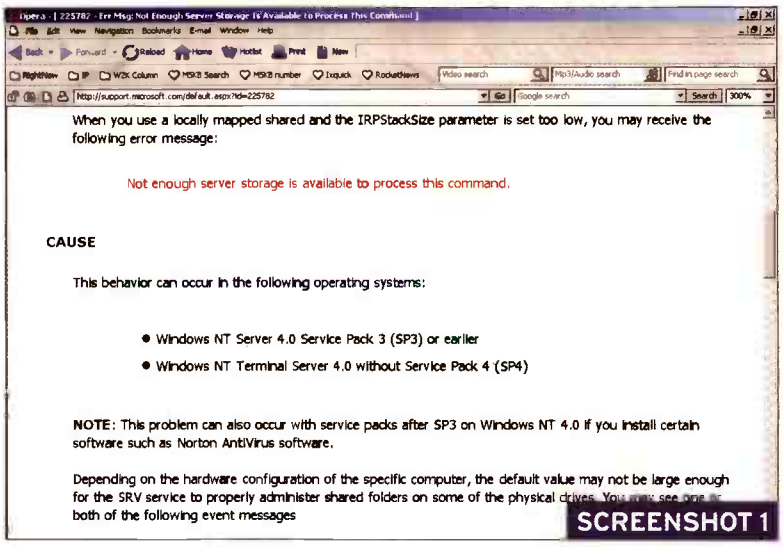
In the spirit of keeping it simple this month's column finds some easy answers to recurring problems. Steve Tuff wants to back up Windows 2000 but he cannot use his CD writer as the target device for Windows Backup. The reason is simple – Windows Backup is a cut-down ('lite') version from which the ability to back up to CD has been removed. Many backup programs work with Windows 2000 and back up to CD. None are free but most offer free 30-day trials. Novabackup (**www.novastor.com**), NTI Backup Now (**www.ntibackupnow.com**) and Handybackup (**www.handybackup.com**) are all worth checking. Steve settled on Orlogix Backup MyPC from **www.orlogix.com**. Backup MyPC, the current iteration of the Windows Backup program developed by Veritas, is a good choice.



The full version of the 'lite' Backup included in Windows 2000

As always there is a kludge, which involves sharing the CD drive and using Windows Backup to back up to the share, but this has two drawbacks. It only works when Windows 2000 networking is installed, and there's no way to span CDs when more than one disc's worth of data needs to be backed up. If you want to try this kludge and don't have networking installed, install Windows 2000 networking and select the Loopback adaptor as the network interface card (Nic). Or use Windows Backup to back up to a local file on the hard drive and then use standard CD writing tools to copy the file to CD. Alternatively, use a utility like Winzip to create compressed archives that can be copied to CD. The common disadvantage of these workarounds is that they require a lot of manual setup or scripted automation. By contrast, the backup utilities mentioned above will automatically span CDs, create catalogues, issue reports and allow scheduling.

What is IRPStackSize and why is it bothering me?


When you use a locally mapped shared and the IRPStackSize parameter is set too low, you may receive the following error message:

Not enough server storage is available to process this command.

CAUSE

This behavior can occur in the following operating systems:

- Windows NT Server 4.0 Service Pack 3 (SP3) or earlier
- Windows NT Terminal Server 4.0 without Service Pack 4 (SP4)

NOTE: This problem can also occur with service packs after SP3 on Windows NT 4.0 if you install certain software such as Norton AntiVirus software.

Depending on the hardware configuration of the specific computer, the default value may not be large enough for the SRV service to properly administer shared folders on some of the physical drives. You may see one or both of the following event messages

SCREENSHOT 1

Another reader, Kevin Mulgrew, ran into an obscure problem that's been around since Windows NT days when warnings to the effect that: 'The mapped network drive could not be created because the following error has occurred: Not enough server storage is available to process this command' appeared whenever he tried to map a network drive. Kevin maps drives to back up his other computers to the hard drive on the Windows 2000 computer and says, 'It all worked fine until recently (I let Windows Update install something).' Given the way Windows Update has gone awry lately this isn't an unlikely scenario, but the more usual cause is the installation of Norton software which alters the default setting for a Registry key called IRPStackSize.

Fixing the problem is relatively easy – change the value of IRPStackSize to 15. Click on Start/Run, enter REGEDT32, and hit OK. Find the HKEY_LOCAL_MACHINE window and navigate to the following key: \System\CurrentControlSet\Services\Lanmanserver\Parameters. Select the IRPStackSize value. Now you can either delete it and restart to reset it to the default value, or you can set the value to the default 15 manually. Then restart Windows 2000. For more detail, check the Knowledgebase article **http://support.microsoft.com/?id=238316** and the links at the end of the article (see screenshot 1).

Adding extra drives

Bryan Suitters has a Windows 2000 computer with a 40GB hard disk and would like to add a 2GB drive to be used for backups. He plans to format the drive with three partitions of about 640MB and to transfer the contents of each partition, when filled, to a CD for permanent storage. Brian wants to know how to prepare the drive once he has installed it in the computer, and whether to format it with the Fat or NTFS file system. Adding a drive is relatively easy but there's a catch. Bryan's spare 2GB drive has previously been used in another computer, so it probably has existing partitions. If this drive is simply added to the system, on the right cable, correctly jumpered, and with Bios settings on Auto (for IDE drives), when the computer is next powered up Windows 2000 will detect the drive and enumerate any partitions on it. Problems can arise because Windows 2000 first

enumerates primary partitions on all detected drives. If there's a primary partition on the hard drive being introduced – which would be expected as it's come from another computer – Windows 2000 will count this as partition number two and give it the drive letter D. All other drive letters will be shifted along by one letter and lots of stuff will stop working if there are any installed programs or Windows system files or data on any of the re-lettered drives. The way to avoid this problem is to not get into this situation in the first place! Fixing it after the fact is messy and involved.

So, don't install a used drive and start Windows 2000 unless you're certain it doesn't contain a primary partition. When physically installing the drive, cable it as the only drive (set the jumper to Master), and boot with a Windows 98 SE boot disk. Disk images can be found at **www.bootdisk.com** if needed. Boot the drive and delete all partitions with FDISK. Power off and reconnect both drives ready to boot into Windows 2000. When Windows 2000 starts, log on as Administrator and either follow the prompts if any appear, or use Disk Administrator to partition it to taste. OK any request to approve a drive signature for the new drive. Finally, format the new partitions. Our preference is for the NTFS file system. It's far more reliable than Fat and can recover from problems that would result in data loss or corruption on a Fat drive.

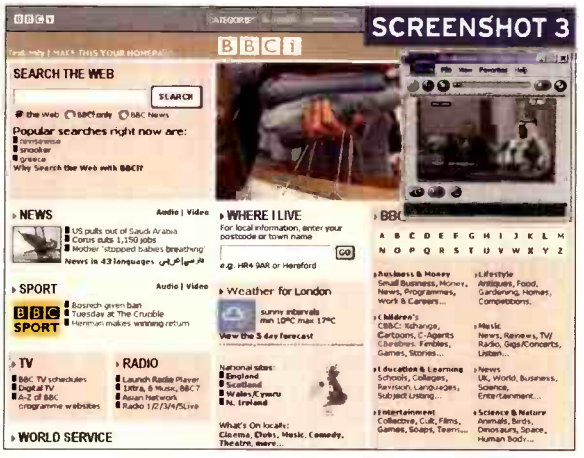
Life is easier when there is no primary partition on the drive being introduced. By convention physical hard drives are given numbers starting at zero, so the first physical drive is Drive0, as can be seen in Windows 2000 Disk Administrator. If all the partitions on the drive being added – Drive1 – are logical partitions, they'll be counted after the partitions on the existing drive, Drive0, and lettered accordingly. If Drive0 has drives lettered C, D and E, the first partition on the added drive, Drive1, will be given the letter F. If the computer also has one or more CD (or a Zip drive or other removable drive), it will probably already be lettered F in this case, and then the first partition on Drive1 will be G. It's very easy to change drive letters of CD drives in Computer Management/Disk Administration. Ensure no program is using the drive, select it in Drive Management, right-click to select Properties, and select Edit (see screenshot 2). It's often helpful to give CD drives memorable letters such as R (for Read) and W (for Write) and in doing so leave space for hard drive partition changes.

Size is another consideration when adding drives to Windows 2000. Support for newer hard drives with ATA66/ATA100 interfaces was introduced in Service Pack 2. Support for hard drives over 137GB in size was introduced in Service Pack 3. Before adding a monster hard drive, upgrade to SP3 and follow the instructions to enable 48bit LBA support in Knowledgebase article **http://support.microsoft.com/default.aspx?id=305098**.

Really annoying

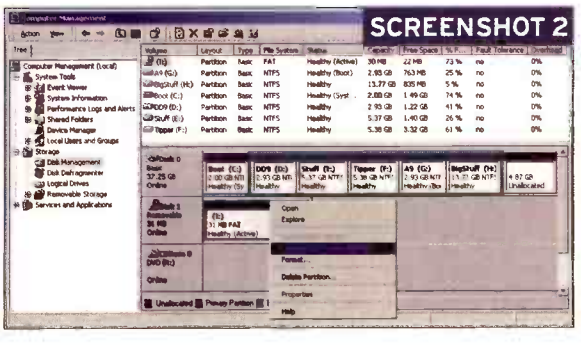
Peter Watson ran into a problem with the Realone Player. Having installed the free version, he found some limitations on what it was prepared to do. Peter couldn't get it to display the configuration screen and, while it would play some of the videos on the BBCi site (see screenshot 3), it refused to play the news videos. We've successfully run Realone Player on Windows 2000 before but, frankly, it's a dog – heavy on resources and larded with options that continually seek to access Real's website. Our recommendation, if your main interest is video from the BBC, is to avoid Realone altogether and instead install its predecessor, Realplayer 8 Basic, instead. It happily streams video and audio from the BBC and is freely available from a link on the BBC page at **www.bbc.co.uk/radio/audiohelp.shtml?focuswin**. Don't be deterred by the description which appears to suggest that Realplayer 8 is only supplied for Windows 95 and Macintosh computers. Follow the link and you can select the Windows 2000 version from the Real download page.

Robert Dolan has two desktop systems with Windows 2000 Professional on each and would like to copy files that are too large for a CD from one machine to the other. Robert was told that he could do this with a RJ-45 crossover patch cable and would like to know how to proceed. RJ-45 cables are used in 10BaseT and 100BaseT (Fast Ethernet) networks and normally wired RJ-45 cables are used to connect each computer to a hub or switch in a star topology. A 'crossover' RJ-45 cable simply transposes the normal wiring of the receive and transmit wire pairs in the cable, and its only purpose is to dispense with the need for a hub or switch when directly connecting two computers. To use a crossover cable you need a Nic in each computer.



Fun with Real Player 8 Basic and Windows 2000

Installing a Nic in Windows 2000 installs a default network setup that enables the two computers to communicate. If you change this in any way on either computer they may not be able to communicate. Connect the Nics with the crossover cable. In Windows 2000, open System Properties. If you're logged on as an administrator, right-click on My Computer and select Properties. Otherwise, open Control Panel and hold down the Shift key while right-clicking on the System applet; select RunAs to run System with administrator rights. When System Properties opens, click on the Network Identification tab and ensure that both computers have exactly the same Workgroup name. In order to see Computer B from Computer A, the person logged on to Computer A must be using a user account that exists on Computer B. An alternative is to enable the Guest account on both computers, but this essentially makes both wide open to anyone and is a bad idea on all but the simplest networks with no security requirement and no Internet access. If you don't have Nics in both computers, you might want to have a look at 'Direct Cable Connections' in the Help (Start/Help), though this will be slower than a network link.



Slice and dice your hard disk with Disk Administrator

CONTACTS

Terence Green welcomes your comments on the Windows 2000 column. Email him at: win2000@pcw.co.uk. Please do not send unsolicited file attachments.

Barry Shilliday
has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time prefers to travel the world – and snap it with his camera

Migrate your mail from Outlook

Transfer your email to Linux, get together with Gaim and see what's new with Xfree

A major concern of anyone currently using Windows and thinking about moving to Linux is compatibility with existing data. As regular readers know, on the whole there is no real problem: most file formats are standard and independent of the operating system. The big exception is data created using applications from Microsoft. Ninety per cent of the time these are in a proprietary format that isn't simple to migrate. Fortunately, many of these formats, including Word's '.doc', can be read by Linux and Unix applications, and can be either converted into an open, standard format, or rewritten to the original proprietary one.

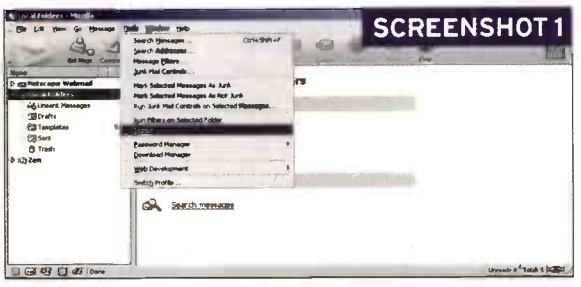
David Bullon, from Bedford, has asked a question along these lines. He currently uses Microsoft Office for most of his work, and Microsoft Outlook for email. Now, with Open Office, the former is no problem in terms of compatibility. The latter isn't such an easy matter, though. He asks if it's possible to migrate his several years worth of email to a Linux system.

The quick answer is no. Outlook uses its own format and Microsoft hasn't released the specifications, without which there's no simple way for another program to import the email. The longer answer is, of course, yes – but not directly. The solution lies with Mozilla or Netscape 7.

It is possible for Mozilla to import email from Outlook, and because Mozilla exists on both platforms and uses the same configuration files, you can then copy the data across to Linux without Mozilla noticing.

You might wonder why it's necessary to take this indirect route – if Mozilla can import from Outlook, why not just do it in one step, directly from Linux? The reason for this is that under Windows, a shared (dll) library is available that allows a program to manipulate Outlook files in their proprietary form. Mozilla under Linux has no access to Windows dll files, and so the capability is therefore lost.

So, back to the question. The first step is to install Mozilla on Windows. You can use Netscape 7 as well, as it's just Mozilla with another name; Netscape does insist on registering, while Mozilla just gets on with it, so take the easier route. Mozilla's a more than capable browser for Windows. It supports tabbed browsing, pop-up bans and other features not available in Internet Explorer, so it's a good idea to install it anyway. It also includes a News reader, and an email client – particularly useful in our case. Download the latest Windows binaries for Mozilla at www.mozilla.org.



Above: Mozilla can import email from several sources, including Outlook

Right: Importing email into Mozilla

Once installed, start the Mail and News client – there's an icon second from the left at the bottom of the browser window to launch it. Find the Tools menu and select 'Import' (see screenshot 1). Now a dialogue window asks what sort of material you want to import; pick mail. Next, the window will offer Outlook as an import source and you're ready to start the process. It can take a while if you have a large amount of email to transfer (see screenshot 2).

If all goes well, you will now have all your Outlook email available to Mozilla. This is a complete copy, so delete any of the folders in Mozilla's version that aren't needed, like 'Deleted Items' or 'Junk Mail'.

The migration

Now comes the more difficult part. We need to move the files where Mozilla has stored your email over to Linux. There are several ways to do this, but first we need to find those files. Mozilla has an annoying trait of storing its data in oddly named directories. To find the location, enter the 'Mail and Newsgroup Account Settings' from the Mail and News window – it isn't available from the browser window. Find and select the line that reads 'Local Folders', and the directory is revealed (see screenshot 3). The exact location of the directories will vary depending on the version of Windows, and the hierarchy will always contain a random string of letters and numbers, such as 'gt33pad8.slt'.

Go to the directory shown, and within it you should find another called 'Outlook Mail.sbd'. You need to transfer this directory; it will contain large text files – one for each Outlook mail folder. One option now is to zip this directory with Winzip or similar, and then copy the zip file to Linux later.

The import

Now that the email is available to Mozilla and we know where to find it, we can finally import the data into the browser's Linux sibling. From the Linux desktop, start up Mozilla and, if you haven't done so before, set up the Mail client. This step is needed in order to create the mail directory structure on the disk. Make sure that Mozilla is closed down before proceeding.

Check that everything is in order by looking in the .mozilla directory, located in your home directory:

```
$ ls ~/.mozilla/default/
rba1u5nc.slt ↵
$ ls ↵
~/.mozilla/default/↵
```

The account settings reveal the location of local email

```
rba1u5nc.slt/Mail/
Local Folders ↙
mail.server.com
```

(Key: ↙ code string continues)

The directory structure is the same one used under Windows, but consistent and a bit shorter. Enter the directory ~/.mozilla/default/[random text]/Mail/Local Folders/ and unzip the 'Outlook Mail.sbd' directory here.

An alternative method is to mount the Windows partition and copy the files directly across – assuming that the Windows and Linux partitions are on the same PC. Many distributions, such as Suse, Lycoris and Mandrake, automatically mount any Windows partitions found during the install. You can check to see what's mounted by running the 'mount' command without any options. It will produce a list with something like:

```
/dev/hda1 on /mnt/windows ↙
 type vfat (...)
```

or

```
/dev/hda1 on /mnt/windows ↙
 type ntfs (...)
```

If you need to do it manually, commands along the lines of the following will do the job:

```
# mkdir /mnt/windows
# mount /dev/hda1 ↙
/mnt/windows
```

This would work if the Windows partition is at /dev/hda1 – the first partition on the disk connected to the primary master IDE interface (this is the most common configuration). If you're not sure which partition to use, try the command:

```
# fdisk -l /dev/hda
```

The Windows drives (partitions) are listed as either 'Win95 Fat32' for Windows 95 and 98, or 'HPFS/NTFS' for Windows NT, 2000 and XP (though these can also use Fat32).

A final point to bear in mind is that Red Hat, for whatever reasons, has decided not to include the NTFS driver found in the standard kernel. If you're running Red Hat see the box on kernel modules (below) for more information on NTFS support. Every other distribution carries the driver and won't have any problem mounting NTFS partitions.

Finishing up

With the data copied across, there's a little more to do. The ownership on the files needs to be set correctly, especially if you copied across the files as root. Enter the 'Local Folders' directory again, and run the command:

```
# chown -R <userid> ↙
Outlook*
```

Where <userid> is the ID with which you log in. The -R option recursively changes all the files, making sure every file copied across is set.

If other people use the Linux system, it might be worth looking at the file permissions too, or other people may be able to read your imported email. The following line restricts access to just your ID, but isn't necessary on most systems, since they restrict access to the entire home directory:

```
$ chmod -R 700 Outlook*
```

Kernel modules

The Linux kernel is modular – in other words, a lot of the capabilities of the kernel are provided by small pieces of code called modules. These can be inserted into, or removed from, the kernel at any time, and mainly offer support for hardware device drivers, filesystems and network options, though almost any kernel function is a possibility. Using modules helps to keep the kernel image itself to a minimum – if all the drivers for every possible system were included in the kernel, it would be many megabytes in size and would waste memory. The dynamic nature of kernel modules is one reason Linux needs to be rebooted so rarely; it's possible to remove a device driver, upgrade it and insert it back into a running kernel. It's also possible to add new modules to the kernel, adding support for something previously lacking.

One such module provides NTFS filesystem support, and without it installed, it's not possible to mount an NTFS partition. The official kernel has supported NTFS for read-only access for a long time, but the last few Red Hat Linux releases have removed this module from the supplied kernels.

Although not really the concern of the NTFS kernel module developers, they've addressed this problem by providing precompiled modules that can be plugged back into a running Red Hat system. The downloads can be found at http://linux-ntfs.sourceforge.net/info/redhat.html and include good documentation about installing the module. All that needs to be done is download and install the RPM and run 'modprobe ntfs' to insert the module. No reboots necessary.

Gaim, the new GTK-2 based version

That's all you have to do. Start Mozilla, and load the Mail client – listed under Local Folders you should find your Outlook folders all freshly marked as unread. Next month we'll look at making these available to KDE's Kmail.

Instant messaging

There are quite a few possibilities for instant messaging software on Linux and Unix: AMSN, Everybuddy, Gabber, Gnomeicu, Kmerlin, Kopete, Licq, Micq, Pork, and YSM to name just a few. The situation isn't helped by all the different protocols around. MSN uses one, Yahoo another and Aim another. What's more, while they all (more or less) do the same thing, they're all totally incompatible with each other. Most of us have an account on at least one or two of them, and it's common to have to run multiple clients for each of the protocols.

Gaim is a good way of solving this. It doesn't use its own protocol, but instead connects to all the common ones from one interface, resulting in only one window and one client. The homepage of the Gaim project is **http://gaim.sourceforge.net/** and the client runs primarily on Linux/Unix, but also works with Mac OS X and Windows. It's an extensible client – plug-ins allow features not commonly found with the native versions, like encrypted conversations and an 'as you type' spelling checker (see screenshot 4).

Gaim installation

You can download binary RPMs by following the download links on the homepage, or trying **http://sourceforge.net/projects/showfiles.php?group_id=235**. As usual though, we're going to build Gaim from the source code, but if you

want to use the pre-built RPM, download and then install as follows:

```
# rpm -Uvh gaim-0.62-
1.i386.rpm
```

The RPM command with the -U option takes care of any earlier copies installed. If you want to install this way, skip to the configuration section below.

Otherwise, download the source code from the same place. The current version at the time of writing was gaim-0.62.tar.bz2, but get a more recent copy if one's available.

Before building Gaim itself, if you want to use the spelling checking plug-in, you'll need an additional package – gtkspell. To see if you already have a copy, try:

```
$ ls /usr/lib/libgtkspell*
```

If that command shows any files present, then it is installed. Otherwise, the link is **http://gtkspell.sourceforge.net**. Download the latest archive (currently version 2.0.4) and install it as follows:

```
# tar xfvz gtkspell-
2.0.4.tar.gz
# cd gtkspell-2.0.4
# ./configure --prefix=
/usr --disable-gtk-doc
# make
# make install
# ldconfig
```

Next, it's a good idea to remove any version of Gaim that might already be installed. On an RPM-based system (most major ones), run the command:

```
# rpm -qa | grep gaim
```

If anything comes back, 'gaim-z0.59.8-0', for example, an older version is installed. To remove, run:

```
# rpm -e gaim
```

Now it's time to compile and install the new version:

```
# tar xfvj gaim-
0.62.tar.bz2
# cd gaim-0.62
# ./configure --prefix=/usr
# make
# make install
```

Run the newly installed program from the menu, or simply press Alt & F2 and enter 'gaim'. The main login window will appear (see screenshot 5).

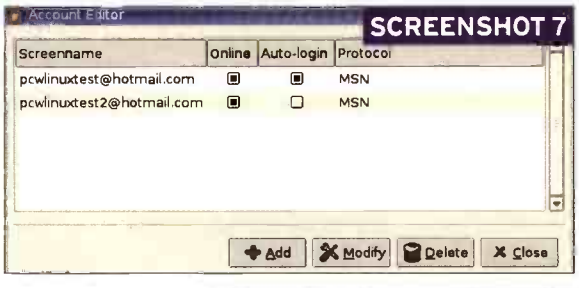
Setting up Gaim

First, click the accounts button, to bring up the account editor, and then click 'Add'. The account setup window pops up. It's simple to fill in: pick the protocol (MSN, Yahoo and so on) and enter the login details (see screenshot 6). Notice that the full email address is required, not just the first part. Once completed, go back and add any other messaging accounts you want, even extra ones of the same type. The account editor will look something like screenshot 7. Click the online button to connect and disconnect from each account, and click the auto-login button if you want to connect as soon as Gaim is loaded.

Check the preferences for other features (see screenshot 8). Here you can set Gaim to contain each conversation in one tabbed window, or have multiple windows for each. Also found here is the plug-in manager, where you can enable spelling checking and other handy extras. Enable the system tray icon plug-in if you want the Windows-style icon on the panel. There are many options to play with, and they're mostly self-explanatory.

Gaim's main window on start-up

Setting up an MSN Messenger account with Gaim is no more difficult than the native client



Above: All your instant messaging accounts go here

Right: Have 'teh' automatically corrected to 'the'? Lots of plug-ins extend Gaim

Xfree news

Xfree86, the X11 Window System that provides the framework for all GUIs on Linux and BSD systems, has had some exposure in the news recently. A political disagreement among the developers has led to the expulsion of Keith Packard, a core developer who was responsible for the new and very much needed font improvements in the code. He had been unhappy with the slow development model, and had asked around to see how people felt about it in general. The other developers were not impressed with his actions, and he was removed from the team. As a result, the Xfree project is likely to fork, with two versions. In the past, most major projects that have forked have eventually come back together in a somewhat Darwinian style – the better one survives. A new website has emerged from the dispute – **http://xwin.org**. Also take a look at **www.osnews.com** for some detailed reports on the situation.

Amid the disputes, Xfree86 4.3.0 has finally been released. A summary of changes can be found at **www.xfree86.org/4.3.0/RELNOTES.html**. These include long-awaited updated drivers for ATI cards, the ability to change resolution on the fly (previously it was necessary to restart X11), and support for colour animated cursors. The new version has made it in time for the new round of releases from Suse, Red Hat and so on, so the easiest way to get the new version is to upgrade your distribution.

Which one – $ or #?

All the examples for the shell begin with $ or #. This doesn't form part of the command, but simply represents the prompt: if you are logged in as root, you get '#', while everybody else sees '$'. Therefore, log in as root before running any commands shown with the # symbol at the beginning of the line.

CONTACTS

Barry Shilliday welcomes your comments on the Linux/Unix column. Email him at: linux@pcw.co.uk. Please do not send unsolicited file attachments.

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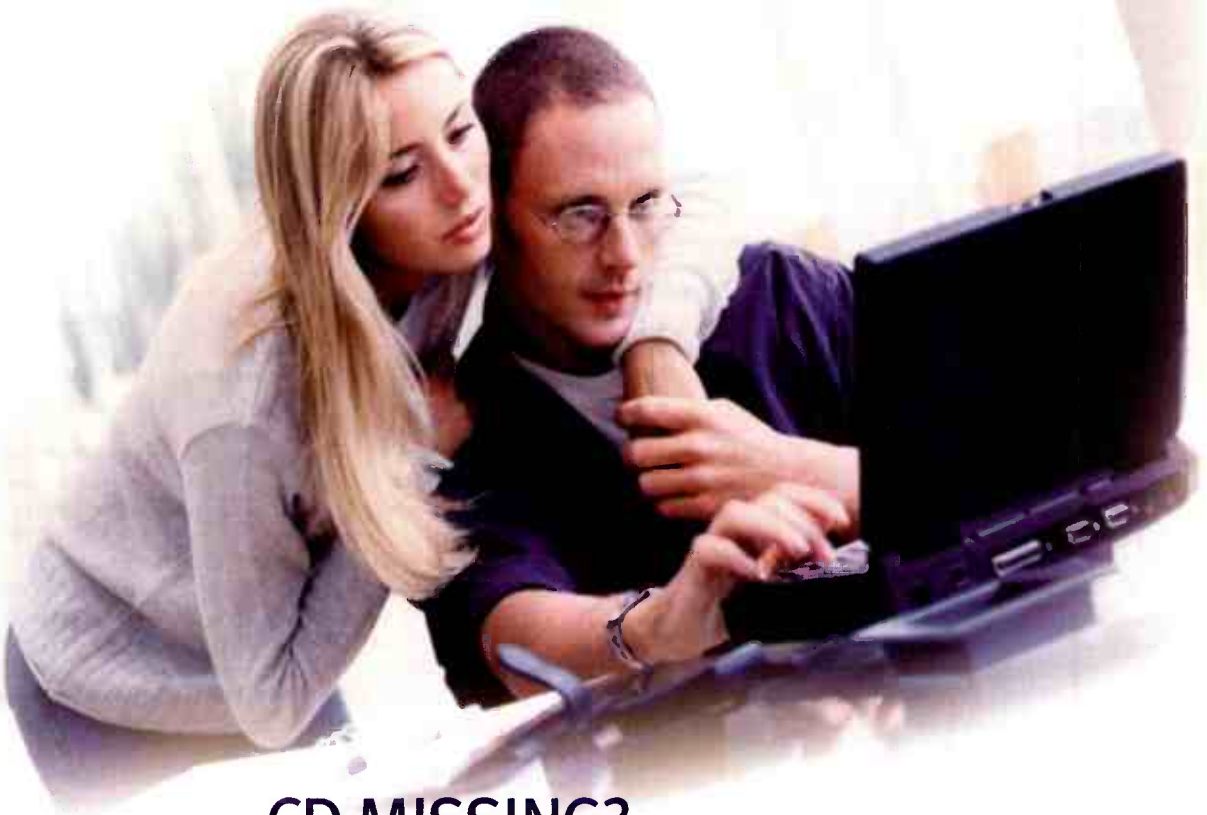

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Tim Nott
Is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family

Activating Autotext

How to make the most of Autotext on Word – and how to cancel its less useful features

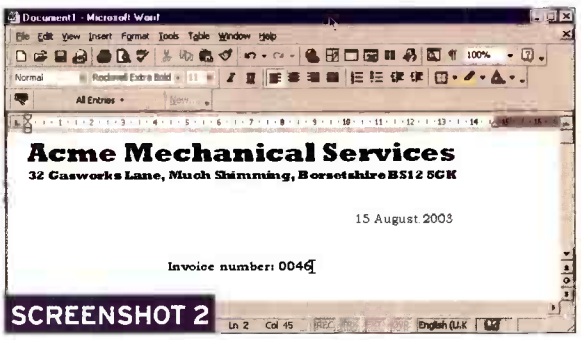
In June we covered the Autocorrect feature in Word – now it's time for Autotext. Autotext has been around since the earliest days of Word for Windows and Dos, when it was known as the Glossary. Most other word processors have long had a similar feature whereby you can insert 'boiler plate' text – commonly used phrases such as 'yours sincerely' – with a couple of keystrokes. Round about Word 6 it was renamed Autotext, a name that defies logic as it isn't automatic or confined to text.

To create an Autotext entry, first type and select the text you want to store. Next go to Insert, Autotext, New... a box will appear showing the first few words of the text selected and prompt you for a name. Type in anything short and memorable, such as 'ys' for 'yours sincerely'. Now, whenever you type 'ys', followed by F3, 'yours sincerely' will appear in its place. Since Word 97 a refinement has been added in that, if you type the first few letters of an Autotext entry, a tip box appears showing a suggested entry: press the Enter key and the full text will appear in the document. Unfortunately this is bundled with the same smart trick that tries to append the current month and date to years. If you type 'August 2003' on 15 August and press Enter, you'll get 'August 2003-08-15'. This can be turned off from the checkbox in the Insert, Autotext... dialogue.

This leaves you with a set of built-in Autotext entries that seemingly can only be accessed through a menu or toolbar. However, the auto-complete feature still works with F3: type 'To who' followed by F3 and it will expand into 'To whom it may concern:'. Although some of the built-in entries are useful, many of the entries are of limited use to British writers (Dear Mom and Dad?) so you may want get rid of them. You can delete entries within the main Autotext dialogue (see screenshot 1).

SCREENSHOT 1

You can remove Autotext entries and stop the date appending



SCREENSHOT 2

All done with bookmarks, a text file and a little VBA

As mentioned earlier, you are not confined to text: you can select a graphic and save it as an Autotext entry. If the graphic is placed 'in-line' with the text, you can have text and a graphic in the Autotext entry. You can also include fields to facilitate things such as overlined letters (as seen in last month's Question time) or ordinal dates. Next month we'll look at some Autotext tricks for power users.

Sequential numbering

A common request is to create business documents, such as orders, quotations, or invoices containing a serial number with an automatic increment. To do this you need a way to store the current number and increase it for each new document.

There are several approaches: you can store the number in the Windows Registry, in the document template, or in a separate text file. Then, to insert the number, you can use form fields, Autotext entries or a bookmark. Text and file bookmarks are the simplest options.

So, first you need to create or open the template, then define a bookmark in the template as a placeholder for the number – let's give that the name 'Serial'. Then you need to create an Autonew macro in the template, containing the following code:

```
Sub AutoNew()
ChangeFileOpenDirectory ↙
"C:\pathtomy\invoices\"
Serialnumber = ↙
System.Private↙
ProfileString(CurDir & ↙
"\Numbering.txt", ↙
"Settings", ↙
"Serialnumber")
If Serialnumber = "" Then
Serialnumber = 1
Else
Serialnumber = ↙
Serialnumber + 1
End If
System.PrivateProfile↙
String(CurDir & ↙
"\Numbering.txt", ↙
"Settings", ↙
"Serialnumber") = ↙
Serialnumber↙
ActiveDocument.Bookmarks↙
("Serial").Range.↙
InsertBefore ↙
Format(Serialnumber, ↙
"000#")
End Sub
```

(Key: ↙ code string continues)

Starting at the second line, this changes the working directory to a folder of your choice: this is where the numbered documents will be stored, so you need to change the path between the quotes to suit your own requirements. This also sets the path for all subsequent operations in the macro. You don't have to do anything else. The first time the macro runs, which will be when you create a new document from the containing template, it won't find the file Numbering.txt in the third line as it doesn't exist. So, moving on to the next line, as the variable Serialnumber returns an empty string (""), it will be set to a value of one. If the file – and hence a value for Serialnumber – does exist, it will be incremented by one.

Once the 'iffing' is over, the next line writes the new value of Serialnumber to the file – if the file does not exist it will be created and if it does exist it will be overwritten. The penultimate line inserts the serial number at the bookmark in the new document, in the format '0001, 0002...'. You can change this format to suit (see screenshot 2). To ice the cake, save the document with a name based on the number by adding the following line before 'End Sub':

```
ActiveDocument.SaveAs ↙
FileName:="Invoice" & ↙
Format(Serialnumber, ↙
"000#")
```

CONTACTS

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Stephen Wells
Is a freelance journalist and a regular contributor to computer magazines. He's been writing *PCW*'s Spreadsheets column for many years. A US citizen, he now resides on the Essex coast

Extending Excel

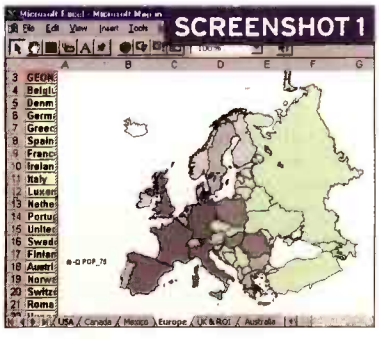
Add-ins and templates can help tailor Excel to your specific needs

When Dan Bricklin and Bob Franckston invented the spreadsheet 25 years ago, their intent was to simulate the bookkeeper's worksheet. Their Visicalc eventually inspired a number of imitators including Multiplan, the first spreadsheet for Windows. That spreadsheet developed into Excel, which now has hundreds of functions and is used for myriad applications in a wide variety of trades and professions. These busy spreadsheet users frequently save time by taking advantage of specialist add-ins which tailor Excel to their specific interest.

One of the most imaginative add-ins is used for converting tabular data into a map. From Excel 4 to Excel 2000, Microsoft included an application, Microsoft Map, which did just that (see screenshot 1). There were also tables of demographic data from Mapinfo in a file called Mapstats.xls. So if you've retained or are still using those versions of Excel, you're ahead of the game. If you are using Excel 2002, Microsoft wants you to buy Microsoft Map Point Europe 2002. This includes detailed maps of the UK, France, Germany, Italy, Spain, the Netherlands, Denmark, Belgium, Luxembourg, Austria, and Switzerland. Don't confuse this product with Microsoft Autoroute which is intended for planning trips. Map Point is designed to show Office data (such as contacts from Outlook as well as tables from Excel) on a map.

Businesses interested in store locations, real estate listings, industry-specific boundaries, regional sales analysis, government statistics, and numerous other fields of specialised data that can be mapped, can make use of the up-to-date tabular data from Mapinfo. See www.mapinfo.co.uk.

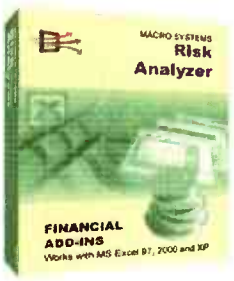
Microsoft Map can recognise some tabular data and key it on a map



Analyse everything

If you have non-geographic data to assess you might use the Analyse-it add-in, which is compatible with Excel 95, 97, 2000 and XP. It's been used for analysing everything: from rainfall rates to the effectiveness of fertilisers, comparing sales techniques and predicting financial outcomes. Download a free 30-day evaluation copy at www.analyse-it.com and try it out on your own data.

For the commercial Excel user, a wide range of popular add-ins is offered by Bob Flanagan's Macro Systems. Just download the Macro Systems Add-Ins package from www.add-ins.com. Then on the Tools menu, under Add-Ins, check Macro Systems Add-Ins Manager. This adds an item to the foot of the Tools menu which leads to a couple of dozen applications. One is Risk Analyzer, used for evaluating business plan investments. It gives you tables and graphs you can also use in Word and Powerpoint presentations. Included in the short Macro Systems download is a book, *Time Saving Microsoft Excel Solutions*, which details what is offered by each add-in. But beyond being promotional material for Macro Systems' products, the book offers dozens of free Excel tips, shortcuts and helpful hints.



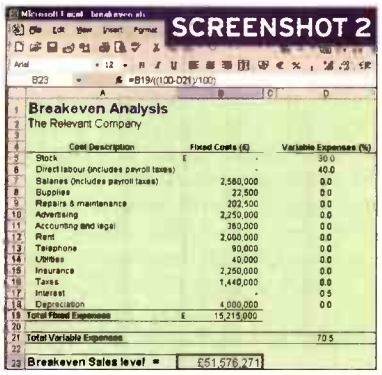
An Excel add-in for projecting outcomes of business investment plans

Location, location...

If you need to communicate the location of your organisation's facility on a spreadsheet, one of the easiest to use add-ins is offered by Streetmap. Although intended primarily to be used as a link from HTML-coded website pages, you can run it from an Excel worksheet. Just use the HYPERLINK() function. This has two arguments: the link, and the wording to be displayed in the cell.

Go to www.streetmap.co.uk to create the link. Click on How to link to us, and fill in the brief form for creating a link using your chosen postcode. Once the linking code is displayed for you, copy and paste it into the first part of the HYPERLINK() function surrounded by double quotes. Insert a comma to separate the arguments. Then add any wording you wish to display in the linking cell, again in double quotes.

A free template for breakeven analysis is available online



For example, if you used the postcode for the British Library in London, which is NW1 2DB, and you wanted to display in the cell Our location, then, depending on the options chosen in the Streetmap form, the entry might look like this: =HYPERLINK("http://www.streetmap.co.uk/newmap.srf?x=530019&y=182893&z=0&sv=nw1+2db&pc=nw1+2db","Our location").

If the user is online, and clicks on the cell which reads Our location, the streetmap is displayed with an arrow pointing to the exact location of the British Library. If you have entered an out-of-date postcode or a Post Office box, the Streetmap site will inform you when the map is displayed.

For simple applications, you may find what you need in the Microsoft Office website Template Gallery at http://search.officeupdate.microsoft.com/TemplateGallery. One example is the useful Breakeven Analysis template (see screenshot 2). You list the fixed costs of your company for a period in one column and the projected variable ones, expressed as a percentage of sales, in another. The template then calculates the breakeven sales level based on the formula: Breakeven sales level = Total fixed expenses/((100-Total variable expenses %)/100). By playing with the entries you can estimate sales improvements needed to justify the extra expense.

CONTACTS

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Ken McMahon
became a freelance journalist after he experimented with graphics on a Commodore 64. In 1987 he bought an Apple Mac Plus before founding Pelican Graphics, and hasn't looked back since

On the Plus side

At play with Microsoft Plus Digital Media Edition and Photoshop Camera Raw plug-in

In this month's Hands on digital imaging there's something for everyone. I've spent several interesting hours playing with Microsoft Plus Digital Media Edition, which adds a number of useful digital media applications to Windows XP, including a slideshow presenter, which outputs highly compressed wmv files that can be viewed in Windows Media Player.

I've also been checking out Adobe's Photoshop Camera Raw plug-in, which lets you get at the raw pixel data captured by high-end digital cameras before it's had all manner of post-processing 'improvements' applied to it. Finally, if you've ever wondered how to get portrait format digital video taken with a camera turned through 90 degrees to play the right way up, you'll find the answer here (and no, it's not turning the monitor on its side).

Plus points

Microsoft Plus Digital Media Edition (see also this month's Windows XP column) is an extension to Windows XP, designed for people who want to make more of their personal digital video, photograph and audio content. It neatly fills the gap between doing nothing and making use of the kind of features on offer from budget photo and video-editing applications, such as Adobe Photoshop Elements and Ulead Videostudio.

The suite of mini applications and utilities includes: Plus Photo Story, a slideshow editor with pan and zoom features; Plus Party Mode, which turns Windows Media Player into a party jukebox; Plus Dancer, complete with animated 3D groovers (see screenshot 1); Plus Analogue recorder; Plus Audio Converter; and a CD label maker, alarm clock, sleep timer and eight new Media Player skins.

There are also 50 new transitions and effects for Windows Movie Maker 2 – Microsoft's answer to Apple's Imovie – and Plus Sync & Go, which provides synchronised web content to your PocketPC. That's a lot of pluses for £15.99 inc VAT.

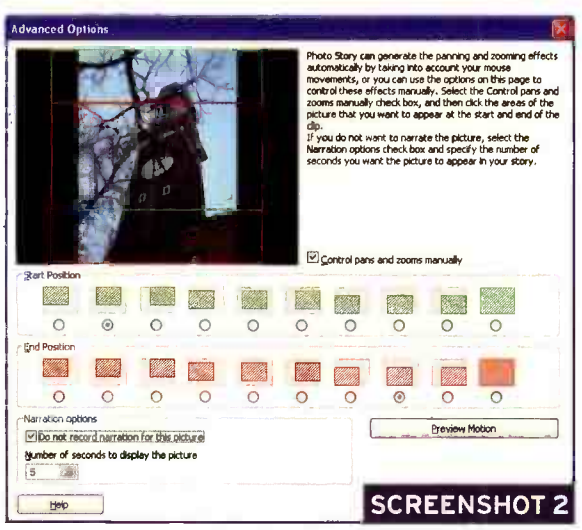
Aside from polishing up my disco technique with Plus Dancer, of all the applications, Plus Photo Story looks the most promising. This may be because I recently spent several hours working out the best way to incorporate stills into a video with pan and zoom effects. Even in an advanced video-editing application like Premiere there's a lot of work to be done to make this effect work. Images must be resized and stretched to take account of non-square DV pixels, and if you're working with a budget application that doesn't have keyframeable animation controls, you need to adapt the existing titling or picture in picture effects.

And you thought the office assistant was irritating – one of the Plus Dancers

The good thing about Plus Photo Story is that it's quick, simple and it works. Using a wizard-based interface you arrange a selection of images in sequence, apply pan and zoom to each one, add a voiceover narration and backing music track, then output the whole thing using one of the available wmv presets. Like Movie Maker 2, Photo Story uses the new Windows Media 9 encoder.

There are limitations. Where transitions are concerned it's one size fits all, and if you don't like cross-dissolves this isn't for you. And the pan and zoom controls are quite limited. There's an option to set the pan and zoom by moving the mouse over areas of the image while you're recording the voiceover, but it's not intuitive. A far simpler method is to use the 'advanced' controls, which provide a range of preset start and end points. Using these, you can produce just about anything from straight push-in and pull-out zooms, left-right, right-left and diagonal pans, to pan and zoom combos.

Plus Photo Story has limited pan and zoom controls



What you can't do is start the pan off-screen, have the new image dissolve in, then have the movement begin. Zoom range is restricted from full frame to about two-thirds full frame and portrait format shots display letterboxed – with black bands down either side (see screenshot 2). It would be useful to have a little more pan and zoom control so that you could, for example, zoom in to the width of a portrait shot, eliminating the black bands and pan from top to bottom.

Output options

Photo Story can import wma and MP3 sound files, but it didn't want to know about the 256Kbits/sec MP3 we used as a test file – it went through the motions, but no music came out of the other end. Converting the file using Plus Audio converter to a 128Kbits/sec wma file did the trick though. One useful touch is that, regardless of the length of the slideshow, the sound fades out at the end of the last slide.

Compression with the default 640 x 480 resolution setting was around 10:1 and the quality was very good. We started with 10 1,536 x 2,048 jpegs, each around 1MB in size and the wmv output file was 859KB. Adding a background image to the title frame increased this to 914KB and the 50-second long sound file added just over a megabyte. Using the lower quality sound setting resulted in a file size of 1.46MB.

If you're planning on emailing a short slideshow, there's a 320 x 240 resolution option. If you're after better quality you can download 600 x 800 and 1,024 x 768 resolution encoding profiles from **www.microsoft.com/windows/plus/dme_more/moreprofiles.asp**.

Both these profiles encode variable bit rate (VBR) 24fps (frames per second) video and 44KHz VBR audio. The quality of the video using the default profile is excellent, and there's no reason to suppose that it wouldn't be better using the VBR profiles, though you'll need to consider the performance capabilities of the playback machine before going ahead. For the 1,024 x 768 profile Microsoft recommends a 2.2GHz processor and 256MB of Ram.

Turning your pictures into wmv videos using Photo Story is undoubtedly a quick and simple way to add interest and share them. If Microsoft was to add an mpeg2, or even a DV codec, as it's done with Video Maker 2, then it would be a lot more useful, as you could then output your slideshow to DVD or incorporate it into a DV project. Another big omission is the lack of a Save button: once you finish a project and exit that's it. To recreate it you have to start over.

Raw plug-in

If you own a digital camera that can save images in raw format, and you're a Photoshop 7 user, you might be interested in the Photoshop Camera Raw & Jpeg 2000 plug-in. Digital camera raw formats are sometimes called 'digital negatives', because they provide 'raw' captured pixel data without any post-processing by the camera.

Even on the finest quality setting, digital cameras apply a degree of lossy compression to images prior to saving them as jpeg files. Additionally, the image will be adjusted for white balance and exposure and saved in the sRGB colour space.

The advantage of working with the raw image data is that you can decide how best to process the data and produce better quality images as a result.

The plug-in supports professional and mid-range cameras from Canon, Fujifilm, Minolta, Nikon and Olympus (see screenshot 3); for a full list go to **www.adobe.co.uk/products/photoshop/cameraraw.html**.

You can browse folders of raw images in the browser. Opening them calls up the Camera Raw plug-in window, which displays an image preview alongside a control panel with menu presets and slider controls. These are initially set to your camera defaults.

Below the preview window, four pulldown menus allow you to define the image colour space, bit depth, size and resolution. The colour space most commonly used for digital still camera images, sRGB, is designed for monitors and, if possible, I prefer to use Adobe RGB, which has a wider gamut. If your pictures are going to be displayed on screen you can always convert them to sRGB later, with the original raw files safely backed up. And if the intended destination is a printed magazine, you can set the output resolution to 300ppi (pixels per inch) here, saving yourself the bother of having to do it later.

Total control

The White balance menu offers common presets like daylight, tungsten, fluorescent and flash, or you can use a slider or input box to adjust the colour temperature more precisely. A histogram is displayed in the preview window with overlaid red, green and blue charts.

While visual feedback is more useful for white balance adjustments, the histogram comes into its own when making changes with the exposure, shadows and contrast sliders. The exposure compensation slider is calibrated in f stops ranging from minus two to plus four, and the shadows slider controls the input level that is mapped to black. The histogram updates as you drag these sliders, so you can clearly see the point at which highlight or shadow detail starts to become clipped. Better still, holding down the Alt key shows clipped pixels in the preview window, providing a very clear view of exactly how and where these adjustments will affect the image.

'No-one is going to take Jpeg 2000 seriously until Microsoft supports it in Internet Explorer'

The remaining sliders control saturation, sharpness and smoothness. Sharpening is often carried out in the camera, but if you're planning on manipulating images in Photoshop it should be the last thing you do to the image, not the first. By dragging the sharpness slider to zero you can turn off sharpening until you need it. Likewise, the smoothness slider provides a lot more control over noise reduction than in-camera filters, and will be increasingly useful as cameras with maximum ISO ratings in excess of 800 become the norm.

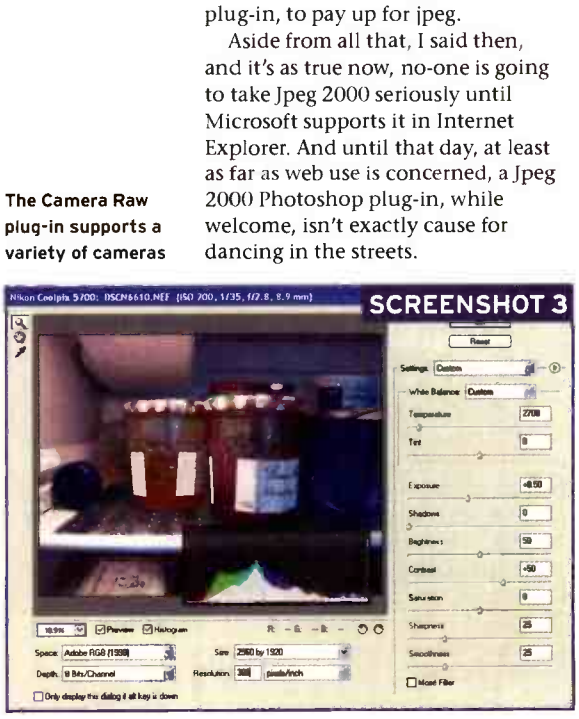
The bad news is that it's not a free download, unless you're prepared to wait for the next release of Photoshop, which I reckon is due some time between now and the end of the year. The cost of the download is £65, but if image quality is important to you – and if you have a camera that's capable of producing raw files, it probably is – it's a price worth paying.

There's also the added bonus of the Jpeg 2000 plug-in. We took a look at Jpeg 2000 in the December 2000 issue, but just in case your memory, or back-issue collection doesn't stretch that far, Jpeg 2000 is the new jpeg – with better quality, higher compression and advanced features like variable compression for rectangular 'Regions of interest', and multiple resolution and quality streams in a single file.

The Photoshop plug-in supports some of this functionality and now that Adobe is supporting the format in its flagship image-editing application (Photoshop Elements, Ulead Photo Impact 7 and Corel Photo Paint 11 have had Jpeg 2000 support for some time), we can only hope that its uptake will gain some momentum.

In December last year I speculated that Forgent Technologies' 'licence grab' (Forgent claimed ownership of patents covering jpeg compression technologies and was successful in obtaining licence fees for its use from, among others, Sony) might act as a spur to uptake of the new Jpeg 2000 standard. Since then very little seems to have changed, except that Forgent has managed to persuade Pegasus Imaging Corporation, which produces a Photoshop Jpeg 2000 plug-in, to pay up for jpeg.

Aside from all that, I said then, and it's as true now, no-one is going to take Jpeg 2000 seriously until Microsoft supports it in Internet Explorer. And until that day, at least as far as web use is concerned, a Jpeg 2000 Photoshop plug-in, while welcome, isn't exactly cause for dancing in the streets.



The Camera Raw plug-in supports a variety of cameras

Rotating movies

Ever wondered why movies are always landscape format? As digital cameras become ever more video-capable, the temptation to produce a tall thin movie, whether by design or accident, becomes irresistible. The downside, as Hands on contributor Nigel Whitfield discovered, can be more than just a pain in the neck. I've had emails from other Hands on readers with the same problem, the only difference being they lacked Nigel's persistence in finding a solution. He writes: 'While a friend was staying, we made a little home video using the movie function of his digicam – about 30 seconds at 15fps, though I can't remember the resolution.

'Anyway, for one reason and another we put the camera on a tripod, and it was rotated through 90 degrees. Of course, once the clip was downloaded from the camera, you needed to turn your head to one side to see it properly (see screenshot 4).

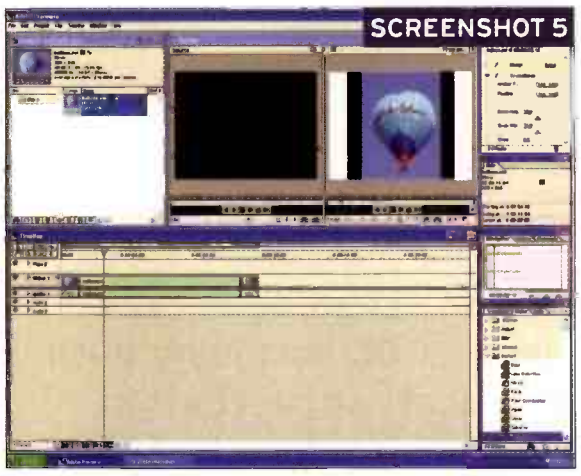
'Fortunately, Quicktime came to the rescue, opening the avi, then exporting it as an image sequence. A batch rotate job in Fireworks turned all 448 images through 90 degrees, and then Quicktime Player imported them all to recreate the file, with a 3:4 aspect ratio, but nevertheless saveable as a valid avi or mov file.

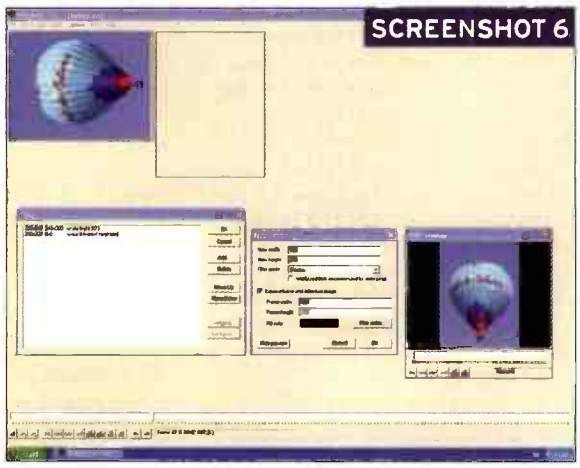
'If only that were the end of it. I wanted to take it into Imovie and add sound, captions and so forth. I could save it as a DV clip, but when importing that into Imovie, the aspect ratio was corrected, stretching everything out to the sides. So back to the sequence of images, and a batch in Fireworks that rotated, resized the canvas to a 4:3 ratio and shifted the picture into the middle of the canvas. I've now got a DV clip with white borders down each side, but at least the picture is in proportion and the right way round.

'I can't help thinking it would have been so much better to just turn the camera through 90 degrees before we started.'

Easy to say, in retrospect, but nonetheless true. If you want portrait format video the easiest way to get it is to shoot landscape, then mask the frame in a video-editing application. If the deed is already done, then you've no option other than to rotate the video.

If possible, do this in a video-editing application. As Nigel discovered, Imovie, in common with most video-editing applications, scales imported video files to match the project dimensions.





Top: Often it's not until you see this that you begin to understand the seriousness of the problem

Middle: Rotating and resizing in Premiere

Bottom: Virtualdub, the free and easy alternative

In Premiere, you can rotate clips to any angle using the motion settings dialogue, which is opened by clicking settings next to the motion filter in the effects panel. Default motion is off screen left to right, so you need to centre and rotate through 90 degrees both the start and end frames.

Now your clip is rotated, but the top and bottom has been clipped. To fit the full height you'll need to scale the clip using the After Effects Transform filter, which is in the distort folder. Assuming the frame size is 320 x 240, you need to reduce the size by 240/320 or 75 per cent: don't forget to do this for both the width and height (see screenshot 5).

If you don't have Premiere it's still possible to rotate video clips easily, using a freeware program called Virtualdub, an excellent Windows video capture, processing and transcoding utility developed by Avery Lee and distributed under the GNU General Public Licence. It has a wide range of video filters, including levels, HSV adjust, invert, blur and sharpen. More to the point, Virtualdub can rotate, resize and flip clips and it's very fast (see screenshot 6).

The Virtualdub interface isn't fancy, but it's extremely functional. Input and output windows provide before and after previews, and the filters are accessed from the video menu. To rotate your clip, open the filters dialogue box, click Add, select the rotate filter and choose left or right 90 degree rotation, depending which way you tilted the camera when shooting.

If you preview the video, you'll see it's been rotated 90 degrees and is now 240 x 320. To get it back to 320 x 240 we've first got to reduce the entire clip in proportion to a height of 240, then 'letterbox' it, adding black bars to the sides to bring the width back up to 320.

To do this click the Add button in the filters dialogue, select Resize and in the new width and new height input boxes enter 180 and 240, then press the Preview button to check the clip has been proportionally resized. Next, check the Expand frame and letterbox checkbox, and increase the width back up to 320, press the Tab key and you'll see the black bars appear left and right.

Click OK twice to return to the main application window and press F5 to preview the rotated and letterboxed video. You can now save the clip and import it into your video-editing application at the correct size and proportions for the rest of your project.

You can download Virtualdub from www.virtualdub.org.

Alternatively, as Nigel says, you can save yourself the effort by keeping the camera horizontal.

CONTACTS

Ken McMahon welcomes your comments on the Digital imaging & video column. Email him at: digitalimaging@pcw.co.uk. Please do not send unsolicited file attachments.

Guy Kewney
has been reporting on all aspects of IT since long before the first personal computers arrived on the scene. He now believes the wireless revolution will change the world

Smartphones and GPRS

If at first you don't connect, reboot and try again – your perseverance will pay off

This month I'm going to show you how to connect your PC to the Internet using a Microsoft Smartphone, Orange's SPV. There is nothing more frustrating than doing everything right and finding it still doesn't work, so here's how to use your Smartphone as a GPRS modem.

The following instructions are correct; I've tested them myself, and several other people have followed them successfully. However, because of the current state of GPRS, I can't guarantee that they will work. Also, you should be warned that it may cost you a fortune.

Users of the first Microsoft Windows-powered Smartphones found it odd that the device could connect to a PC for synchronisation, and to the web over GPRS for browsing, but couldn't connect the PC to the web.

Microsoft has now fixed this problem – as far as it can. What it can't do, however, is arrange for a working GPRS connection. My experience is that if you roam around Europe, you can expect misery.

Diagnosing the causes of the misery isn't easy, because the error messages are very misleading and usually cryptic as well.

A few simple steps

Ensure you have the following ingredients: first, the driver file. It's available from Orange, as usbmdm.inf, and is on the CD supplied with current models of the SPV. But don't search the web for it, because every modem supplier uses this name for its own modem driver. If you can't get it, mail me and I'll send it.

Second, you need a USB cable. I heartily recommend the Minisync (www.boxwave.com/products/minisync). It's small, winds up into a little bobbin and, most importantly, charges up your SPV from the USB port while you're travelling. Yes, that will reduce the battery life of the PC, but only by a small amount.

Finally, you need updated software on your SPV. The original operating software didn't have the modem link. We'll assume here that you know how to update your SPV's software from the Orange website.

First, you need to disable Activesync on your PC. This isn't strictly necessary, but I couldn't make it work first time, until I'd gone into Activesync and forced it to leave the USB connection alone. It's simple: go to the 'File' menu, select 'connection settings' and disable USB by unticking the middle box shown in see screenshot 1.

Next, make sure the phone is not connected to the PC. Again, this is supposed to be unnecessary, but it's best to do it anyway. Another step that shouldn't be necessary, but often is, is to switch off the phone and then switch it on again. By 'switch off the phone', I mean literally take the battery off.

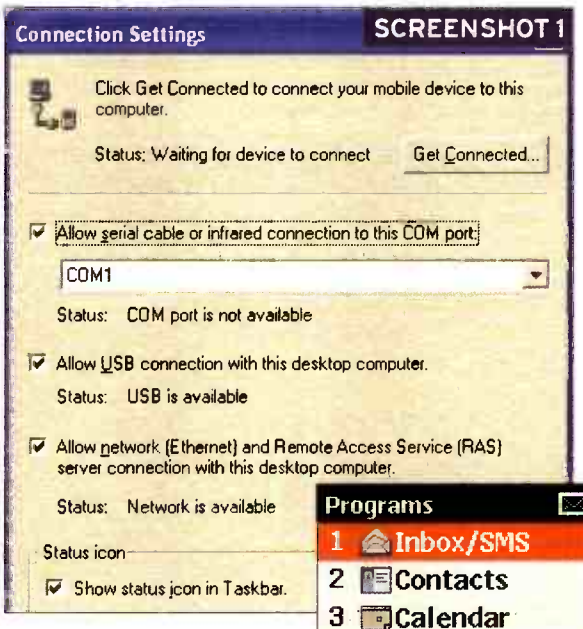
When the phone has rebooted, press the 'Programs' button, which is the unlabelled button on the left side of the joystick. As you can see in screenshot 2, the label saying 'Programs' is on the screen.

You'll now have a list of programs, starting with '1 Inbox' and ending with '9 More...', and you'll have to press the nine button unless you want to scroll down with the joystick. On my phone the sequence is '9 9 7 (Accessories) 5 (Modem link) but you may have more programs, or fewer, so the numbers may be different.

The Modem link screen should show the connection as USB; shifting to the left and right will change it to USB if it says Infra-red or something else. The status should be 'Inactive' and you have to press the right button under the screen, which says 'Menu' and then select 'Activate' with the joystick (see screenshot 3).

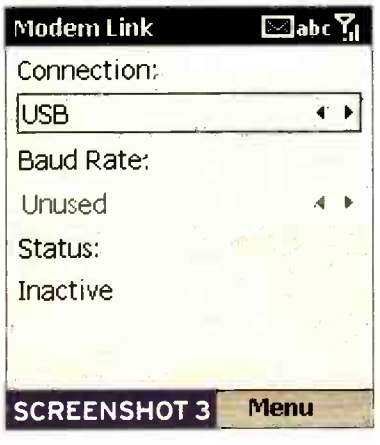
Now, quickly connect your SPV to the PC, as the 'Active' sign times out within a minute, and the phone modem has to be activated for this to work (see screenshot 4).

If this is the first time you've done this, Windows will say it has found new hardware and will run a Wizard. It will ask for the usbmdm.inf file, and the easy way to get this is to put the Orange CD in the drive and point to that. Ignore any warning that the software hasn't passed its Windows Logo testing (see screenshot 5).



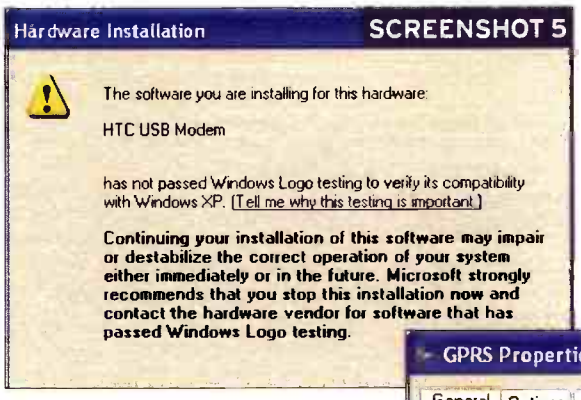
Above: You can stop Activesync from taking over the connection by disabling the USB checkbox

Right: You'll need to go through the Programs list to find the modem options



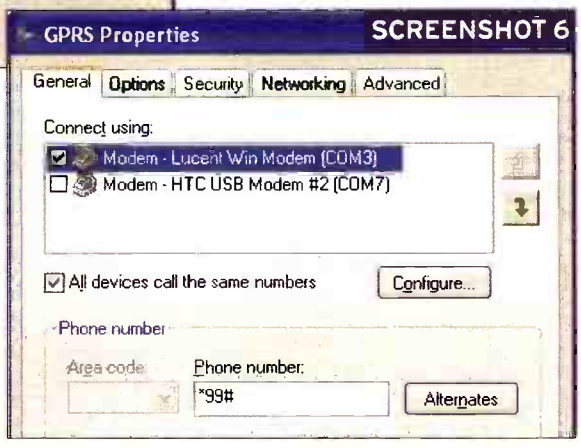
Far left: In the Modem Link application, make sure your phone is set to use USB, not infra-red

Left: When you activate the modem, you have around a minute before it times out and has to be reactivated



Left: The modem driver hasn't been signed for use with Windows, so you'll have to ignore the warning

Below: Make sure you choose the right modem and enter the correct GRPS number – *99# – when you set up the connection



Configuring the modem

When the wizard is done, you have to configure the modem. To do this, the modem must be active, which it probably won't be any more: the SPV will have timed out, so you will probably have to re-enable 'Activate' again.

You now have to create a 'connectoid' for the modem. Under Windows XP, for example, go to the Control Panel from the Start button. Find 'Phone and modem options' and look for the HTC USB modem; select that. Now press 'Properties' and choose Advanced.

A box comes up labelled 'Initialisation string' and into that, type exactly this:

```
+cgdcont=1,"IP","orange↙
internet","",0,0
```

(Key: ↙ code string continues)

That's the modem configured. But to make GPRS work, you have to make a new connection item on the menu. Call it 'GPRS'.

It will require a new phone number. You can leave most other choices empty, but it will need this number: *99#.

At this point, you must disconnect the phone, then save everything, close down and restart Windows. Finally, pull the battery off your SPV, and then refit it, and switch it back on. In theory, you don't have to do all these steps, but it's worth doing them to be safe.

After restarting, you have to re-enable the SPV modem. Do this exactly as you did before: Programs, More, More, Accessories, Modem Link, Activate. Now connect it to the PC. The PC should acknowledge the connection by beeping.

Go to Start and pick 'Connect To'. A list will appear and the new HTC USB modem should show. If it doesn't, disconnect the phone, re-enable the modem and reconnect the phone.

There's another trap to avoid here: make sure the SPV modem is ticked as HTC USB modem, and that no other modem has a tick in its box.

By default, the built-in modem will probably be enabled (see screenshot 6).

Now click OK, and then press 'dial' and hope that your phone is in a GPRS area, that it is connected to a GPRS provider and that there is a fully commissioned and correctly working GPRS service.

The best way of making sure there is a GPRS service available is if you see a 'G' at the top of the phone screen, and can get the phone itself to browse the Internet. Both are necessary; I've seen a 'G' and yet been unable to connect. But both are not sufficient; I've had both, and yet still been unable to get online.

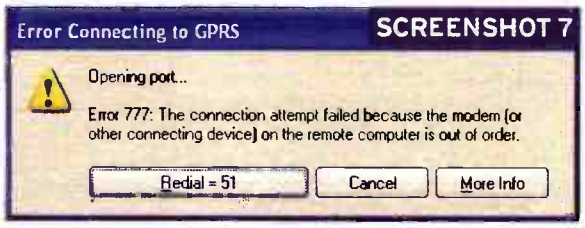
Error messages

Problems getting a computer online can be many and varied. Often, the error messages you get on screen are utterly unrelated to the causes.

For example, you will quite often get an error message, as shown in screenshot 7.

Error messages aren't always what they seem – this one actually means there's a network problem, not an error in your SPV

The 'modem' it is referring to is the GPRS network. It isn't out of order, it's just sulking most of the time, and restarting will often be sufficient. The trouble is, I can't tell you how much of a restart.



On occasions, the only way to fix it has been to close down the phone and the PC, disconnect them and start from the beginning: activate modem, connect phone to PC, check which modem is involved and dial.

You may also receive the message 'error 734: the PPP link control protocol was terminated' which just means 'something went wrong'. Sometimes, redialling will do it, but sometimes it won't.

One thing I have learnt is that it pays to know the IP address of several websites. Often, the problem will simply be that the GPRS network doesn't have a working Domain Name Server. You can test it; if your browser will connect to 217.146.97.25, but won't connect to www.kewney.com then DNS is broken. Strangely, this won't necessarily stop the phone itself from browsing. I think this is because the phone will go through a Wap gateway for most web stuff, and the Wap seems not to require properly functioning DNS.

If this is the case, and if you know the IP address of a working DNS box, enter that into your networking settings, and you may be able to surf anyway.

Finally, a warning! A phone tends to use extremely little data compared with what a PC may do. If all you're doing is connecting to an IRC chatroom, then you're quite safe. Very little Ascii will pass over the GPRS link, but if you have Outlook set up to download new mail every 10 minutes, you can very easily find yourself downloading 10MB a day.

In Spain, I discovered that one GPRS provider, Movistar, can charge as much as 25 euros (£17.70) per megabyte, if you don't opt for a deal that provides for large downloads. Even if you optimise it, you can easily find yourself spending 50 euros a week, and it's not hard to reach 100 euros a week.

However, it can be useful if your hotel data line is dead, or you don't know a local ISP to dial into, or if you're simply on a bus or a train and need to get in touch. So good luck and remember – persist. One failed connection doesn't prove it isn't working correctly, so try again. If that doesn't work, reboot and try again.

CONTACTS

Guy Kewney welcomes your comments on the Mobile computing column. Email him at: mobilecomputing@pcw.co.uk. Please do not send unsolicited file attachments.

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Epson 800/1520 (JT108/JT089)	£6 .. £8	
Epson 440/640 (JT187/JT191)	£5 .. £8	
Epson 740 (JT189/JT191)	£6 .. £8	
Epson 480/580/C20/40 (JT013/JT014)	£5 .. £8	
Epson 680 (JT017/JT018)	£9 .. £12	
Epson 880 (JT019/JT020)	£6 .. £9	
Epson P 790/870/75/90 (JT007/JT008)	£9 .. £8	
Epson Photo 810 (JT026/JT027)	£9 .. £11	
Epson C42 (JT036/JT037)	£5 .. £8	
Epson C60/C61 (JT028/JT029)	£9 .. £11	
Epson C62/CX3200 (JT040/JT041)	£9 .. £11	
Epson C70/80 (JT032140/C24/M34/Y44)	£14 .. £7	

Conqueror Colour Plus (Inkjet) A4 A3 A3+

Brilliant White Glossy (127gsm) 50's	£20	£34 ..	£38
Diamond White Matt (110gsm) 50's			£14
Diamond White Matt (110gsm) 100's	£11	£17	
Brilliant White Satin (190gsm) 20's	£11		

Color Copy Paper (Laser) A4 A3 A3+

Ultra Smooth (100gsm) 500's ..	£12	£24 ..	£26
Ultra Smooth (120gsm) 500's ..	£15	£29 ..	£32
Ultra Smooth (160gsm) 250's ..	£19	£22 ..	£24
Ultra Smooth (200gsm) 250's	£24		
Ultra Smooth (200gsm) 200's ..	£18		£24

HP Inkjet Cartridges

	Black	Colour
Deskjet 500 Series (51626A/25A)	£18 ..	£19
Deskjet 600/660/670/690/695(29/49A)	£18 ..	£19
Deskjet 610/612/640 (6614D/49A)	£18 ..	£19
Deskjet 810/PSC500 (6615D/23D)	£18 ..	£21
Deskjet 816/825/840/845 (6615D/25A)	£18 ..	£20
Deskjet 920/940/V40/V45 (15D/6578D)	£18 ..	£22
Deskjet PSC750/PSC950 (15D/6578D)	£18 ..	£22
Deskjet 820/50/70/1100 (45A/41A)	£19 ..	£20
Deskjet 720/815/890/1120 . (45A/23D)	£19 ..	£21
Officejet T45/T65/R45/R65 . (45A/23D)	£19 ..	£21
Deskjet 930/950/970/1220 . (45A/78D)	£19 ..	£22
Deskjet G55/85/95/K60/80 . (45A/78D)	£19 ..	£22
PhotoSmart P1000/P1100 (45A/78D)	£19 ..	£22
Deskjet 2000/2500 (44A/41C/42Y/43M)	£24 ..	£24
Deskjet 2200/2250 (44A/36C/37M/38Y)	£24 ..	£24
Deskjet 3320/3420 (8727A/28A)	£14 ..	£17
Deskjet 5550/PS7000 Series (56A/57A)	£16 ..	£24
Deskjet 5550/PS7000 Photo Cart.(58A)		£19
CP1160/OJ 7110/D-Series (11D/10D)	£17 ..	£20
Designjet 10/20/50PS ... (69ml- No.84)	£32 ..	£32

HP A4 Paper Media

	Pack	Price
Colorfast Photo Paper (7014A)	20 ..	£15
Premium+ Glossy Photo (7040A)	50 ..	£17
Premium+ Photo Glossy (6832A)	20 ..	£11
Premium+ Photo Matte (6951A)	20 ..	£11
Premium+ 10x15cm Glossy (7025A)	60 ..	£15
Premium+ 10x15cm Photo .. (6945A)	20 ..	£6
Professional Brochure & Flyer (6818A)	50 ..	£9
Premium HeavyWeight 2-Sided (1853A)	100 .	£11
Photo Paper 2-Sided (1847A)	20 ..	£6
Photo Quality Paper (6984A)	20 ..	£5
Premium Glossy Paper (3831A)	10 ..	£7
Premium Transparency (3832A)	20 ..	£13
Iron-On T-Shirt Media (6050A)	10 ..	£11

HP A3/A4 Paper Media

	A4	A3
Professional Brochure/Flyer .. (50)(6818/21A)	£9 ..	£16
Premium Inkjet (A4-200/A3-100)(51634/1856A)	£12 ..	£17
Premium Photo .... (A4-15/A3-20)(6040/59A)	£6 ..	£24
Bright White .... (A4-500/A3-200)(1825/1858A)	£7 ..	£15

HP A3+ Proofing Paper Media Pack Price

Proofing Semi Gloss (150gsm) (7884A)	50 ..	£96

Other Inkjet Supplies

Apple/Lexmark/Olivetti/Xerox

	Black	Colour
Apple S/Writer I/II/1200 (8041)	£15	
Apple S/Writer 1500 (8041/4609)	£15 ..	£19
Apple S/Writer 2200 (3308/3309)	£27 ..	£29
Apple S/Writer 2400/2500 (3240/3328)	£28 ..	£32
Apple S/Writer 24/2500Tanks (3330/29)	£5 ..	£12
Lexmark 150/1000/2000 (13400/13619)	£20 ..	£24
Lexmark 32/50/7000/Z11 (A1970/1980)	£20 ..	£24
Lexmark Z42/43/Z51/52(A1970/M0120)	£20 ..	£26
Lexmark Z12/Z22/Z32 ... (17G0050/60)	£21 ..	£21
Lexmark Z13/23/33/25/35(10N0016/26)	£21 ..	£23
Lexmark Z55/Z65/Z65N (18L0032/42)	£22 ..	£26
Olivetti JP150/170/350 Head +4 Refills	£38	
Olivetti JP170/190/360/450 Mono/Col	£20 ..	£30
Xerox C6/C8/4C/6C/450C (7660/766?)	£9 ..	£9
Xerox XJ8C/WC470/480x (7881/7880)	£30 ..	£28

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Apple L/Writer Select 300/310/360 ..	(1960) .	£65
Apple LaserWriter II	(6002) .	£60
Apple Personal L/Writer LS/NT/NTR .	(0089) .	£67
Apple Personal L/W 300/320/4-600 ..	(2045) .	£56
Apple LaserWriter 12/640PS	(4683) .	£85
Apple LaserWriter Pro 16/600/630/800(2473)		£65
Apple LaserWriter Pro 810	(3602)	£259
Apple LaserWriter 8500	(5893)	£165
Apple Colour LaserWriter 12/600PS (3756/?) .		£84 CM £84
Brother HL730/760/FAX-8/9000 .	(TN/DR200) .	£17 .... £89
Brother HL820/1051/1060	(TN/DR300) .	£17 .... £89
Brother HL1240/50/70 Hi-Yield(TN6600/DR6000) .		£49 .... £89
Brother HL2400 Colour Laser	(TN01-BK) .	£94 CM £78
Canon CLBP 360 PS ColourLaser (EPH-BK) .		£69 CM £78
Epson EPL-5500/W	(S050005/51029) .	£45 .... £55
Epson EPL-5700/5800	(S050010/51055) .	£69 .... £55
Epson AcuLaser C1/2000	(50033/34Y/35M/36C) .	£48 CM £89
Epson AcuLaser C4000 ..	(50091/88Y/89M/90C)	£38 CM £109

PHOTOCONDUCTOR / FUSER / TONER / DRUM

HP Laserjet 5L / 6L / 3100 / 3150 ..	(C3906A) .	£39
HP Laserjet 5P / 5MP / 6P / 6MP ..	(C3903A) .	£49
HP Laserjet 1100 / 1100A	(C4092A) .	£39
HP Laserjet 1150	(Q2624A) .	£49
HP Laserjet 1200 / 1220 . High Yield	(C7115X) .	£59
HP Laserjet 1300 . High Yield	(Q2613X) .	£65
HP Laserjet 2100 / 2200	(C4096A) .	£65
HP Laserjet 2300	(Q2610A) .	£85
HP Laserjet 4000 / 4050 .. High Yield	(C4127X) .	£79 . *£179
HP Laserjet 4100 High Yield	(C8061X) .	£79
HP Laserjet 5Si / 5SiMX / 8000	(C3909A)	£109 . *£349
HP Laserjet 4V / 4MV	(C3900A) .	£94
HP Laserjet 5000 / 5000N/5000GN	(C4129X) .	£99
HP Laserjet 8100 / 8150/M320	(C4182X)	£119
HP Color Laserjet 4500 ..	(4191A/92A/93A/) .	£59 CM £79
HP Color Laserjet 4500 Drum Kit ..	(C4195A)	£59
HP Color 4500 Transfer/Fuser Kit	(C96A/98A)	£149 .. £165
HP Color Laserjet 4600 ..	(9720A/21A/ /23A)	£99 CM £139

QMS Toner Kits Toner Kits - All 4 Toners

QMS MagicColor 2	£325
QMS MagicColor 330	£315
QMS MagicColor 22002210	£265
QMS MagicColor 3100	£285
QMS MagicColor 6100/6110	£495

TONERS	BLK ..	CO
QMS MagicColor 2 ..... (04B/03C/02M/) .	£89 CM	£89
QMS MagicColor 330 (01B/02C/04M/) ..	£39 CM	£99
QMS MagicColor 2200 (01B/04C/03M/) .	£42 CM	£75
QMS MagicColor 3100 (01B/02C/03M/) ..	£32 CM	£89
QMS MagicColor 6100 (01B/02C/03M/)	£105 CM	£135
Samsung ML1210/1220/1250 ... (ML1210) .	£39	
Samsung ML1510/1710/1750 ... (ML1710) .	£49	
Samsung ML1650/1651 ..... (ML1650) .	£79	
Samsung ML2150/2151N/2152W(ML2150)	£79	
Samsung ML4500/ML4600 ..... (ML4500) .	£45	
Samsung ML6040/6060 ..... (ML6060) .	£65	
Xerox / Tektronix		

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Epson Inkjet Cartridges

	Black	Colour
Stylus 400/600 (093/089)	£15 ..	£16
Stylus 800/850/1520 (108/089)	£16 ..	£16
Stylus 440/460/640/660/670 (187/191)	£15 ..	£16
Stylus 740/760/860/1160 ... (189/191)	£16 ..	£16
Stylus 480/580/C20/C40 . (T013/T014)	£11 ..	£14
Stylus 680 (T017/T018)	£20 ..	£17
Stylus 880 (T019/T020)	£20 ..	£17
Stylus 900/980 (T003/T005)	£20 ..	£24
Stylus Scan 2000/2500 (189/191)	£16 ..	£16
Stylus Photo 750 (187/193)	£15 ..	£13
Stylus Photo 1200 (187/T001)	£15 ..	£17
Stylus P 790/870/890/915 (T007/T008)	£15 ..	£12
Stylus Photo 1270/1290 . (T007/T009)	£15 ..	£17
Stylus Photo 810/830/925 (T026/T027)	£19 ..	£17
Stylus Photo 950 (T331/2/3/4/5/6)	£10 CM	£10
Stylus Photo 2100 (T341/3/4/5/6/7/8)	£11 CM	£11
Stylus Photo 2000P (T015/T016)	£21 ..	£24
Stylus C42 (T036/T037)	£12 ..	£16
Stylus C60/C61 (T028/T029)	£22 ..	£18
Stylus C62/CX3200 (T040/T041)	£22 ..	£18
Stylus C70/80 (T321/C322/M323/Y324)	£23 CM	£11
Stylus C82 (T321/C422/M423/Y424)	£23 CM	£11
Stylus 3000 (118B/130C/126M/122Y)	£38 CM	£38
Stylus Pro5000 (118B/147C/143M/122Y)	£38 CM	£38
Stylus Pro5500 (T486/487Y/488M/489C)	£49 CM	£49
Stylus Pro7000 (All 6 Cols - Price Each)	£31 CM	£31
Stylus Pro7500 (All 6 Cols - Price Each)	£38 CM	£38
Stylus Pro9000 (All 6 Cols - Price Each)	£47 CM	£47
Stylus Pro9500 (All 6 Cols - Price Each)	£60 CM	£60

Epson Stylus Paper Media Pack Price

Premium Glossy Photo Roll 100mm(41303)	1x8m .	£12
Premium Semi-Gloss Roll 100mm . (41330)	1x8m .	£13
Premium Glossy PhotoRoll 210mm (41377)	1x10m	£30
Premium Semi-Gloss Roll 210mm (41336)	1x10m	£32
Premium Glossy PhotoRoll 329mm (41379)	1x10m	£42
Premium Semi-Gloss Roll 329mm (41338)	1x10m	£44
A4 Colorlife Photo (41560)	20 ..	£15
A4 Premium Glossy (41287)	20 ..	£11
A4 Premium Glossy (41624)	50 ..	£24
A4 Premium Semi-Gloss (41332)	20 ..	£11
A4 Glossy Photo Weight (41349)	20 ..	£10
A4 Glossy Film (41071)	15 ..	£21
A4 Photo Glossy (41126)	20	£8
A4 Photo Glossy (41620)	50 ..	£17
A4 Photo Paper (41140)	20 ..	£10
A4 Photo Paper (41622)	50 ..	£22
A4 Archival Matte Paper (41342)	50 ..	£11
A4 Matte HeavyWeight (41256)	50 ..	£10
A4 720/1440 Dpi Photo Quality . (41061)	100 ..	£10
A4 Transparency (41063)	30 ..	£36
A3 Colorlife Photo (41561)	20 ..	£40
A3 Premium Glossy (41315)	20 ..	£24
A3 Premium Semi-Gloss (41334)	20 ..	£25
A3 Glossy Photo Weight (41350)	20 ..	£23
A3 Glossy Film (41073)	10 ..	£40
A3 Photo Glossy (41125)	20 ..	£18
A3 Photo Paper (41142)	20 ..	£21
A3 Archival Matte Paper (41344)	50 ..	£23
A3 Matte HeavyWeight (41261)	50 ..	£22
A3 720/1440 Dpi Photo Quality . (41068)	100 ..	£24
A3 360 Dpi Inkjet Paper (41065)	100 ..	£19
A3+ Water Colour Radiant White (41352)	20 ..	£20
A3+ Premium Glossy (41316)	20 ..	£31
A3+ Premium Semi-Gloss (41328)	20 ..	£32
A3+ Glossy Photo Weight (41347)	20 ..	£29
A3+ Glossy Film (41074)	10 ..	£48
A3+ Photo Glossy (41133)	20 ..	£20
A3+ Photo Paper (41143)	20 ..	£25
A3+ Archival Matte Paper (41340)	50 ..	£30
A3+ Matte HeavyWeight (41264)	50 ..	£28
A3+ 720/1440Dpi Photo Quality (41069)	100 ..	£30
A3+ 360 Dpi Inkjet Paper (41066)	100 ..	£23
A2 Photo Glossy (41123)	20 ..	£35
A2 720/1440 Dpi Photo Quality . (41079)	30 ..	£24
A2 360 Dpi Inkjet Paper (41078)	30 ..	£19

Niall Magennis
has been dabbling in Midi and digital audio since the days of the Atari ST. He writes on a freelance basis for a number of music magazines and lives in London in a flat overrun with music equipment

Change your tunes

If your old tapes and vinyl are gathering dust, it's worth converting them to CD or MP3

Contrary to what the record companies would have us believe, we didn't all suddenly dump our vinyl and cassette collections in a rush to buy everything again on CD. Many people still have vast libraries of vinyl and tapes containing rare recordings that you can't even buy on CD. But these old analogue formats are no longer as convenient as they were once, so it's natural to want to convert them to something more up to date and immediate like CD or MP3. There's the added advantage of being able to skip quickly between tracks and not having to worry about harming old records that now may be quite rare. But how do you go about getting the audio from tape or vinyl into your computer? Unfortunately, it's not quite as easy as it might seem at first, and vinyl in particular can prove quite troublesome. So let's take a look at how you should approach this format conversion.

Obviously, like any recorded media, tape is prone to degradation over time, especially if cassettes aren't stored in their cases or are left beside magnetic sources such as unshielded speakers. So for reasons of longevity you might want to create digital copies of your cassettes.

Luckily cassettes can be easier to record into your computer, simply because you can usually connect a tape player directly to your PC's sound card. There are two main ways you can do this, but the way you choose will depend on the type of player you have. If your player is a Hifi separate then you should simply be able to buy a lead that will connect to the line out plugs on your tape deck and feed to the 1/8in mini jack line in socket on your sound card.

If, on the other hand, you are using a Walkman or cassette player with no line out connectors, then you'll need to take the audio output from the headphone socket, usually a mini jack, and feed it to the line in mini jack on your sound card. This will mean that you'll have to play about with the volume control to find a suitable level that doesn't overload the sound card's line in socket and cause distortion. It's best to set the level using the loudest part of the recording, as this will save headaches later, where some parts of the tape you are recording sound fine but other parts are distorted because they have overloaded the sound card's inputs.

The Terratec Pre-Amp draws power from your computer's Gameport socket

So getting audio from tapes isn't that complicated, but you may have to pay a visit to your local Hifi shop or Maplin store (www.maplin.co.uk) to find the right lead for the job.

Vinyl conversion

Connecting up a turntable is somewhat more troublesome. A Hifi separate record deck will have phono outputs on the rear, but if you connect these directly to the line in on your sound card you'll get very strange results indeed. For a start the sound will probably be hardly audible, but it will also be severely lacking in bass and loaded with high frequencies.

But why exactly does this happen? The problem lies in the inherent characteristics of vinyl itself. The physical nature of vinyl makes it difficult to accurately reproduce bass frequencies. As you would expect, the grooves in a record are an analogue representation of the frequencies produced by playing a piece of music. The problem, however, is that lower frequencies can literally pop a needle out of the record groove. Because of this the bass frequencies need to be attenuated before the record is pressed. As a result, when the record is played back, these frequencies need to be boosted again to add the low-end ingredients back into the mix. This job is taken care of by a piece of gadgetry called a phono pre-amp. But this device also performs another role.

To help overcome high-frequency noise and hiss, the real high frequencies of the recording are boosted before the record is stamped, so the phono pre-amp is also used to reduce these frequencies during playback. As a result the phono pre-amp is essential for both boosting bass frequencies and reducing the high frequencies pressed onto the vinyl – this is why your records will sound very odd if you try playing them directly into a computer without using a pre-amp.

If you don't want to shell out for a special phono pre-amp for use with your PC, you can instead just feed the headphone output of your stereo amplifier to the input on your sound card. However, this means you'll have to lug either your PC to your amplifier or the amp to the PC, neither of which is much fun. You'll also have to be very careful not to over-cook the signal going into your sound card, otherwise, just like with tape, you'll get distortion on your recordings.

If you're planning on converting lots of vinyl to CD or MP3 then you may find it more convenient to buy a dedicated pre-amp for your computer. These generally take the form of small boxes that attach to either your sound card's gameport or your PC's USB port. They simply provide a pair of phono sockets for

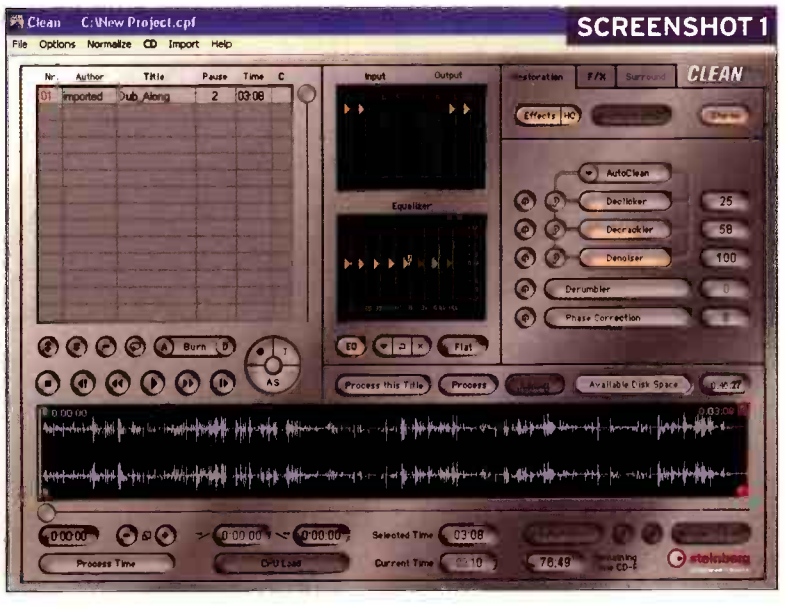
The Clean Plus package comes with a pre-amp that is powered by your computer's USB port

attaching a record deck and a 1/8in mini jack lead that can be plugged into the line in on your sound card. The pre-amp then handles all the jiggery-pokery in between, to put the two back on speaking terms.

Pre-amps

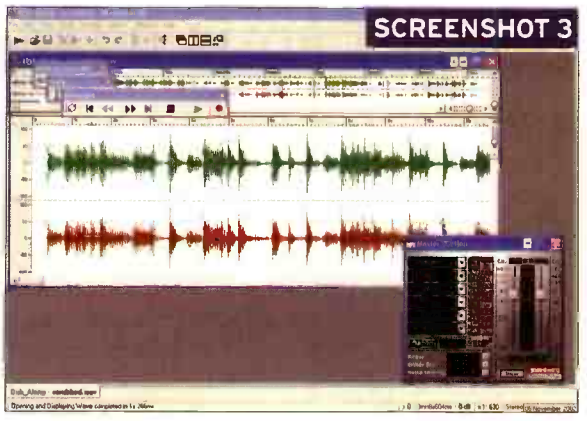
If this kind of setup interests you then you've got two main choices. The first is a phono pre-amp kit from Terratec (**www.terratec.co.uk**) that connects to your computer's gameport. This has three-way switches so you can set it up for the type of record deck you have as well as how high the output level to your sound card should be. The pre-amp comes with a software package called Sound Laundry that can be used to clean up the results of your recordings. This software can't make the recordings from vinyl or cut those recordings into individual songs. It only allows you to load in a wave file of a song ripped from vinyl and then have the software try to clean up crackles and scratches. It's quite limited and is only really included as an added bonus. Terratec now also offers a USB version, which has exactly the same functionality, except it is powered from the USB port rather than the gameport.

The other option is a product called Clean Plus from Steinberg. Clean is a piece of software that is specifically designed for those wanting to rip LPs to CD or MP3. If you've got lots of vinyl to convert then it really is worth investigating because it can automate most of the conversion process (see screenshot 1). You can set up Clean to record an entire LP from vinyl and then search for silences between tracks, which the software uses to automatically split the large recording of the LP into separate tracks. This is a huge time saver, but the software also has some other tricks up its sleeve. It has a number of de-noiser algorithms for removing scratches and hiss, as well as built-in CD burning so you can complete the entire job from within Clean. The software is available in standard and Plus versions, where the standard version is a software-only package and the Plus version includes a hardware pre-amp that connects to your USB port. This pre-amp provides you with phono connectors for your record deck and a mini jack for connecting to your sound card's line in socket. There are simple low-, mid- and high-selector switches for both the incoming and outgoing signals and that's about it, but you don't really need much more. The standard software-only package costs £24.99 inc VAT and the Plus package, which includes the pre-amp, is priced at £59.99 inc VAT (see screenshot 2).



Above: Clean allows you to add effects to further polish the tracks you recorded

Clean has heaps of built-in features for tarting up poor quality vinyl recordings



You'll need an audio editor such as Wavelab Lite if you want to get into the nitty gritty of editing your sound files

If you're serious about converting lots of vinyl then the Plus package is worth investing in. It will take care of all your needs and save you a great deal of time because you won't have to manually split your recording into individual tracks and use the noise removal tools on a track by track basis. If you want to get further into the nitty gritty of editing the LP recordings, Clean allows you to do this too, because it comes with the excellent Wavelab Lite wave editing software (see screenshot 3).

You can, of course, save money by using your stereo's amp instead of a dedicated pre-amp, and by opting for cheaper or even free software you can download from the Internet but none of these packages comes anywhere close to the professionalism that is offered by Clean.

Nevertheless, if you want to go down this route then a decent place to start is with a program called Rip Edit and Burn. This is a commercial program costing $39.95, but for a 30-day free trial version that you can use to try before you buy, visit **www.ripeditburn.com**.

A good search of the net using Google will throw up lots of other programs that can be used, at least partly, to automate the ripping process. Look for software such as Audiotools, LP Ripper/LP Recorder, Musicmatch and Groove Mechanic. There are also some other more commercial products such as Cakewalk's Pyro, Roxio's Easy CD Creator Pro and Diamond Cut. Whichever method you choose, the important thing is to enjoy your old tunes again in all their former glory.

CONTACTS

Niall Magennis welcomes your comments on the Sound column. Email him at: sound@pcw.co.uk. Please do not send unsolicited file attachments.

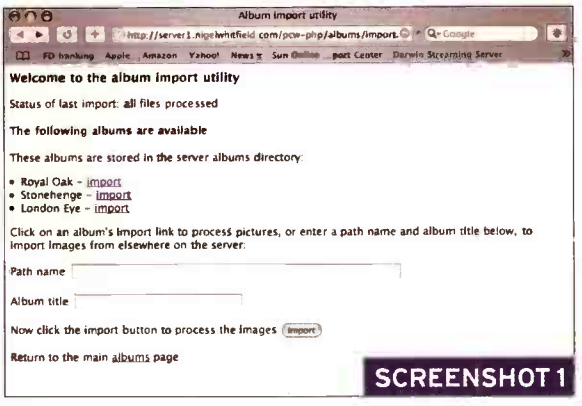
Nigel Whitfield
edited computer magazines before going freelance in 1995. A specialist in Internet and consumer issues, he has a degree in Computing Science from Imperial College

Upload your images

Adding picture galleries to your website is easy, with a bit of planning and a little logic

It's a year now since we started looking at PHP in this column, and I hope that over the last 12 issues, you've picked up enough hints and tips to be reasonably confident about building your own sites using the language. Over the next few months, we'll be presenting a series of more or less complete projects – things that you can use on your own website to help keep it looking up to date without having to spend hours creating new pages from scratch.

In last month's issue, we looked at some of the basic functions and tools we're going to use this month – file uploads and image scaling. We're going to link those with a database to create a system that allows you to easily add new picture galleries to your site, with little more effort than simply uploading all the pictures. And because you may already have plenty of pictures stored on your site, we'll include a way to 'import' those into the database.



The import page lets you choose from album directories or import pictures stored elsewhere on the server

Planning

The first stage of creating any project like this is planning. We're going to start by deciding on a few rules to help make things simpler. The photo album system will live in a directory of its own on the server, called albums. The index.php file in that folder will have to show a list of the albums available. We'll also need an import script, to create the database of pictures, and a view script, to display an album.

We'll group all the pictures for each album in a folder of their own, with a name starting AL_. By doing that we can have other subfolders for different purposes, if we need to later. What about pictures we've already added to the site, stored on different servers? We'll add options to the import script to cope with them later. But the structure we've outlined means that to add a new album, you just need to upload all the images to a folder with a name beginning AL_, and then run the import script. That will create a database, storing information about images.

We also need to decide what information needs to be stored, and create an appropriate table in the MySQL database. We're going to store the name of the image file, the album it belongs to, a title for the picture, the name of the photographer, the date the shot was taken and the width and height of the image, which will be useful when creating tables to display the albums.

Additionally, we'll store a caption, and details, which could be used to add extra information, like the names of all the people in the shot. The final thing we'll add is a path field, which won't be needed for files stored in appropriately named album directories, but will come in useful later when we want to refer to pictures that were uploaded elsewhere on the server.

If you have a lot of pictures, you might also want to create an index, perhaps using the album and image columns:

```
CREATE INDEX picture ON ↙
albums ( album, image ) ;
```

(Key: ↙ code string continues)

Logic

Now, we need to think about the logic of how our scripts will work. The index.php will need to produce a list of albums for visitors to click on. That's easily accomplished, with a quick query to the database, along these lines:

```
SELECT album FROM albums ↙
GROUP BY album ;
```

Using the GROUP BY ensures that each album appears only once. If you also want to display an image from each album, you could instead say

```
SELECT album, image FROM ↙
albums GROUP BY album ;
```

And if you want to include albums that aren't in subdirectories, then include the path field too; when that field is null, we'll assume the album is in one of the AL folders, and if it's not null, it will point to a different folder on the web server.

How about this importing business? That's going to be pretty straightforward too. The script will list all the folders available, and clicking on one will open that directory, reading all the entries, as we've seen how to do before. If there's no entry in the database that matches the album and image name – now you see how indexing those columns might help – then we'll display a form on which all the information can be filled in. Submitting the form will make an entry in the database and then run the script again, until there are no images in the folder without database entries.

There are a couple of things we'll also need to consider. First, we'll need a way to tell the import script to look elsewhere on the server, and second it should have some sort of protection, so casual visitors to the site can't run it.

The import script

Our import.php script is pretty simple; we're creating a list of files and calling a new script, called db_populate.php with a parameter called directory, if it's one of the AL_ directories that we find when we look at the folder.

Directories with that sort of name are going to use the name as the album name too, with the _ characters turned into spaces, so AL_Royal_Oak will contain all the pictures for an album called 'Royal Oak'.

If someone wants to specify other locations on the server, they'll have to type in the details in a form at the bottom of the page, as you can see in screenshot 1.

There are plenty of issues surrounding this, of course, so don't allow just anyone to type in a path. Rather than spend ages cleaning up the input, the sample code at **www.nigelwhitfield.com** doesn't do any checking, so you can happily enter a relative path, like ../code/uploads.

If you want to do checking, remember that when the directory name is used in a script, it refers to paths on the server; when it's used in a web page, like the results of a script, it refers to the URL paths. The two could be very different – /home/sites/home/web/pictures could be the server path to

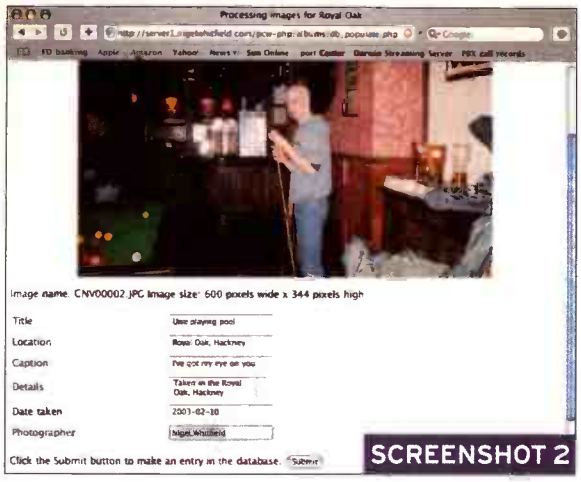
FIG 1

The db_populate script

We've omitted the connection to the database, and the HTML for the image display and form, which follows the comment 'now create the page'

```
if ($_SERVER['REQUEST_METHOD']=='POST' ) {
        // we've got photo details to save
        $album = $_POST['album'] ;
        $directory = $_POST['directory'] ;
        $path = $directory ;

        // get all the variables that were submitted ...
        $image = $_POST['image'];


        // insert code here to update the database


} else {
        // we're just starting out
        // if directory is set, but not album we're in the
albums directory
        if ( $_GET['album'] == "" ) {
                $album = ✔
preg_replace('/^AL_/','',$directory) ;
                $album = preg_replace('/_/',' ', $album) ;
        } else {
                $album = $_GET['album'] ;
        }
        // if path and album, but not directory, then it was ✔
a form submission
        if ( $_GET['directory'] == "" ) {
                if ( ! is_dir($_GET['path'] )) {
                        // doh! this isn't a folder
                        // redirect to the import script
                        header("Location: ✔
import.php?msg=bad+directory+path") ;
                }
                $directory = $_GET['path'] ;
                $path = $directory ;
        }

}

// now we know where we are, we can start working

chdir($directory) ;

$imagedir = opendir( '.' ) ;

while ($dirent = readdir($imagedir) ) {
        if (is_file($dirent) && ✔
preg_match('/\.jpg|\.gif|\.png/i', basename($dirent))) {
                // let's check to see if this image is in the
database
                $qr = mysql_query("SELECT * FROM albums ✔
WHERE album='$album' AND image='$dirent'") ;
                if ( mysql_num_rows($qr) == 0) {
                        // there's no entry for this image
                        $imagedata = getimagesize($dirent) ;
                        $width = $imagedata[0] ;
                        $height = $imagedata[1] ;
                        // now create the page with the form
//  ...then stop here
                        exit ;
                }
        }
}
// if we get here, we've seen all the image files
header("Location: import.php?msg=all+files+processed") ;
?>
```

(Key: ✔ code string continues)



SCREENSHOT 2

This form shows you a picture and allows you to enter the details, which will be recorded in the database before either the next image is shown, or you're returned to the main import page

http://mysite.com/pictures, for instance. You need to consider how to process paths if you're going to allow people to enter them.

There are two other things to consider with the import.php page. First, you'll notice a status message at the top. You won't always see that – it's produced by code like this:

```
<?php
if ( $_GET['msg']!= "" ) {
        print "<p>Status ✔
of last import: " . ✔
$_GET['msg'] . "</p>" ;
}
?>
```

That means in other scripts, when we want to return people to this page, after an error or the end of processing files, we can say

```
header("Location: ✔
import.php?msg=all+✔
files+processed")
```

The plus symbols are turned back into spaces automatically. The other point to note on the import.php script is that we're using the GET method to call the db_populate.php script from the form at the bottom.

Normally, we'd advise against using GET, because it can limit the amount of data transferred. However, the db_populate.php script will be calling itself using POST when users enter information about a picture, and as there's not much data on the import page, we'll use the GET method.

By ensuring that it's always called from import.php via GET, whether with information entered onto the form or by clicking a link, we can carry on checking the REQUEST_METHOD to see if we should be making an entry in the database or not.

Populating the database

Figure 1 shows the guts of the db_populate script. Space constraints mean we can't include the whole thing here. What's missing is largely the form at the bottom of the page, which you can see in screenshot 2.

In next month's column, we'll complete the system with a script that allows you to display the albums you've created, with options to choose which of the information is displayed with each one. It's fairly straightforward, but you should brush up on the techniques for using objects that we've covered in the last few months.

CONTACTS

Nigel Whitfield welcomes your comments on the Web development & ecommerce column. Email him at: webdev@pcw.co.uk. Please do not send unsolicited file attachments.

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Alan Stevens
has been implementing and supporting networks for over 25 years, working for IT vendors, systems integrators and customers. He now mostly researches and writes about networking matters

Access all areas

Here's how to enable client TCP/IP access to your Windows network server resources

Having covered the basics of setting up a Windows server for file and print sharing in the past few issues, I now want to look at what's required to enable client PCs to access those resources. Fortunately no extra software is required, with everything needed at the client end included as part of the Windows operating system. However, you do have to make sure it's correctly installed and configured which, for the most part, means getting TCP/IP set up right.

These days TCP/IP is usually loaded by default when the operating system is installed, or when a new network card is added. As such, you have only to worry about making sure the correct IP address is configured, to uniquely identify the PC on the Lan.

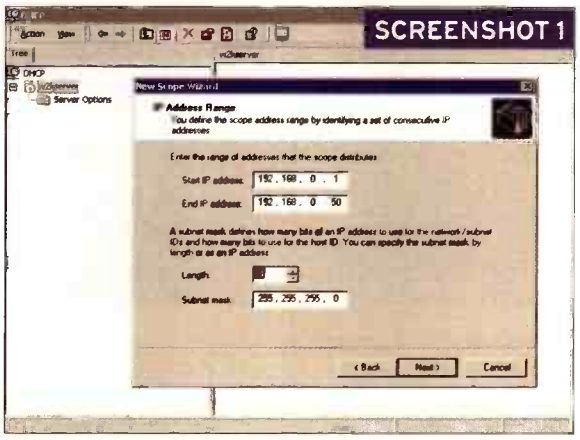
There are two ways of assigning IP addresses, one of which is to manually configure each client individually. On the plus side there's not a lot to it, but even if you have only a handful of PCs the procedure can be time consuming and give rise to problems if you assign the same address to more than one system. A better approach is to assign addresses dynamically using DHCP, the Dynamic Host Configuration Protocol, where a special server listens out for PCs requesting an address (usually on startup) and assigns them from a predefined list, or scope.

If you've already connected your Lan to the Internet using an ISDN or broadband router like those I discussed in the April issue (Internet routers needn't be scary – *PCW*, April 2003) then you'll probably have a DHCP server already.

However, if you don't have such a device, or if you want more control over IP address assignment, it's worth knowing that the Windows 2000 Server comes with its own DHCP server, and the Windows software is very easy and quick to deploy.

Windows DHCP server

The Windows 2000 DHCP server isn't normally loaded by default. Instead, you have to install it yourself using the Add/Remove Programs applet in the Windows Control Panel. To do this, click on Add/Remove Windows Components and look for an entry for DHCP listed under Networking Services. It only takes a couple of minutes to load and you won't need the original CD-Rom to complete the installation. However, as with other server changes, it is worth applying service packs again once finished, to ensure everything is up to date.



The DHCP server included with Windows 2000 Server provides comprehensive facilities to assign and manage client IP addresses automatically

You can then start using the DHCP server straight away without having to reboot, but if you've already got a DHCP server on the Lan, disable it before configuring the Windows 2000 implementation as they could clash. You then start the necessary MMC (Microsoft Management Console) snap-in by selecting DHCP from the Start/Administrative Tools menu.

An entry should already exist for the host server involved, so all you have to do is select it with the mouse, then right-click and select New Scope from the pop-up menu. A wizard will take you through the following menus asking for various parameters including a name for the scope and the range of addresses to be assigned, plus any you want to specifically exclude – usually fixed IP addresses that you don't want to duplicate.

If you're new to networking the terminology involved may seem a bit daunting, but it's not that difficult. To begin with it's pretty unlikely that you'll have been assigned a public address range, since most small businesses rely on Network Address Translation (Nat) in their Internet router to convert local addresses to the one public address assigned by the ISP. That means you can use any addresses you like on the Lan, but it's worth following convention and using one of the ranges specifically reserved for such use.

A good choice would be 192.168.0.1 – 254 which allows up to 254 devices to be configured starting with 192.168.0.1, then 192.168.0.2 and so on. However, if you've fewer than 254 PCs, it's a good idea to limit the DHCP scope to just the number of addresses required, plus a margin for future expansion. For example, I usually configure PCs in the range 192.168.0.1 – 50, assigning addresses outside this scope to devices such as servers and gateways that need fixed addresses (see screenshot 1). That's because with dynamically assigned addresses there's the possibility of addresses changing, which is fine for a client PC but can cause problems on devices such as servers and routers.

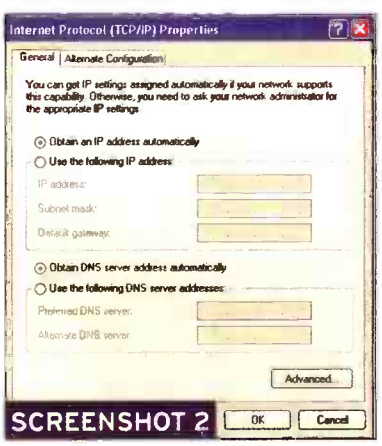
You'll also be asked for something called a sub-net mask, the ins and outs of which need only concern you on large networks. On a small Lan the Windows DHCP server will suggest you use 255.255.255.0 for the addressing scheme I've just suggested and that will be fine.

Lastly you should also use the DHCP server to configure clients with the address of the Internet router and any preferred DNS servers. You'll find those settings, along with many others, under Server Options in the DHCP management snap-in.

What the client sees

Configuring a client PC to use DHCP couldn't be easier. Most Windows PCs will already be set up to get their IP addresses this way, and it's just a tick-box option on those that aren't.

On a Windows XP system, for example, you open the Control Panel then Network Connections to select the connection involved, the default here usually being called 'Local Area Connection'. Having opened the right connection, click the Properties button in the window displayed then select



Make sure you configure each client PC to obtain its IP and default gateway addresses automatically from the DHCP server, with DNS server addresses too, if possible

```
C:\WINDOWS>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : 192.168.0.5
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . . . . : 192.168.0.222

C:\WINDOWS>
```

SCREENSHOT 3

Left: To check that the DHCP server has assigned suitable IP addresses to a client PC, open up a command window and run the ipconfig tool

the Internet Protocol (TCPIP) entry and, again, click Properties to control exactly how the IP address is assigned.

If it's not already selected highlight the entry marked 'Obtain an IP address automatically'. The default gateway address will also be obtained automatically (if you've configured the DHCP server to provide this information) and it's worth getting DNS server addresses this way too (see screenshot 2).

On older Windows 95/98 PCs the procedure is similar to that for XP, although you may need to provide the initial installation CD-Rom in order to complete the process. You may also need to reboot. However, on Windows 2000 and XP systems neither of these actions is required.

Did it work?

Having made the necessary changes you can quickly check that an address has been obtained by opening a command window and typing the command ipconfig, as shown in screenshot 3. This will display the addresses assigned to every network interface in the client PC, although on some Windows 95/98 systems the command-line utility may be replaced by a graphical tool called winipcfg.exe, which provides the same information in a more user-friendly fashion.

You can also check that the client can communicate with other devices on the network using the TCP/IP ping tool. Again, you'll need to open a command window to use this tool, then type ping, then a space, then the address of the device you want to communicate with (a server or router with a known fixed address is a good choice), as shown in screenshot 4.

```
C:\WINDOWS>ping 192.168.0.222

Pinging 192.168.0.222 with 32 bytes of data:

Reply from 192.168.0.222: bytes=32 time=3ms TTL=255
Reply from 192.168.0.222: bytes=32 time=1ms TTL=255
Reply from 192.168.0.222: bytes=32 time=1ms TTL=255
Reply from 192.168.0.222: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.0.222:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\WINDOWS>
```

SCREENSHOT 4

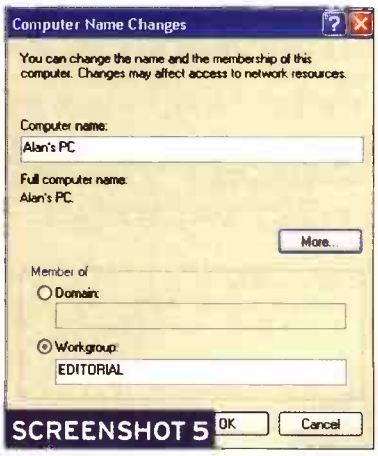
If you can ping other devices on the Lan, such as a network server or router, then the TCP/IP protocol is correctly configured on the client PC

If the device you've pinged replies then all is well. If it doesn't, or ping says the network is unreachable, you'll need to check all your network settings (and physical connections) to find where you've gone wrong.

The right workgroup

Assuming you can ping other network devices, next you need to make sure that the client PC is in the right Windows workgroup or the domain where Active Directory is deployed. Again, this is very simple, but it varies depending on the version of Windows involved. On Windows 2000 and XP, for example, you need to open the Control Panel and run the System applet to change the workgroup identity. On older versions of Windows, right-click on Network Neighborhood and select Properties (see screenshot 5).

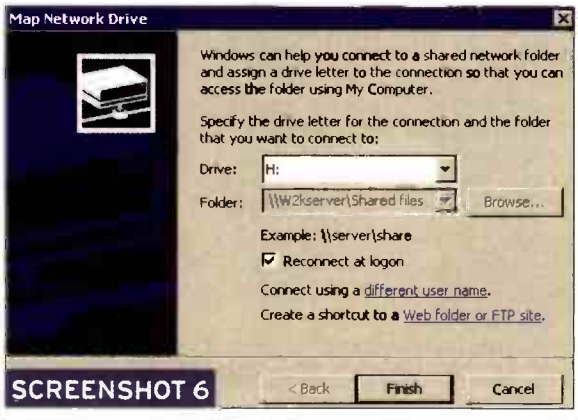
The default workgroup is called 'Workgroup', but you can change the setting to anything you like. Just make sure every PC and server that you want to share information with is in the same workgroup or domain, otherwise users will have trouble finding the resources they want.



SCREENSHOT 5

Make sure every PC is in the same workgroup or domain, otherwise users will have trouble finding shared files and printers on the network

It's a good idea to map network drives to shared files on the server, as this makes it easier for users to find and use them



SCREENSHOT 6

Map that drive

Finally you should be in a position to access shared files and printers on the network server from the client PC. One way to do this is to browse to the server at the client desktop, starting from the Network Neighborhood on older Windows PCs, My Network Places on Windows 2000 and XP or Windows Explorer on any of these. But for real convenience you should consider mapping a network drive to the most commonly used shares.

With drive mapping there's no need to remember long, complicated share names. Instead a single drive letter with a colon is used, in the same way that A: is used to access floppy disks, C: to access the local hard drive and D: the local CD-Rom.

Any letter not used for a local device can be mapped to a network drive, although it's a good idea to start with G: or above to allow for more than one local hard disk and CD-Rom to be installed. You should also use the same letter for everyone given access to a share, to make life easier. For example, when I set up a small network I normally use G: for the main public share that anyone can use and H: for each user's private folder on the server. On other networks X:, Y: and Z: might be used – it's really up to you (see screenshot 6).

To map a server file share, first browse to it, then right-click and you should see a menu entry marked Map Network Drive. The dialogue displayed is self-explanatory, but make sure you select the button marked Reconnect at logon, as this causes the drive to be remapped automatically every time the user logs onto the network.

And that's about all there is to it. I covered shared printers last month and if you've been following this short series on setting up a small Windows network you should now have a good grasp of what's involved. Of course problems can still arise, so in next month's issue I'll be discussing some alternatives to a Windows server, in the form of server appliances, which are even easier to set up and manage. And I'll also take a look at Linux-based servers, which do everything a Windows server can, at a fraction of the cost.

CONTACTS

Alan Stevens welcomes your comments on the Networks column. Email him at: networks@pcw.co.uk. Please do not send unsolicited file attachments.

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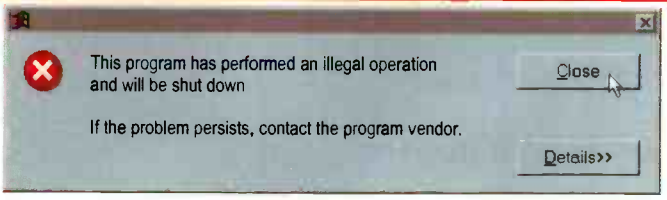

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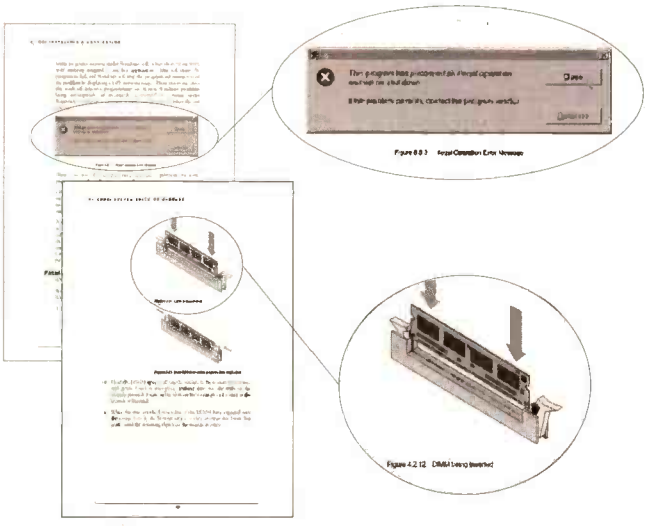

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Mark Whitehorn
is one of those lost souls who actually likes databases. He splits his time between consultancy, writing, working for two universities and tinkering with old cars

Optimal performance

A smarter and faster optimiser could be the answer to your queries

In the June issue I provided a solution to a problem of matching dates. Reader Robert Wills wanted to match a date in one table with the exactly equivalent date in another table (and then to use that match to locate a value called Percentage). What made this question interesting was the requirement that, if no exact match could be found, then the nearest, earlier date should be matched.

So, given:

Table1

Date	Percentage
2/01/03	2
3/01/03	0.7
17/01/03	5
19/01/03	12

Table2

Date
2/01/03
4/01/03
14/01/03
21/01/03

The desired answer is:

Date	Percentage
2/01/03	2
4/01/03	0.7
14/01/03	0.7
21/01/03	12

This problem is difficult in SQL because, no matter how you structure the query, at some point you need to match every record in Table 2 with every record in Table 1, in order to find the exact or closest match. Given five records in each, this is trivial; given 10,000 in one and 1,000 in the other, the database engine will have to make 10,000,000 comparisons. In other words, SQL-based solutions are liable to scale poorly. I provided a solution (based on four queries) and said that if anyone found a solution that scaled better we would publish it.

The responses, and the subsequent testing, were enlightening because they illustrated several points about how database engines use the information we give them in order to solve problems. Understanding these processes is worthwhile because that knowledge can be used to speed up queries. In case this sounds too academic, we are talking about really significant gains. Some of the suggested solutions took 44 minutes to run; with a little understanding that can be reduced to 39 seconds, and a shade more gets us to 33 and then 24 seconds. A more significant change (which involves some effort) reduces it to around one second.

Number of queries

My solution consisted of four queries, but I received several answers that compressed the solution into one SQL statement. A good example is:

```
SELECT table2.date, ↙
table1.percentage
FROM table1, table2
WHERE table1.date =
   (SELECT ↙
MAX(table3.date)
    FROM table1 AS table3
    WHERE table3.date <= ↙
table2.date);
```

(Key: ↙ code string continues)

This makes use of a device in SQL called a sub-query, which is essentially one SELECT statement embedded inside another.

So, is one query better than multiple queries? Well, let's split up the question a little.

Single-query solution

In this case, running on Access, the answer is no. I did some tests using 10,000 records in Table 1 and 1,000 in Table 2. This single-query solution took 44 minutes to run, while the four-query solution took 39 seconds. That's more than 60 times faster.

But what about readability? This is a non-trivial point because we have to try and write solutions that are understandable and therefore easy to maintain. I believe that a four-query solution is easier to explain on paper, because it splits the problem into easily digestible chunks. However, to a database developer, who is familiar with the data, this single-query solution is, I believe, more instantly understandable. So, in this respect, in a development environment, the single-query solution is better.

Does this mean we can have speed or maintainability, but not both? Before answering that, let's dig a little deeper. For a start, why are these two solutions so different in speed? What is the database engine doing with these SQL statements?

Query optimisers

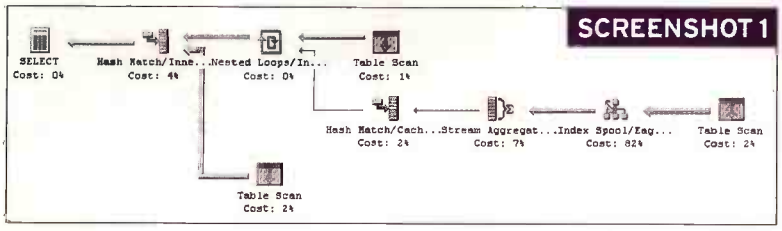
The answer is that every database engine has, at its heart, a query optimiser. When you send the database any SQL statement, that optimiser breaks down the query into a set of primitive operations which it then runs against the tables. In certain database engines, you can ask to see the primitive operations that it has selected. Screenshot 1 shows how the query optimiser in SQL Server handles the single-query solution.

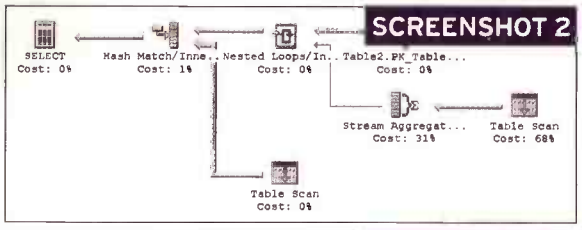
Developing a good, smart query optimiser is one of the most complex areas of database engine design. In many ways, the query optimiser is like a chess-playing program. The SQL statement that you send to the database engine simply outlines what data you want extracted from the database and how you want it sorted. It doesn't say much about how you want the optimiser to find the data. And the optimiser is faced with an almost infinite number of ways in which it could locate that data. From all of those, it has to find the fastest. And, to make matters worse, it has to make its choice quickly.

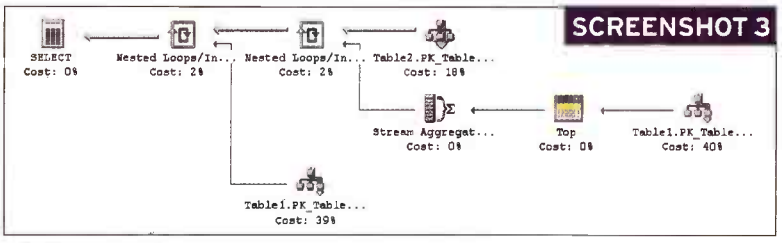
Why? Well, suppose there are 100,000 possible solutions to a given problem, the slowest of which takes two minutes and the fastest two seconds. Clearly, the optimiser should find the fastest solution, but if it takes four minutes to locate it, then a better choice would have been to use the first solution it came across. It probably wouldn't have been the fastest, but it would have been faster than four minutes two seconds.

However, bear in mind that a query optimiser can only optimise one query at a time. So, if you split a solution into four queries it will optimise each one as a separate entity. This means that if you send a solution to the optimiser that is made up of four distinct queries, you are essentially forcing it to adopt one particular logical solution to the problem as a whole. If you send it a solution based on one SQL statement, you are leaving it free to optimise the problem as a whole.

This has fairly profound implications. Imagine your database engine has a very smart, quick query optimiser. In that case it would be better, in general terms, to give it one SQL statement and leave it to find the best solution it can. True, this means swallowing your pride and accepting that it can do a better job than you, but in my experience a really good optimiser is smarter and faster than I am in most cases.







Above: SQL Server's query analyser shows us how the optimiser is solving this problem; it reads from right to left

On the other hand, if your database engine has a mediocre query optimiser, then you may well be able to direct it towards using a more optimal solution by splitting up the query into smaller jobs, which forces it to answer the question using the logic you have outlined.

I think that's what is happening in this case. The query optimiser in Access (more specifically the optimiser in the Jet database engine that underlies Access) is not handling this single SQL statement in an optimal way, hence the 44-minute query time.

So, am I really smug about my solution because it is 60 times faster than the single-query solution? No. In the database world it is always very dangerous to get smug. My solution was faster because I was directing the optimiser moderately intelligently, but that doesn't mean I found the optimal optimisation. A two-query solution came from Ken Sheridan, a seasoned contributor to the column:

QryNearestDate

```
SELECT Table2.Date,
MAX(Table1.Date) AS
NearestDate
FROM Table2
INNER JOIN Table1
ON Table2.Date>=
Table1.Date
GROUP BY Table2.Date;
```

QryNearestDate2

```
SELECT
qryNearestDates.Date AS
Date2, qryNearestDates.
NearestDate AS Date1,
Table1.Percentage
FROM qryNearestDates
INNER JOIN Table1
ON qryNearest
Dates.Nearest
Date = Table1.Date;
```

That shaves off more than 10 per cent and gets the task done in 33 seconds. However, the best solution running under Access was a single-query solution from Raymond Obin:

```
SELECT A.Date,
B.Percentage
FROM Table1 AS B INNER
JOIN (
  SELECT AA.Date,
Max(BB.Date) as KeyDate
  FROM Table1 AS BB,
Table2 AS AA
  WHERE BB.Date<=AA.Date
  GROUP BY AA.Date) AS A
ON B.Date = A.KeyDate;
```

Which ran in 24 seconds. But we can do even better.

Engines and optimisers

If these differences are really due to the optimiser, then swapping to a better optimiser should make a difference. So I transferred the data and the queries to SQL Server and ran them again. The result is that, with the same volumes of data, the answer for several of these solutions came back in the time it took Windows to redraw the interface – in other words, around a second. The four-query solution was reduced to 20 seconds – better than in Access, but wiped out by the single-query solutions. The sample file, dbcaug03.mdb is available from **www.penguinsoft.co.uk**.

Take home messages

Complex queries run against large sets of data can be slow, so you may need to think about optimising them.

If the optimiser is fast and smart, you can often trust it to do most of the work for you. If it isn't, then you may get massive performance gains by some judicial tweaking.

You can influence the way in which the optimiser solves a particular problem by splitting the query into components.

How do you know if the optimiser is smart? Well, you can try varying the query to see if you can influence the speed. However, in general, the well-known database engines (SQL Server, DB2 and Oracle) have in the past five years or so acquired very effective optimisers; you can still beat them under certain circumstances, but it's getting to be more of a challenge. Access, on the other hand, doesn't have the best optimiser. On occasions, just like this one, it is well worth trying to help it along.

Top right: The same query, but with Table1.MyDate as a primary key

Bottom: Adding a further index (Table2.MyDate) once again alters the optimiser's strategy

Finally, if you are experiencing significant query performance issues with Access, consider swapping the database engine that it employs. Access, by default, uses the Jet database engine. However, it will also happily use the MSDE (Microsoft Database Engine) which is simply a cut-down version of the engine that sits underneath SQL Server and, significantly, uses the same optimiser. In fact, if you elect to create a project rather than a new database in Access, then Access will try to connect you to either SQL Server or MSDE. This means you have to have either one or the other installed somewhere; see the manuals for details. The MSDE is on the Access CD-Rom so you should be able to install it easily.

Solving a query?

How do you know your optimiser is solving a particular query? With a product like Access you can only infer what the optimiser is doing by experimentation. However, the more complex database engines (such as SQL Server) will show you. In screenshot 1, I asked the query analyser in SQL Server to show me how it will execute the single-query solution. In this case, neither table has any indices.

Screenshot 2 shows the same query running, but now I have made Table1.MyDate a primary key. This means that the field becomes indexed and is therefore much faster to search. The optimiser spots the change and alters its strategy as a result.

In screenshot 3 I have also made Table2.MyDate a primary key so, once again, the optimiser selects a different strategy.

CONTACTS

Mark Whitehorn welcomes your comments on the Databases column. Email him at: database@pcw.co.uk. Please do not send unsolicited file attachments.

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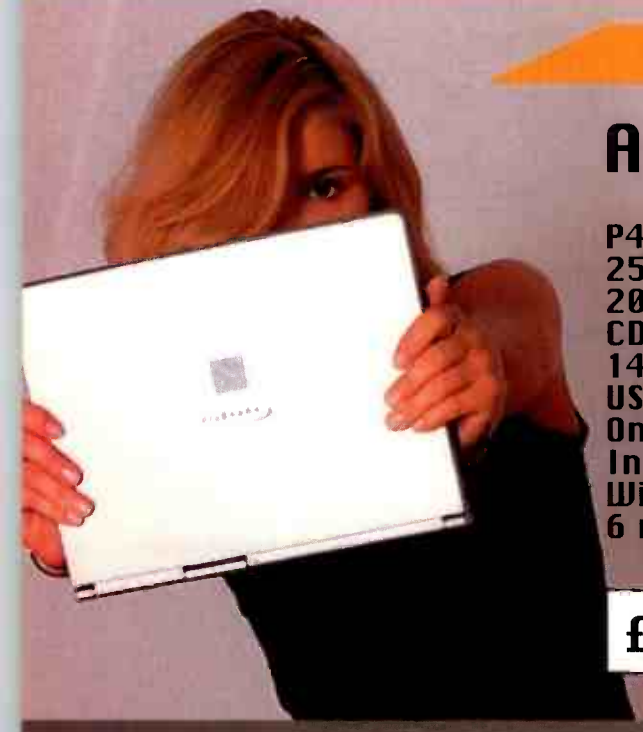

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Tim Anderson
is both an IT journalist and software developer, and began writing for *PCW* in 1993. Since his first Commodore Pet, he has acquired expertise in Rad programming, Windows and the Internet

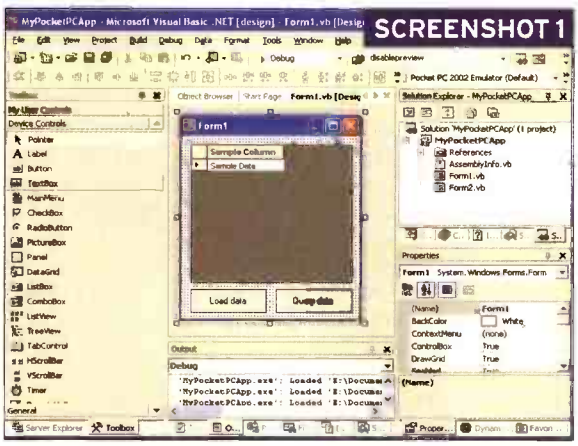
Visual Studio on the move

A tour round the new Visual Studio, complete with .Net for mobile devices

April 2003 saw the final release of Visual Studio .Net 2003 and Windows Server 2003. The products were brought out together, since Windows Server 2003 has the .Net Framework fully integrated for the first time. The Framework itself has been upgraded to version 1.1, introducing some minor changes, numerous bug fixes and improved performance. VS .Net 2003 is not dramatically different from its predecessor, and is priced more as a maintenance release than a full upgrade. It still has some important new features, though, including Compact Framework, a reworking of .Net for PDAs and other mobile devices. This is the easiest way yet to write custom mobile applications.

One of the .Net puzzles is that Microsoft has failed to win over many programmers working in VB 6 or earlier versions. Although .Net has plenty of advantages, it introduces its own problems. Many VB users want a quick and easy way to create custom applications, and aren't impressed by features like multithreading, deep object-orientation or XML web services. VB .Net is more powerful than VB 6, but in some respects it is more difficult. Further, VS .Net is spoilt by one or two strange features. For example, if you create a deployment project, you can build a Windows installer setup for your .Net project, but it can't install the .Net runtime. If you want to create a seamless setup for users who might not have .Net already installed, you have to use a C++ Bootstrapper executable, or turn to a third-party installer. That's a minor niggle though, compared to memory management.

That may seem odd, given that built-in memory management is billed as one of .Net's greatest features. So it is, up to a point. One problem area is around what Microsoft calls 'unmanaged resources'. The other is that writing applications where memory is managed by garbage collection isn't always as easy as it should be. In fact, serious .Net programmers should regard a memory profiler as an essential tool. As an example of what can go wrong, there are the notorious Menuitem bugs. Take your new VS .Net 2003, and create an MDI application, where document forms are enclosed by a main parent



Designing a Compact Framework Windows application is very similar to working on any .Net Windows Forms project

form. Add a menu to the main form and another to the document form. On the main form's menu, include a Window menu and set its MdiList property to True. This is a standard MDI feature, and means that when more than one document is open, users can navigate between them using items automatically added to the MdiList menu. Unfortunately, your application now leaks memory. Every time you use the Window menu to switch between documents, a new set of Menuitem objects is created, while others that should be removed remain in memory. Everything seems to work fine, but as users work away the application uses increasingly more memory. If you are lucky, the app might get closed before it crashes.

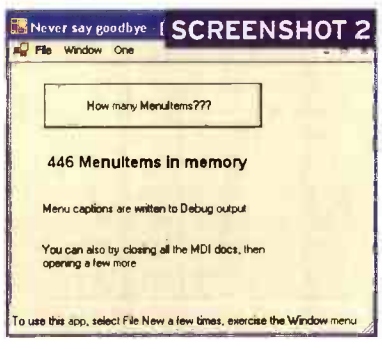
.Net niggles

The reason for this is a bug in System.Windows.Forms, the set of GUI classes used by .Net. The Menuitem class keeps a static collection of Menuitem objects in a Hashtable. Since it's a static collection, it belongs to the class rather than to any instance of Menuitem. If a particular Menuitem is referenced in this collection, the .Net garbage collector cannot touch it. Somehow, Menuitems get added to this Hashtable but not removed, causing the leak. To make matters worse, it's possible that the misbehaving Menuitems may hold references to other objects. The effect is that one errant object can keep hundreds of others in memory. One possibility is that when users close a document, the entire form, with all its data, stays in memory, increasing the memory leak. You can track memory usage with calls to GC.GetTotalMemory(), for memory consumed by managed objects, and Process.GetCurrentProcess.WorkingSet(), for total physical memory. The former is more significant, since if managed objects aren't released, the physical memory usage can't go down either (see screenshot 2).

To be fair, you can get the same sort of problem in VB 6. A rule of Com is that objects remain alive until there are no more references to them. What the bug demonstrates is that even with garbage collection you still have to worry about memory issues. It's unfortunate when bugs reside not in your own code, but in the Framework. Fortunately, there's a relatively easy workaround, which is not to use the MdiList property, but to create your own Window menu. However, you wouldn't know that unless you used a memory profiler. It's a bit unfair on VB coders who expect applications to 'just work'. Problems like this put developers off .Net, which is a shame because the technology is excellent.

Another related issue is the use of Dispose. In .Net, classes can have destructors, but they run at an indeterminate time. That's no use if you want to clean up resources such as database connections, or native graphics objects like brushes and pens. Classes that manage these kinds of resources implement an interface called IDisposable. The Dispose method releases the native resources, and you are meant to call it in your clean-up code. Many VB .Net tutorials make little mention of IDisposable. Experience suggests that if a class implements IDisposable, you should always call the Dispose method, or risk a memory leak. For example, the Form class implements IDisposable. Here's the correct way to show a dialogue:

```
Public Sub ShowADialog()
Dim dlg As New Form2()
 Try
 If dlg.ShowDialog() = ✔
```



The notorious Menuitem bug. This is what you get after opening a few documents and switching between them a number of times with the Window menu. The fix is not to use MdiList

FIG 1

Compact Framework database application

A common use for Pocket PC applications is to take your data with you while on the road. Here's a quick demonstration of how to create, append and display database records using VB.Net.

1. Create a new Windows application and add a reference to System.Data.SqlServerCe and System.Data.Common. Add a corresponding statement to the top of your Form1.vb class:

```
Imports
System.Data.SqlServerCe
```

Add two buttons and a datagrid.

2. Here's the code for the first button, to create and populate a database:

```
Try

If System.IO.File.Exists("\My ↙
Documents\books.sdf") Then
System.IO.File.Delete("\My ↙
Documents\books.sdf")
End If

'Create database
Dim engine As New SqlCeEngine↙
("Data Source = \My Documents↙
\books.sdf")
engine.CreateDatabase()

Dim conn As New SqlCeConnection↙
("Data Source = \My ↙
Documents\books.sdf")
Dim cmd As SqlCeCommand
conn.Open()

Try

cmd = conn.CreateCommand()
cmd.CommandText = "Create TABLE ↙
Books(id int IDENTITY(0,1) ↙
PRIMARY KEY, Title nvarchar(50),↙
Author nvarchar(50))"
cmd.ExecuteNonQuery()

Dim iCount As Integer = 0
For iCount = 0 To 20
Dim sCreateRow As String = _
"INSERT INTO BOOKS(Title,Author) ↙
VALUES ('Book " _
& iCount.ToString & "','Tim ↙
Anderson')"
cmd.CommandText = sCreateRow
cmd.ExecuteNonQuery()
Next

Me.Button1.Text = "Done"

Finally
cmd.Dispose()
conn.Close()
conn.Dispose()

End Try

Catch ex As Exception
If TypeOf (ex) Is System.Data.↙
SqlServerCe.SqlCe Exception Then
Dim SqlEx As SqlCeException = ↙
CType(ex, SqlCeException)
MessageBox.Show(SqlEx.Errors(0).↙
Message)
Else
MessageBox.Show(ex.Message)
End If

End Try
```

3. And here is code to query the data:

```
Dim conn As New SqlCeConnection↙
("Data Source = \My Documents\↙
books.sdf")
conn.Open()
Dim da As SqlCeDataAdapter
Try

da = New SqlCeDataAdapter↙
("Select * from Books", conn)
Dim ds As New DataSet
da.Fill(ds, "Books")
Me.DataGrid1.DataSource = ↙
ds.Tables("Books")

Finally
da.Dispose()
conn.Close()
conn.Dispose()
End Try
```

(Key: ↙ code string continues)

```
DialogResult.OK Then
 ' Do some stuff
 End If
 Finally
 dlg.Dispose()
 End Try
End Sub
```

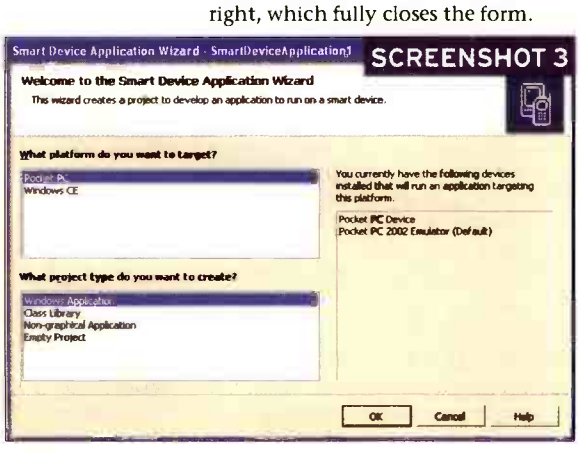
(Key: ↙ code string continues)

If you omit the call to Dispose, the form should get disposed anyway when the last reference to it goes out of scope and its destructor runs. However, it doesn't take much for some reference to keep the dialogue alive for ever. You can call Dispose multiple times without ill-effects, so use it, provided, of course, you really do want the object to disappear.

Compact Framework

To use the Compact Framework, you need VS .Net 2003 and a compatible SDK. The SDK provides an emulator, or you can test on a device by first hooking it up with ActiveSync. Next, go to File-New Project and choose a VB or C# project of type Smart Device Application (see screenshot 3).

There are several sub-types, including Windows Application. Choose this to open the form designer and start work. When you click Run, you get a deployment dialogue. The emulator should always be available, and any attached devices will be listed. Select the target device, click Deploy, and the application will open. To stop debugging, either choose that option from the Debug menu, or close the application on the device. By default, Pocket PC windows minimise rather than quit when you close them, which can catch you out. To change this, set the form's MinimizeBox property to False. Then an OK button appears top right, which fully closes the form.



The Smart Device Extensions support several project types. The available targets vary according to which SDKs you have

You could do something like the above with the old embedded Visual Basic. However, there are many reasons to go for VB .Net. These include JIT compilation to native code, object orientation and a richer class library. There's also good integration with SQL Server CE, a cut-down version of Microsoft's database engine which comes with VS .Net. There's an overhead for the .Net goodies, but the Compact Framework is very lean. You can monitor this using the Memory tab in the Settings utility on a Pocket PC. As an example, a freshly reset Jornada 568 showed 3.22MB of program memory in use. A simple VB .Net application opened in less than a second, and took program memory up to 5.57MB.

.Net for Smartphone

The Compact Framework does not run on first-generation Smartphone 2002 devices, such as Orange's SPV. However, it will run on future versions.

CONTACTS

Tim Anderson welcomes your comments on the Visual programming column. Email him at: visual@pcw.co.uk. Please do not send unsolicited file attachments.

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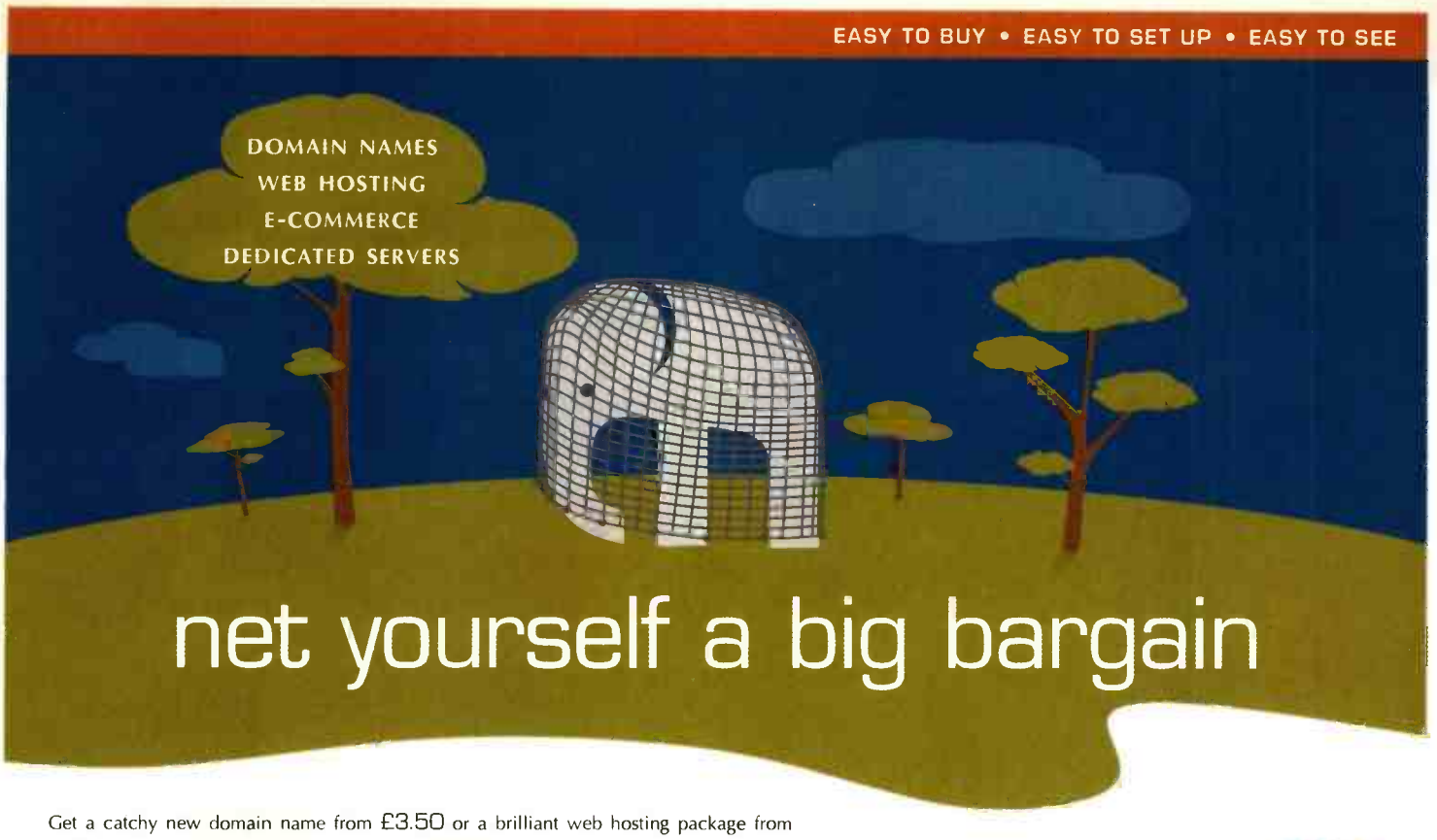

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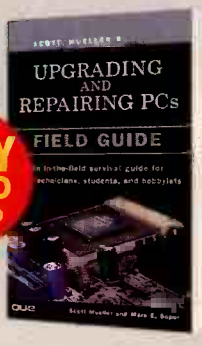

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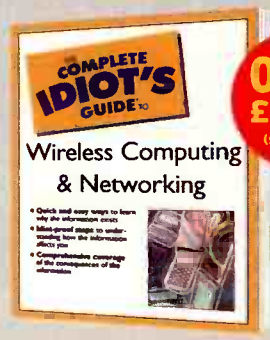

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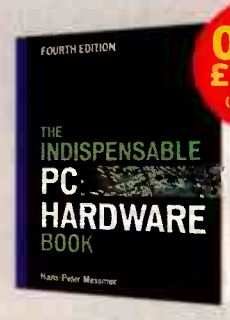

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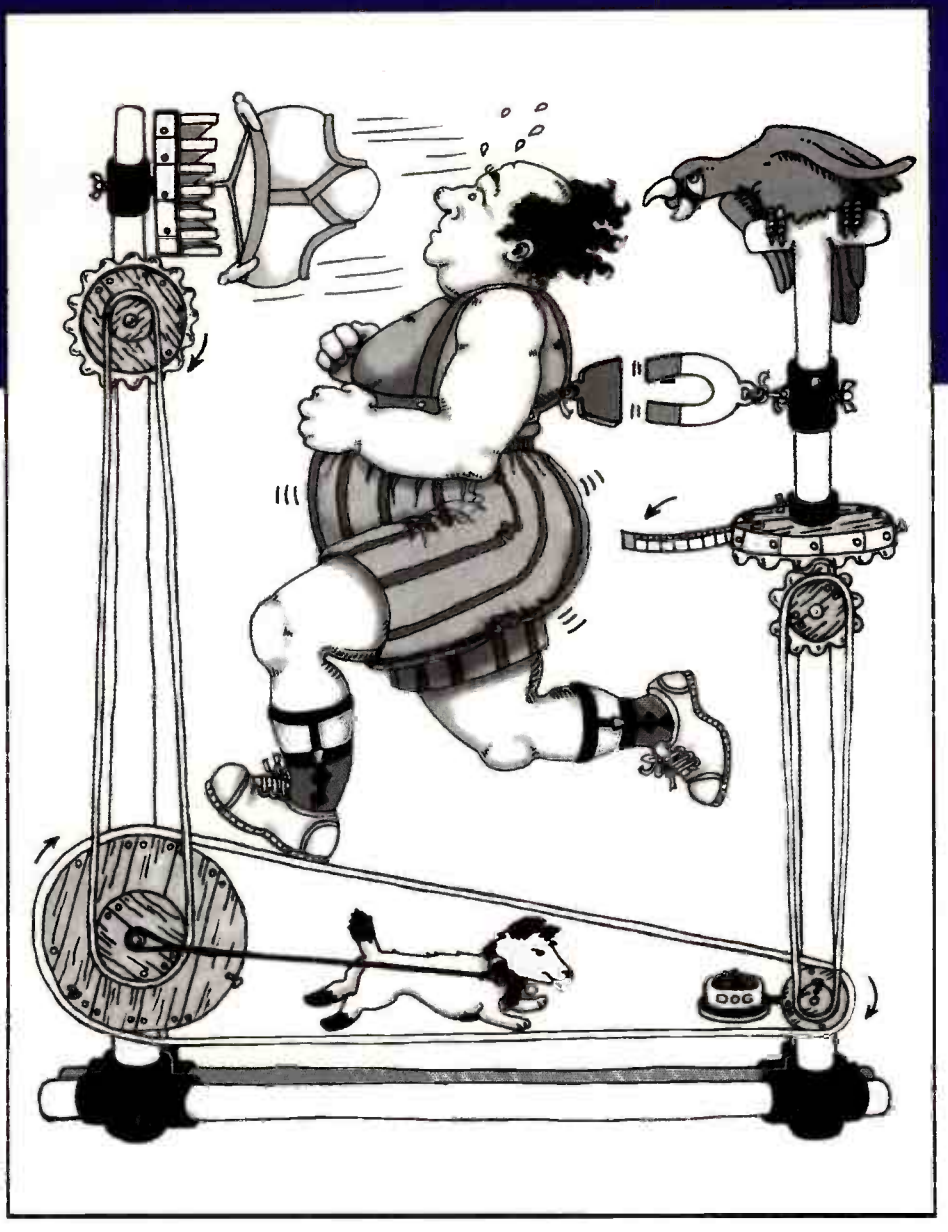

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www.dabs.com/sony

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£519.00

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- Intelligent auto adjust
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SONY

Hitachi CML174SXWB 17" TFT Panel in Black
quicklinx 28Y3PW
www.dabs.com/hitachi

£325.44
£288.00

The thin and sleek design of the CML174SXW TFT monitor provides distortion-free images while saving desktop space. Features include excellent contrast ratio, fast response time and a DVI-D/D-sub input. This monitor will complement any environment into which it is placed.

- 17" TFT Black LCD display
- 0.26 dot pitch
- 1280 x 1024 max resolution
- Plug and play
- 3 years warranty

HITACHI

Samsung SM152B
quicklinx 29BVPW
www.dabs.com/samsung

£229.12
£195.00

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- 15" Flat Panel
- 1024 x 268
- Contrast 480:1
- 3 Year Warranty

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www.dabs.com

£487.62
£415.00

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- 3 years warranty

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www.dabs.com/ctx

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23DPPW	10 15 36 15" TFT 1024x768	217.37	185.00
23DQPW	10 15 37 15" TFT 1024x768 Silver	217.37	185.00
21XHPW	10 19 10 19"TFT	586.32	499.00
	CTX		
24CRPW	S500 15" LCD	210.32	179.00
299ZPW	S530 15" TFT Monitor 1024x768	269.07	229.00
138BPW	PV720A 17.1" LCD TFT Silv/BlK	410.07	349.00
1Y0WPW	CTXPV520A 15" TFT LCD Panel	257.32	219.00
2D14PW	19" Multimedia TFT Blk/Silver	616.87	525.00
	DABSVALUE		
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2432PW	15" TFT Slim 1024x768 TC099	188.00	160.00
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1YMKPW	L565 17" TFT Panel Black	487.62	415.00
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28Y2PW	CML174SXW 17" TFT Panel	370.12	315.00
1ZDFPW	CML171SXW 17" TFT	327.82	279.00
28XKPW	CML152XW2 15" TFT Panel	229.12	195.00
	IIYAMA		
24N5PW	BX3814UT 15" LCD TFT	210.32	179.00
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1685PW	AS4315DBK 17" LCD in Black	498.20	424.00
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29Y5PW	L1710B 17" TFT 1280 x 1024	358.57	305.00
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2125PW	L1510S 15" LCD TFT in Silver	220.90	188.00
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SONY

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SONY

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quicklinx 17S9PW
www.dabs.com/creative
check website for special offers
£22.32 inc £19.00 exc

CREATIVE

Creatives webcams are fully detachable and can go anywhere you do, allowing you to record then share your experiences with anyone instantly! Bringing you the ability to take digital stills, movies and sound clips, all out on the move.....and easily edit or store them for future use, all whilst retaining the full functionality of a webcam!

quicklinx	CREATIVE	ex VAT	Inc VAT
22YXPW	Webcam Pro	32	37.60
24B2PW	Webcam Pro Ex	45	52.87
29DZPW	PC CAM 550	49	57.57

Panasonic SV-SD85

quicklinx 2H8QPW
www.dabs.com
£169.00 inc £143.88 exc

Panasonic

Incredibly small and light, capable of up to 18hours of playback with NiMh rechargeable battery

- 64MB SD Card
- rechargeable
- AC Adaptor

Creative I-Trigue 2.1 3300

quicklinx 2DBRPW
www.dabs.com/creative
£78.72 inc £67.00 exc

CREATIVE

Creative® I-Trigue™ 2.1 3300 speakers combine superb style and advanced technology for a better audio experience. The two 9-Watt RMS satellites, with their unique design and innovative titanium drivers, deliver exceptional sonic accuracy as well as a stunning appearance.

quicklinx	CREATIVE	ex VAT	Inc VAT
24B1PW	Inspire 5.1 5500	110	129.25
24B0PW	Inspire 6.1 6700	75	88.12
249ZPW	BSB 270	21	24.67

Sharp MD-MT270H

quicklinx 2H4MPW
www.dabs.com/sharp
£159.99 inc £136.17 exc

SHARP

- Earphones, AC adaptor, RCA lead
- 107 g without battery
- 83.0 (W) x 28.0 (H) x 77.0 (D) mm

Pure Digital ZXR-550 - 5.1 channel speaker system

quicklinx 2DDKPW
www.dabs.com
BONUS points /AIR MILES!
£68.15 inc £58.00 exc

PURE DIGITAL

The ZXR-550 provides improved usability and enhanced surround sound audio, whether bringing your DVD movies to life, blasting out the latest games or immersing you in music. ZXR-550 features dual flared subwoofer bass ports, improved amplifier electronics and tuned satellite speakers, giving it a flatter, more accurate response for class-leading musical fidelity.

- 65W RMS
- Detachable Speaker Stands

JVC GR-DX95EK

quicklinx 2DD9PW
www.dabs.com
£579.99 inc £493.61 exc

JVC

- 1/6-inch 800,000-Pixel CCD
- 16x Optical Zoom
- 520 Lines of Resolution with Super High-Band Processor
- USB PC Link

Canon MV600i Digital Camcorder

quicklinx 2DGZPW
www.dabs.com/canon
£464.99 inc £395.74 exc

you can Canon

Enhanced specifications, better connectivity and improved performance in a compact and stylish new design. Allows everyone from camcorder beginners, frequent travellers and families to enjoy digital recording.

- Mini DV
- 18x Optical zoom
- 360x Digital Zoom
- Night Mode

See our website for latest prices

Memory Stick 128MB
Capture, transfer & share digital images
quicklinx YZVPW
www.dabs.com/sony
SONY
£55.00 inc £46.81 exc

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for digital printing visit www.dabsxpose.com

Canon Powershot A300 Digital Camera
quicklinx 2GCWPW
www.dabs.com/canon
NEW
£169.99 inc £144.68 exc

Versatile and easy to use with multiple shooting modes for simple point and shoot photography. The PowerShot A300 has a sliding lens cover and is an extremely attractive and modern looking camera to the first time digital camera buyer.

- 3.2 Megapixels
- 5 x Digital Zoom
- Built-in Flash
- 16MB Compact Flash
- 3 minute movie clips

you can Canon

Powershot A70
quicklinx 2D5GPW
www.dabs.com/canon
£254.99 inc £217.02 exc

Versatile and easy to use with multiple shooting modes, ideal for home and family use.

- 3.2 Megapixels
- 3 x Optical Zoom
- 3.2 x Digital Zoom

you can Canon

Sony DSC-P72 Cyber-shot
quicklinx 2D39PW
www.dabs.com/sony
NEW
£259.99 inc £221.27 exc

Incredibly easy to use and compact enough to always be on hand, delivering the most stunning digital images you've ever seen. Let the digital fun begin!

- 3.2 effective Megapixels Sony Super HAD CCD
- 3x optical zoom
- MPEG Movie VX with audio
- STAMINA NiMH batteries supplied
- Memory Stick PRO compatible
- 16MB Memory Stick supplied

MEMORY STICK PRO SONY

Sony DSC-P92
quicklinx 2FG8PW
www.dabs.com/sony
£347.00 inc £295.32 exc

This digital still camera delivers a whopping 5.0 megapixel resolution (effective) at an unprecedented value. You also get 3X optical/4X digital zoom and tons of Sony features!

MEMORY STICK PRO SONY

Fujifilm FinePix 410 Zoom Digital Camera
quicklinx 2FD5PW
www.dabs.com/fuji
BONUS points /AIR MILES!
£369.99 inc £314.89 exc

The FinePix F410 Zoom, successor to last year's hugely successful FinePix F401 Zoom, is the first camera to showcase Fujifilm's new Fourth Generation Super CCD HR (High Resolution) technology, and merges style with incredible resolution to create a true all-rounder.

- 3.1 Million Effective Pixels
- 3 x Optical Zoom
- 16Mb Xd Picture Card
- USB Picture Cradle

FUJIFILM

Nikon CoolPix 3100
quicklinx 2FC5PW
www.dabs.com/nikon
£259.99 inc £221.27 exc

Compact and lightweight but packed with features.

- 3.0 Megapixels
- 3x Optical Zoom
- 4x Digital Zoom
- 14 scene modes

Nikon

HP Photosmart 850 Digital Camera
quicklinx 2FCJPW
www.dabs.com/hp
£299.98 inc £255.32 exc

The HP Photosmart 850 is HP's premier, precision 8x optical zoom digital camera delivering superior image quality. With 56x total zoom and 4 MP resolution, it lets you capture incredible detail. Intuitive manual controls provide extra creativity.

quicklinx	HP	inc VAT	ex VAT
21YDPW	Photosmart 320	76.59	89.99
21YGPW	Photosmart 620	114.89	134.99
2G9BPW	Photosmart 735	143.83	169.00
2G99PW	Photosmart 935	297.02	348.99

Olympus MJU 300
quicklinx 2FC8PW
www.dabs.com/olympus
£299.98 inc £255.31 exc

Features a sleek, weatherproof, full-metal body. A precision 3x optical zoom lens and high-quality CCD with 3.2 million pixels ensure clarity and sharpness

OLYMPUS

Kodak Easyshare DX6340 Digital Camera
quicklinx 2FGZPW
www.dabs.com/kodak
BONUS points /AIR MILES!
£219.99 inc £187.23 exc

For the digital photographer who wants to do more. Snap a picture with the DX6340 and you'll be impressed by your photographic genius. Something else sure to impress is its professional-quality Schneider-Kreuznach Variogon lens. The DX6340 also features programmed scene modes for a quick, simple solution for common situations - so you always get the shot you want, just the way you want it.

Kodak

- 3.1 Megapixels
- 3.1 x Digital Zoom
- 4 x Optical Zoom
- Schneider-Kreuznach Variogon lens

Dimage E223
quicklinx 2HVKPW
www.dabs.com
£154.99 inc £131.91 exc

An affordable camera offering high-quality images.

- 2.0 Megapixels
- 38-114mm (in 135mm format)
- 9x Zoom (3x Optical, 3x Digital)
- Movie clips up to 60 seconds

MINOLTA

Sony DCR-TRV33 Digital Handycam MiniDV
quicklinx 2CP9PW
www.dabs.com/sony
NEW
£649.99 inc £553.19 exc

Movie making excellence!

Get mega pixel resolution in an impressively compact package! Sony's new DCR-TRV33 MiniDV Handycam® Camcorder delivers incredible 1152 x 864 digital still images. And with its impressive technology such as touch panel operation, you can access the functions of the camcorder with the included stylus. New 16:9 aspect ratio mode lets you capture up to 14% wider-angle images and create video for widescreen displays. Plus, a higher pixel count delivers improved resolution.

SONY

Panasonic NV-DS60B
quicklinx 2H87PW
www.dabs.com
£399.99 inc £340.02 exc

- 4.0 Megapixels
- 12 x Optical Zoom
- Four frames per second shooting

Panasonic

Digital Cameras

quicklinx	CANON	inc VAT	ex VAT
22R8PW	Powershot A200	141.00	120.00
1Y1MPW	PowerShot A30	193.87	165.00
2D5GPW	Powershot A70	257.32	219.00
2557PW	Ixus V3	345.00	293.62
2FC7PW	S50	475.87	405.00
25KHPW	Powershot G3	522.87	445.00
	FUJIFILM		
244FPW	Finepix A202	128.00	108.94
244HPW	Finepix A203	182.12	155.00
14CHPW	Finepix 2800 Zoom	245.57	209.00
221TPW	Finepix 401	304.32	259.00
177KPW	Finepix F601 Zoom	404.20	344.00
21JNPW	Finepix S602	546.37	465.00
	HP		
21YDPW	320 Digital Camera 2.1MP	89.99	76.59
21YGPW	620 Digital Camera 2.1MP ZM	134.99	114.89
24YYPW	Photosmart 850 Cam with Dock	339.98	289.35
	KODAK		
2FCZPW	Easyshare DX6340	245.57	209.00
2FGRPW	EasyShare LS633	276.12	235.00
	NIKON		
1YJWPW	Coolpix 2500	276.12	235.00
27TNPW	Coolpix 3500	351.32	299.00
	SONY		
2FG4PW	DSC-P32 Cyber-shot	174.99	148.93
2CWNPW	DSC-P52 Cyber-shot	219.00	186.39
2D39PW	DSC-P72 Cyber-shot	259.99	221.27
2FC9PW	DSC-P8 Cyber-shot	305.00	259.58
2FG8PW	DSC-P92 Cyber-shot	347.00	295.32
2FG8PW	DSC-P10 Cyber-shot	389.00	331.07
2FGFPW	MVC-CD500 Mavica	480.57	409.00
2FGDPW	DSC-V1 Cyber-shot	479.00	407.66

Digital Camcorders

quicklinx	CANON	inc VAT	ex VAT
2DGYPW	MV 600	386.57	329.00
2DH0PW	MV650i	645.07	549.00
21K9PW	MV5i	727.32	619.00
2FNWPW	MVX150i	774.32	659.00
Q21PW	MV30i D	938.82	799.00
R0ZPW	MV3i Di	1056.32	899.00
	SONY		
2CP4PW	DCR-TRV145 Handycam D8	308.00	262.13
2CD3PW	DCR-TRV245 Handycam D8	327.82	279.00
2CD4PW	DCR-TRV355 Handycam D8	469.00	399.15
2CP8PW	DCR-TRV22 Handycam MiniDV	565.01	480.86
2G1DPW	DCR-TRV60 Handycam	879.00	748.09
20XQPW	DCR-PC101 Digital Handycam	985.82	839.00
118VPW	IP7 MicroMV Pocket Camcorder	999.00	850.22
28KXPW	DCR-IP220 Network Handycam IP	1314.82	1119.00

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Handheld
Free Angle Swivel Grip
2.5" LCD, 800K CCD
500 x Digital Zoom
10 x Optical Zoom
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quicklinx 2H7TPW

Memory

quicklinx	DABSVALUE	inc VAT	ex VAT
KNJPW	64Mb Compact Flash	18.50	15.75
LNQPW	64Mb Smartmedia	18.50	15.75
2BHPPW	64Mb Memory Stick	29.01	24.69
KNKPW	128Mb Compact Flash	32.00	27.24
153TPW	128Mb Secure Digital	49.00	41.71
14JVPW	64Mb Multimedia Card	25.26	21.50
Y1MPW	256Mb Compact Flash	59.00	50.22
2BHNPW	256Mb Secure Digital	125.00	106.39
	LEXAR		
28DDPW	64MB Compact Flash	39.95	34.00
28DMPW	128MB Compact Flash	72.85	62.00
28FXPW	128MB SmartMedia	76.57	65.00
28G8PW	256MB Secure Digital	175.07	149.00
28G0PW	128MB XD Card	75.20	64.00
	SONY		
J7KPW	64MB Memory Stick	35.00	29.79
YZVPW	128MB Memory Stick	55.00	46.81
2DMKPW	128MBx2 memory Stick	111.62	95.00
2DMLPW	64MB Memory Stick Duo	64.62	55.00
15L1PW	128MB Magic Gate Memory Stick	65.99	56.71

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Inkjet Printers

quicklink		inc VAT	ex VAT
	CANON		
24T7PW	S200x	47.00	40.00
24T8PW	i320	45.82	39.00
24TCPW	i550	108.10	92.00
29T4PW	i850	157.45	134.00
29T3PW	i950	276.12	235.00
2D5MPW	i70	222.07	189.00
	EPSON		
21J3PW	C42UX	51.70	44.00
231QPW	C62	69.32	59.00
25Y7PW	C82	90.47	77.00
24LVPW	Photo 830	86.95	74.00
25YGPW	Photo 915	130.42	111.00
25YJPW	Photo 925	173.90	148.00
1YRQPW	Photo 950	304.32	259.00
2113PW	Photo 2100	521.70	444.00
	HP		
21Y3PW	Deskjet 3420C	46.88	39.90
22YKPW	Photosmart P7150	115.00	97.87
256NPW	Photosmart P230	139.82	119.00
24YJPW	Deskjet 6122	134.00	114.04
	LEXMARK		
25HNPW	Z45se	57.57	49.00
25HPPW	Z55se	69.32	59.00
29SWPW	Z65P	139.82	119.00
25HQPW	Z65 Pro	182.12	155.00

Laser Printers

quicklink		inc VAT	ex VAT
	BROTHER		
10GMPW	HL1230	135.12	115.00
10GNPW	HL1440	175.07	149.00
10GTPW	HL1470N	346.62	295.00
2FF1PW	HL5040	217.37	185.00
	EPSON		
21J4PW	EPL-6100	249.10	212.00
289ZPW	EPL-6100L	158.62	135.00
	KYOCERA		
20NNPW	FS-1010	229.12	195.00
2DFPPW	FS-1900D	504.07	429.00
	LEXMARK		
10TSPW	E210	163.32	139.00
13LGPW	E320	233.82	199.00
13LHPW	E322	151.57	129.00
	OKI		
2CTHPW	B4200	245.57	209.00
2CTJPW	B4300	276.12	235.00
	QMS		
22T0PW	Pagepro 1200W	158.62	135.00
22T1PW	Pagepro 1250e	292.57	249.00
	SAMSUNG		
2F9FPW	ML1510	139.82	119.00
2F9GPW	ML1710	163.32	139.00

Scanners

quicklink		inc VAT	ex VAT
	CANON		
2483PW	Lide 20	54.05	46.00
24N2PW	Lide 30	76.37	65.00
2889PW	Lide 50	96.35	82.00
2CXHPW	3000F	96.35	82.00
24N3PW	5000F	175.07	149.00
24N4PW	8000F	193.87	165.00
2CXJPW	9900F	287.87	245.00
	EPSON		
24LXPW	Perfection 1260	70.50	60.00
2445PW	Perfection 1660 Photo	131.60	112.00
2444PW	Perfection 2400 Photo	175.07	149.00
	HP		
24YVPW	Scanjet 4570C	144.99	123.40
24YXPW	Scanjet 5500C	229.12	195.00
	MICROTEK		
201WPW	ScanMaker 4800 Photo	92.82	79.00
17T4PW	Filmscan 3600	433.57	369.00
	UMAX		
11HXPW	Astra 4450	118.67	101.00
2BMQPW	Astra 6700	137.47	117.00

Multifunction Devices

quicklink		inc VAT	ex VAT
	CANON		
2BBKPW	Smartbase MPC 200 Photo	163.32	139.00
1Y27PW	Smartbase MPC 600F	257.32	219.00
	HP		
2BD3PW	OfficeJet 5110	158.62	135.00
2C6MPW	OfficeJet 6110	269.00	228.94
2CCHPW	PSC 1205	92.82	79.00
21XZPW	PSC 2110	139.99	119.14
24YRPW	PSC 2210	219.00	186.39
	LEXMARK		
24LGPW	X75	72.85	62.00
24LHPW	X85	92.82	79.00
24LJPW	X125	146.87	125.00

to see the full range go to www.dabs.com/hp

HP DeskJets provide quality and performance at an affordable price.

DeskJet 3420c
Designed for families and individuals who are looking for an affordable, reliable printing solution to suit a range of personal, study and home-office needs.
quicklink 21Y3PW
£46.88 inc
£39.90 exc

DeskJet 5550c
Ideal for families and sophisticated personal users who are looking for a reliable, stylish and feature-rich printing solution.
quicklink 21Y5PW
£109.99 inc
£93.61 exc

DeskJet 6122
Brings professional photo REt III 4800dpi* print quality to your home or office. It delivers up to 20 ppm of laser-sharp black text & up to 13 ppm in brilliant colour.
quicklink 24YJPW
£133.99 inc
£114.04 exc

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HP LaserJets give you reliability with lower running costs.

LaserJet 1000W
HP's most affordable LaserJet printer for USB capable Microsoft Windows environments, offering an easy-to-use laser printing solution.
quicklink 120CPW
£129.23 inc
£109.99 exc

NEW

LaserJet 1300
For personal users in any sized office or working at home, offers proven reliability, unrivalled ease of use and an expandable communication solution.
quicklink 2FBJPW
£245.57 inc
£209.00 exc

NEW

LaserJet 2300L
The printer that grows with your business needs, delivers superior laser performance and provides an advanced printing solution.
quicklink 2D9VPW
£386.57 inc
£329.00 exc

to see the full range go to www.dabs.com/epson

The award-winning Epson Stylus Photo range offers outstanding performance.

NEW

Stylus Photo 830U
The perfect introduction to photo printing, targeted at the home user who is looking for unbeatable value and performance. Also ideal for digital camera owners, this A4 printer will deliver professional quality photo prints, reprints and enlargements at high speed.
quicklink 2FC2PW
£86.95 inc
£74.00 exc

Stylus Photo 950
Fulfilling your every output need as a creative professional or amateur photographer, the Stylus Photo 950 offers the most exceptional print quality. Putting you in complete control of your digital image output.
quicklink 1YRQPW
£304.32 inc
£259.00 exc

to see the full range go to www.dabs.com/epson

The EPSON perfection range of scanners are ideal for the home/office and photo enthusiasts.

Perfection 1260 Photo
The perfect scanner for the first time user. Packed with advanced features designed to make the whole process as straightforward as possible.
quicklink 24LYPW
£88.12 inc
£75.00 exc

Perfection 3200 Photo
Bringing high quality film scanning with the flexibility of a flatbed scanner. Offering an optical resolution of 3200x6400 dpi, it also features a built-in 4"x9" Transparency Unit and a custom-developed ASIC for high-speed film scans.
quicklink 29MTPW
£307.85 inc
£262.00 exc

to see the full range go to www.dabs.com/epson

EPSON's latest printing and scanning technologies and is quick & easy standalone copying facility.

CX3200 All in One
Space-saving product with scanning, printing and standalone copying facilities.Compact dimensions, user-friendly operation and high performance features.
quicklink 2572PW
£112.08 inc
£96.00 exc

CX5200 All in One
A one-stop home or home office printing and copying solution. It has highspeed standalone colour copying capability, with no need to power up your PC for high quality, fast, colour copies.
quicklink 29T0PW
£173.90 inc
£148.00 exc

to see the full range go to www.dabs.com/canon

The Canon inkjet printers offer excellent quality and performance.

NEW

i470D Inkjet Printer
The Canon Bubble Jet i470D demonstrates the height of versatility in direct printing. You can print directly from any of the most popular memory card types available, or from your compatible Canon digital camera or camcorder.
quicklink 2G14PW
£175.07 inc
£149.00 exc

NEW

i70 Inkjet Printer
Perfect for stylish homes and offices, and for business executives who need a top-range printer whilst on the move, the i70 combines a host of technologies never before seen in such a compact model.
quicklink 2D5MPW
£217.37 inc
£185.00 exc

to see the full range go to www.dabs.com/canon

The Canon scanners offer excellent quality and performance.

Lide 20
An easy to use scanner that gives you excellent, high resolution scans with consistent results across the width of the page. Includes three EZ scan buttons, ensuring quick access to great features.
quicklink 2483PW
£54.05 inc
£46.00 exc

NEW

Canoscan 3000F
Here's a scanner equipped with a USB 2.0 Hi-Speed interface to give you the fastest scans ever. It provides high-quality images of your films or documents whether you're a power user or a first-timer.
quicklink 2CXHPW
£96.35 inc
£82.00 exc

see the full range at www.dabs.com/lexmark

Convenience, quality and pure Creativity. One machine does three jobs

NEW

X1150 All-in-One
As affordable as a regular inkjet printer, the Lexmark X1150 All-In-One combines high resolution printing, scanning and copying in one single, smart, space saving unit.
quicklink 2H9ZPW
£76.37 inc
£65.00 exc

X5150 All-in-One
Photo-quality results: up to 4800 x 1200 dpi resolution ,variable drop size. High-performance: up to 14ppm colour printing. Easy-to-use: intuitive user interface and one-touch features for stand-alone use.
quicklink 29SXPW
£135.12 inc
£115.00 exc

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Small, economical and easy to use. Delivering high quality results. A perfect solution for printing, scanning & copying.
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quicklinx 2CCHPW

PSC2175 Printer, Copier, Scanner
Designed for creative home users who want to print photo quality images and require high-quality scanning and copying.
£195.00 inc £165.96 exc
quicklinx 2HY2PW

PSC2210 Printer, Copier, Scanner
Designed for creative home users who want to print photo-quality images, use a digital camera and require high-quality faxing, scanning and copying.
£219.00 inc £186.39 exc
quicklinx 24YRPW

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HP ScanJet series - value for money combined with ease of use.

ScanJet 2400C affordable, easy and fun, start scanning today! 1200dpi Scan and copy in colour at the touch of a button. Scan photos, text, graphics and even 3D objects.
£49.99 inc £42.55 exc
quicklinx 2HY3PW

ScanJet 3530C sleek metallic design,1200dpi/48-bit colour and four one-touch buttons scan,copy, e-mail and HP Memories Disc Creator - a great looking scanner.
£75.00 inc £63.83 exc
quicklinx 21XQPW

ScanJet 3570C The scanner that makes it easy to express your creativity & share the results - 1200dpi /48-bit colour, four one touch buttons.
£89.99 inc £76.59 exc
quicklinx 21XWPW

Netgear ADSL Modem Router

£98.70 inc £84.00 exc

quicklinx 2137PW

www.dabs.com/netgear

Netgear's DG814 DSL Modem Internet Gateway (4x10/100 ports) paves the way to shared DSL access by combing a modem and a switch. Instant benefit from high-speed Web access file sharing, video streaming, head-to-head Internet game playing and MP3 downloading. Sleekly designed to complement your home.

NETGEAR

Linksys Wireless-G 54mbps PCI Card

£57.57 inc £49.00 exc

quicklinx 2D13PW

www.dabs.com

BONUS points /AIR MILES!

Wireless-G connectivity at 54Mbps lets you network at high-speed from anywhere in the building. Also interoperates with Wireless-B (802.11b) networks at 11Mbps.

quicklinx	LINKSYS	inc VAT	ex VAT
2CM7PW	Wireless-G Broadband Router	104.57	89.00
2CM9PW	Wireless-G PCMCIA Card	57.57	49.00
2D12PW	Wireless-G Access Point	104.57	89.00

LINKSYS

10/100 PCI Card

£9.40 inc £8.00 exc

quicklinx F2TPW

www.dabs.com/dlink

- Adapter for PCI Bus
- 10/100Mbps NWay interface
- 32-bit PCI bus master operation
- Full duplex support
- Single shielded RJ-45 connector

D-Link

Wireless Access point

£76.37 inc £65.00 exc

quicklinx YKQPW

www.dabs.com/netgear

- 802.11b 11 Meg standards-based networking
- Up to 32 wireless devices per Access Point
- Up to 3 Access Points per network

NETGEAR

USB ModemBlaster

£29.00 inc £25.25 exc

quicklinx 16Q5PW

www.dabs.com/creative

- Simple, reliable & fast access to the world of online entertainment.
- Data, fax and voice capability.
- V.90 support as standard.
- V.92* compliant via free driver upgrade.

CREATIVE

Wireless Tablet 1200

£72.85 inc £62.00 exc

quicklinx 2FKBPW

www.dabs.com/trust

The 1200 Wireless Tablet is an ergonomically designed large USB tablet for, drawing, handwriting, sketching, colouring and picture editing.

Trust

Wireless Desk Set 302KS

£21.15 inc £18.00 exc

quicklinx 2FJ4PW

www.dabs.com/trust

The 302KS Silverline Wireless Desk Set includes wireless keyboard and mouse in an exclusive black and metal design. The mouse is suitable for left and right hand users.

Trust

USB Starter Kit

£58.75 inc £50.00 exc

quicklinx 178HPW

www.dabs.com/actiontec

Transform your home or office into a wireless network.

- USB Solution Provides Mobility
- Transfer Network Data Upto 11Mbps
- Simple Interface & Installation

Actiontec

P706 PhotoJet Printer

£63.45 inc £54.00 exc

quicklinx 2H9NPW

www.dabs.com/lexmark

- 6 colour borderless printing
- Up to 4800 x 1200dpi photo quality resolution
- Prints 4"x6" photos in 60 seconds
- PrecisionSense™ Technology

LEXMARK
Passion for printing ideas.

Brother HL-5040

£217.37 inc £185.00 exc

quicklinx 2FF1PW

www.dabs.com/brother

Whether you're working at home or in the office, the HL-5040 has a print speed of up to 16ppm and a print quality of 2400 x 600 dpi, so you'll get your document in seconds and looking totally professional.

brother

Optical Mouse Lite

£15.27 inc £13.00 exc

quicklinx 2D38PW

www.dabs.com/creative

A high-precision and very stylish desktop mouse upgrade.

The case has silver highlights and contains a blue light which adds a distinctive feature to the desktop.

CREATIVE

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Combine cutting edge design with stylish looks to make your desktop the envy of all your friends and colleagues, both in performance and appearance. Whether you want cable free technology or the basic office tools you're sure to find what you want at dabs.com...

Microsoft

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Increased wireless range - up to 9.1 metres from the transceiver even if the computer is out of sight

See the full range at www.dabs.com/microsoft

£69.32 (£59.00 ex VAT)
69 dabspoints
quicklinx 2824PW

Microsoft

Sidewinder Forcefeedback Wheel

Feel your tyres hug the asphalt. It's everything you'd expect from force feedback technology.

See the full range at www.dabs.com/microsoft

£57.57 (£49.00 ex VAT)
57 dabspoints
quicklinx 29WGP

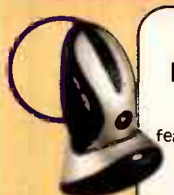
Microsoft

Wireless Optical Ice White Keyboard

The keyboard & mouse work within six feet of the receiver, even if your computer is out of sight (receiver included).

See the full range at www.dabs.com/microsoft

£69.32 (£59.00 ex VAT)
69 dabspoints
quicklinx 2D6JPW



Logitech

MX700 Optical Mouse

Innovative design featuring Zero Degree Tilt™ 5-year guarantee

See the full range at www.dabs.com

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quicklinx 27RMPW

Logitech

Cordless Deluxe Optical Keyboard

Cool design
Cordless freedom
Optical performance
for both Win & Mac

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quicklinx 2F97PW

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AGP Video Cards

quicklinx	AOPEN	inc VAT	ex VAT
2H48PW	FX5200-DV64 DVI 64MB DDR-RAM	51.92	61.00
2H24PW	FX5200-DV128(N8) DVI 128MB DDR-RAM	61.28	72.00
2J97PW	FX5600-FV128 DVI 128MB DDR-RAM	118.30	139.00
2J9BPW	FX5600-FV256 DVI 256MB DDR-RAM	154.05	181.00
2H27PW	FX5800-DV128 DVI 128MB DDR-RAM	247.66	291.00
	CONNECT 3D		
2G9XPW	Radeon 9200 DVI VO 64MB DDR	48.09	56.50
2G9YPW	Radeon 9200 DVI VO 128MB DDR	56.17	66.00
2DC3PW	Radeon 9500 DVI VO 64MB DDR	101.28	119.00
2DC4PW	Radeon 9500 DVI VO 128MB DDR	114.05	134.00
2DC5PW	Radeon 9500 Pro DVI VO 128MB DDR	117.45	138.00
2G9ZPW	Radeon 9800 Pro DVI VO 128MB DDR	290.22	341.00
2DC8PW	All-in-Wonder 9000 Pro 64MB DDR	102.13	120.00
2DC8PW	All-in-Wonder 9700 Pro 128MB DDR	290.22	341.00
	CREATIVE		
17N7PW	GeForce MX 420 VO 64MB SDRAM	48.94	57.50
17N8PW	3D Blaster 4 MX440 64MB DDR-RAM	60.00	70.50
212MPW	3D Blaster 4 Ti4200 VO 64MB DDR-RAM	91.07	107.00
2CB5PW	3D Blaster 4 Ti4800SE DVI VO 128MB	137.03	161.00
	LEADTEK WinFast GeForce4		
2HRNPW	FX5200 DVI VIVO128MB DDR-RAM	69.37	81.50
2LGGPW	FX5600 DVI VIVO 128MB DDR-RAM	133.62	157.00
2LGYPW	FX5600 Ultra DVI VIVO 128MB DDR-RAM	150.64	177.00
2LGZPW	FX5800 DVI VIVO 128MB DDR-RAM	262.98	309.00
2LH0PW	FX5800 Ultra DVI VO 128MB DDR-RAM	318.30	374.00
	TERRATEC		
2DNQPW	GeForce 4 MX 440 VO 64MB DDR-RAM	61.71	72.50
2DNRPW	GeForce 4 Ti4200-8x DVI VIVO 64MB	121.71	143.00
2DNTPW	GeForceFX 5800 DVI VIVO 128MB	354.90	417.00
2DNVPW	GeForceFX 5800 Ultra DVI VIVO128MB	378.73	445.00

Sound Cards

quicklinx	CREATIVE	inc VAT	ex VAT
13QTPW	SoundBlaster 4.1 Digital	26.50	22.56
13QVPW	SoundBlaster 5.1 Digital	43.50	37.03
27S0PW	SB Audigy 2 Platinum	154.00	131.07
18C2PW	SB Extigy	129.00	109.79
	HERCULES		
2217PW	Gamesurround Muse LT	12.50	10.64
2218PW	Gamesurround Muse 5.1 DVD	29.00	24.69
25DHPW	Gamesurround Fortissimo III 7.1	44.00	37.45
2FMLPW	DigiFire 7.1	66.00	56.17
24LSPW	Game Theater XP 6.1	105.00	89.37
	PURE DIGITAL		
282YPW	SonicXplosion RP	48.50	41.28
2830PW	SonicXplosion DVD RP	77.50	65.96
	TERRATEC		
2BB9PW	Aureon 5.1 Fun	28.50	24.26
215SPW	SixPack 5.1+	55.50	47.24
2BBCPW	Aureon 5.1 Sky	96.50	82.13
21RXPW	DMX 6Fire 24/96LT	103.00	87.66
2BBDPW	Aureon 7.1 Space	107.00	91.07
21RZPW	DMX 6Fire 24/96	163.00	138.73
	YAMAHA		
F9KPW	SW1000XG PCI	335.00	285.11
2FNGPW	UW500 USB	233.00	198.30

DVD Drives

quicklinx	ASUS	inc VAT	ex VAT
11JYPW	DVD-E616 IDE 16xDVD 40xCD	34.50	29.37
	LITE-ON		
24G7PW	LTD-165 Retail IDE 16xDVD 48xCD	31.50	26.80
	LG		
2BHJPW	GRD-8161B OEM IDE 16xDVD 48xCD	30.00	25.54
2FN5PW	GMA-4020B IDE DVD-R/RW/RAM	159.00	135.31
	MITSUMI		
2H34PW	DM2000TE OEM IDE 16xDVD 50xCD	30.50	25.96
2FT0PW	DW7081TE IDE DVD+R/RW 4x	184.00	156.60
	PANASONIC		
212QPW	SR-8588 IDE 16xDVD 48xCD	33.50	28.51
2FMKPW	LFD-521E IDE DVD-RAM/-R/-RW	191.00	162.56
2DHKPW	LFD-291 SCSI DVD-RAM	329.00	280.00
	PHILIPS		
233ZPW	DVDRW228K IDE DVD+R/RW 4x	191.00	162.55
	PIONEER		
2DH6PW	DVD-120 IDE 16xDVD 40xCD	32.50	27.65
2G9FPW	DVD-120S IDE 16xDVD 40xCD	37.00	31.48
28N6PW	DVR-105 IDE	161.00	137.02
28N7PW	DVR-A05 IDE	195.00	165.95
	SAMSUNG		
21F9PW	SD-616FE IDE 16xDVD 48xCD	29.50	25.10
	TEAC		
2827PW	DV-516EK IDE 16xDVD 48xCD	40.50	34.46
2CBQPW	DV-W50K IDE DVD-R/RW 4x	236.00	172.63
	TOSHIBA		
2DH7PW	SD-M1712KIT IDE 16xDVD 48xCD	34.00	28.93
291JPW	SD-R5002K IDE DVD-R/RW	203.00	148.00

GeForce FX 5800 Ultra VIVO DVI 128MB

£348.00 inc £296.17 exc

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- CineFX Engine
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- 8 pixels per clock rendering engine
- 200 million triangles/sec
- DX9 with Vertex Shader 2.0+ & Pixel Shader 2.0+
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quicklinx	PNY TECHNOLOGIES GeForce4	inc VAT	ex VAT
2CNRPW	MX440SE VO PCI 64MB	59.50	50.64
2CNSPW	MX440SE VO AGP 64MB	44.00	37.45
29V8PW	Ti 4200 8x VO DVI AGP 64MB	100.00	85.11
29VJPW	Ti 4200 8x VO DVI AGP 128MB	119.00	101.28
2CNVPW	Ti 4800 8x VO DVI AGP 128MB	178.00	151.49

PNY TECHNOLOGIES

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quicklinx 2FDMPW

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With Pinnacle Studio MovieBox USB, anyone can make home movies. Using this stylish, high quality external device, you can easily copy any video to your PC. Use the award winning Pinnacle Studio 8 editing software to create home movies and archive them onto videotapes or store them on CDs & DVDs.

PINNACLE SYSTEMS

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WinTV-PVR-350 puts TV watching under your control! Watch what you want, when you want. Watch TV on your PC screen, in a window or full screen, digitally record your TV shows to your PCs hard disk, or pause live TV and create your own instant replay. You can even burn your home videos or TV shows onto a CD-rom or DVD

Hauppauge!

Dabsvalue Radeon 9000 Pro DVI VO

£78.00 inc £66.39 exc

quicklinx 28D1PW

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- 128MB DDR AGP

quicklinx	DABSVALUE GeForce	inc VAT	ex VAT
2HZFPW	FX5200 DVI VO 64MB AGP	55.00	46.81
2GM9PW	FX5200 DVI VO 128MB AGP	65.00	55.32
2HZGPW	FX5200 ULTRA DVI VO 128MB AGP	119.00	101.28
1HZKPW	FX5600 ULTRA DVI VO 128MB AGP	125.00	106.39
2HZJPW	FX5600 DVI VO 256MB AGP	140.00	119.15
2HZLPW	FX5600 ULTRA DVI VO 128MB AGP	165.00	140.43
2HZPPW	4 Ti 4200-8x DVI VIVO 128MB AGP	259.00	220.43
	DABSVALUE Radeon		
28D1PW	9000 PRO DVI VO 128MB DDR AGP	78.00	66.39
2HMTPW	9200 DVI VO 64MB DDR AGP	55.00	46.81
2HMVPW	9200 DVI VO 128MB DDR AGP	69.00	58.73
2HMYPW	9600 PRO DVI VO 128MB DDR AGP	159.00	135.32
2HN4PW	9800 PRO DVI VO 128MB DDR AGP	339.00	288.51
2HN5PW	9800 PRO DVI VO 256MB DDR AGP	379.00	322.56

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3D Blaster FX5200

£65.00 inc £55.32 exc

quicklinx 2HXYPW

www.dabs.com/creative

- 250MHz core
- AGP 8x
- Direct x9 support
- 64MB DDR

CREATIVE

3D Blaster 4 Ti 4800

£194.00 inc £165.11 exc

quicklinx 2DMMPW

www.dabs.com/creative

- 256-bit graphics architecture
- AGP 8X support
- Memory configuration 128MB of DDR

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Radeon 9800 Pro 128MB

£341.00 inc £290.22 exc

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- TV OUT
- DVI-I OUT
- AGP

connect3D

SB Audigy 2 PCI RP

£85.50 inc £72.77 exc

quicklinx 27RZPW

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- 24-Bit
- 100db
- SNR audio quality
- SB1394™ connectivity

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A new level of audio excellence at your fingertips! Sound Blaster Audigy 2 Platinum eX is a dream come true with a studio quality Audigy 2 External I/O Module and the ability to record DVD-Audio.

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- PCI board
- Bus master transfer supports '24bit 4byte mode' (32bit)
- 4 inputs and outputs total

DVD-R/RW Int IDE

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quicklinx 28N7PW

www.dabs.com

- Writes and reads DVD-R/RW and CD-R/RW formats
- DVD/CD buffer under-run protection
- 4X writing speed for DVD-R / 2x writing speed for DVD-RW

Pioneer

DVD+R/RW Internal IDE

£200.00 inc £170.22 exc

quicklinx 24RHPW

www.dabs.com/aopen

- Large capacity of 4.7GB
- Fast DVD+RW writing speed of 2.4X
- High-speed formatting supported by Back-ground Formatting function

AOpen

16xDVD 48xCD Int IDE

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quicklinx XX9PW

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FX-1 CDRW Desktop 52x24x52x USB 2.0

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- Installs in seconds without opening your computer.
- Compatible with Windows 98SE/2000/ME/XP
- Buffer under run prevention and active write control
- Two years manufacturers warranty

quicklinx	FREECOM	inc VAT	ex VAT
2HMCPW	FX-1 CDRW DT 52x24x52x USB 2.0	116.00	98.73
2DLCPW	FX-1 CDRW DT 48x24x48x USB 2.0	116.00	98.73
2FNCPW	FX-10 DVD+R/RW DT 4x USB 2.0	283.01	240.86

FREECOM TECHNOLOGIES

Freecom FHD-1 18014 USB 2 60GB

£147.00 inc £125.11 exc

quicklinx 21X0PW

www.dabs.com/freecom

- Maximum performance, storage capacity and reliability
- Hi-speed data transfer through the USB-2 interface
- Sync button to synchronize and backup your important data from your workstation to the FHD-1 or vice versa.

quicklinx	FREECOM	inc VAT	ex VAT
2DLHPW	FHD-1 USB 2 40GB	120.00	102.13
21X0PW	FHD-1 USB 2 60GB	147.00	125.11
2FNDPW	FHD-1 USB 2 80GB	166.00	141.28
21X1PW	FHD-1 USB 2 120GB	200.00	170.22

FREECOM TECHNOLOGIES

PlexWriter PX-W4824TA

£68.50 inc £58.30 exc

quicklinx 252XPW

www.dabs.com

- 48r 48w 24rw
- IDE Internal
- Buffer Under Run Protection
- VariRec Technology (Variable Recording)
- 65ms Access Time
- 4MB Buffer

quicklinx	PLEXTOR PlexWriter	inc VAT	ex VAT
252WPW	PX-W4824TA/BP/K IDE 48r 48w 24rw	54.47	64.00
252XPW	PX-W4824TA IDE 48r 48w 24rw	58.30	68.50
252YPW	PX-W4824TA/BLACK IDE 48r 48w 24rw	58.30	68.50
2CHSPW	PX-W4012TS SCSI 40r 40w 12rw	154.90	182.00
1YLZPW	PX-320A IDE 12xDVD 40r 20w 10rw	77.03	90.50
13R8PW	PX-S88TU Retail USB 2.0 24r 8w 8rw	86.81	102.00
28M2PW	PX-W4824TU USB2 48r 48w 24rw	106.39	125.00

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DVD-RW & DVD+RW Multi-Format Drives

£269.08 inc £229.00 exc

quicklinx 25Y5PW

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The world's first multi-format DVD ReWritable drives, making DVD writing accessible to all!

The DRU510A and DRX500UL come bundled with a software suite designed for both novice and standard PC users.

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2J3JPW	DRU-510A DVD+R/RW CD-R/RW	229	269.07
25Y6PW	DRU-500UL DVD+R/RW CD-R/RW F/wire	320	376

SONY

Dabsvalue CD-R 50pk

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quicklinx 259WPW

www.dabs.com/value

- Dabs value Silver 80min 700MB CD-Rs
- CDs on spindle (no jewel cases)
- 48x Rated
- Just 16p each (ex VAT)

dabsvalue

ZipCD Ext USB2

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quicklinx 2B07PW

www.dabs.com/iomega

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- PC/Mac compatible

iomega

CD-RW 48r48w24rw

£33.00 inc £28.08 exc

quicklinx 2B46PW

www.dabs.com

- 48X (CAV) Record, 24X (CLV) Re-Write & 48X (CAV) Read technology.
- E-IDE Interface, support up to Ultra-DMA mode 2
- Innovated SMART-BURN® technology

LITEON

Fusion 40r40w12rw

£92.83 inc £79.00 exc

quicklinx 28VMPW

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Features the new Hi-speed USB 2.0 Interface.

- Hot swappable
- Complete with the LaCie CD Recording Utilities software suite & USB cable

LACIE

CD-RW Internal IDE

£37.00 inc £31.48 exc

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The LiteON CD-RW drive makes it fast and simple to store your information – backup files, store large images, and create music CDs effortlessly.

- 52r 52w 24rw

LITEON

CRW5224 Bonus Pack

£35.00 inc £29.78 exc

quicklinx 28P7PW

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- Just Link and Just Speed Technology
- 52xr 52w 24rw
- Firmware upgradable
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AOpen

CD-RW 52r52w24rw

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quicklinx 2D6LPW

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The MITSUMI CD-ReWriter CR487E TE/RET IDE features:

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- Internal Drive
- IDE rp
- Buffer Under Run Protection
- 80ms Access Time

MITSUMI

52r 52w 32rw CD-R

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quicklinx 2H33PW

www.dabs.com/value

- 52r 52w 24rw IDE Internal artec
- Includes NERO Software & Media

dabsvalue

CDRW 52r52w24rw

£40.00 inc £34.04 exc

quicklinx 2FR3PW

www.dabs.com/philips

- 52x writing on CD-R, 24x ultra speed rewriting on high-speed CD-RW, and 52x read speed

PHILIPS

CD-ROM Drives

quicklinx	AOPEN	inc VAT	ex VAT
12NTPW	CD-956E PRO Retail IDE Fifty Six	15.50	13.19
	ASUSTEK		
120SPW	CD-S520 IDE Fifty Two	16.50	14.04
	LITEON		
2179PW	LTN-526S-02VYC IDE Fifty Two	17.50	14.90
	MITSUMI		
17NXPW	FX-5410 OEM IDE Fifty Four	16.00	13.62
	SAMSUNG		
ZZDPW	SC-152 IDE Fifty Two	17.00	14.47
2DDJPW	SC-152 Black IDE Fifty Two	16.50	14.04
	SONY		
15DVPW	CDU-5211 52x OEM	18.80	16.00
	TEAC		
MCJPW	CD-224PEK PCMCIA Twenty Four	88.50	75.32
21FFPW	CD-224PUK USB Twenty Four	104.00	88.51
27X5PW	CD-552E IDE Fifty Two	26.00	22.13

CD-ReWriters

quicklinx	AOPEN	inc VAT	ex VAT
2H2BPW	CRW5224 Chameleon IDE 52r 52w 24rw	32.77	38.50
28PBPW	EHW-5224U USB 2.0 52r 52w 24rw	67.66	79.50
2J3BPW	COM4012 IDE 16xDVD 40r 40w 12rw	44.69	52.50
	ASUS		
2BBJPW	CRW-5224A IDE 52r 52w 24rw	37.45	44.00
2J6NPW	CRW-5224U/Ext USB2 52r 52w 24rw	67.24	79.00
	IOMEGA		
2FV6PW	32650 USB 2.0 52r 52w 24rw	95.32	112.00
2G38PW	Predator 32449 USB2 40r 40w 12rw	77.03	90.50
	LITEON		
2FTLPW	LXR-40243A-06YC USB2 40r 40w 24rw	68.94	81.00
	LG		
2FV8PW	GCE-8520BB OEM IDE 52r 52w 24rw	34.05	40.00
2GZQPW	GCE-8520B IDE 52r 52w 24rw	37.45	44.00
2FGYPW	GCC-4480BB IDE 16xDVD 48r48w24rw	50.22	59.00
2GZRPW	GCC-4480BB IDE 16xDVD 48r48w24rw	53.20	62.50
	MITSUMI		
2D6KPW	CR487ETE/OEM IDE 52r 52 24rw	33.20	39.00
	PHILIPS		
2B03PW	RWDV3210K IDE 12xDVD 40r 32w 10rw	53.62	63.00
222PPW	JR24CDRWK USB 2 40r 24w 10rw	90.22	106.00
2CCTPW	JR32RWDVK USB2 12xDVD 40r32w10rw	153.20	180.00
	PLEXTOR - PlexWriter		
252WPW	PX-W4824TA/BP/K IDE 48r 48w 24rw	54.47	64.00
252XPW	PX-W4824TA IDE 48r 48w 24rw	58.30	68.50
252YPW	PX-W4824TA/BLACK IDE 48r 48w 24rw	58.30	68.50
2CHSPW	PX-W4012TS SCSI 40r 40w 12rw	154.90	182.00
1YLZPW	PX-320A IDE 12xDVD 40r 20w 10rw	77.03	90.50
	SAMSUNG		
21JKPW	SW-252BEA Blk OEM IDE 52r 52w 24rw	33.20	39.00
2FH0PW	SW-252BEA OEM IDE 52r 52w 24rw	34.47	40.50
2GZCPW	SW-252BEA RP IDE 52r 52w 24rw	36.17	42.50
2FH3PW	SM-348 OEM IDE 16xDVD 48r48w24rw	47.66	56.00
2GZDPW	SM-348 OEM IDE 16xDVD 48r48w24rw	50.64	59.50
2CCYPW	SM-348 IDE 16xDVD 48r 48w 24rw	48.94	57.50
2HTMPW	SM-352 IDE 16xDVD 52r 52r 24rw	58.73	69.00
	SONY		
2FCZPW	CRX220EI-10 OEM 52x 24x 52x	43.47	37.00
27XCPW	CRX2100U USB2 48x 12x 48x	151.57	129.00
22WXPW	CRXP90MU Combo 24x 10x 24x 8x	198.57	169.00
	TEAC		
2DHGPW	CD-W552EK IDE 52r 52w 24rw	43.83	51.50
2DHHPW	CD-W552PUK USB2 52r 52w 24rw	99.58	117.00
2DHJPW	CD-W224PUK USB2 24r 24w 10rw	110.64	130.00
	TOSHIBA		
2CZ4PW	SD-R1312K IDE 16xDVD 40r 32w 12rw	60.86	71.50

UPS & Surge Protection

quicklinx	BELKIN	inc VAT	ex VAT
QBWPW	Regulator Gold Series 325VA	69.32	59.00
QBXPW	Regulator Gold Series 425VA	81.07	69.00
QXMPW	Single Outlet Surge Protector+Tel	11.75	10.00
QGKPW	4Way Strip Surge Protector 2M	12.92	11.00
QF9PW	6Way Strip Surge Protector 2M	23.82	20.00
QCNPW	8Way Strip Surge Protector 2M	41.12	35.00

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Processors

quicklinx	AMD OEM	inc VAT	ex VAT
12NNPW	Duron 1.1Ghz	22.50	19.15
14H5PW	Duron 1.2Ghz	26.50	22.56
16G8PW	Duron 1.3Ghz	29.50	25.11
	INTEL Celeron Boxed		
215KPW	Celeron 1.7Ghz	50.50	42.98
215YPW	Celeron 1.8Ghz	57.50	48.94
24SCPW	Celeron 2.0Ghz	63.00	53.62
2CBMPW	Celeron 2.1Ghz	70.00	59.58
2CBNPW	Celeron 2.2Ghz	74.00	62.98
2FHWPW	Celeron 2.3Ghz	84.00	71.49
2HNH	Celeron 2.4Ghz	102.00	86.81

ATA Hard Disks

quicklinx	EXELSTOR	inc VAT	ex VAT
24TBPW	ExcelStor 40.0 UDMA100 2MB 7200	51.50	43.85
2BDNPW	ExcelStor 60.0 UDMA100 2MB 7200	58.00	49.37
	WESTERN DIGITAL		
10M1PW	Caviar 20.0 UDMA100 2MB 7200	48.50	41.28
10M3PW	Caviar 40.0 UDMA100 2MB 7200	54.50	46.39
25SZPW	Caviar 40.0 UDMA100 8MB 7200	59.00	50.22
10M4PW	Caviar 60.0 UDMA100 2MB 7200	65.00	55.32
25T0PW	Caviar 60.0 UDMA100 8MB 7200	72.00	61.28
10M5PW	Caviar 80.0 UDMA100 2MB 7200	71.00	60.43
211KPW	Caviar 80.0 UDMA100 8MB 7200	80.00	68.09
12NLPW	Caviar 120.0 UDMA100 2MB 7200	94.00	80.00
18HFPW	Caviar 120.0 UDMA100 8MB 7200	104.50	88.94
12NMPW	Caviar 160.0 UDMA100 2MB 7200	128.00	108.94
2J7ZPW	Caviar 160.0 UDMA100 8MB 7200	145.00	123.41
25T1PW	Caviar 180.0 UDMA100 2MB 7200	150.00	127.66
25T2PW	Caviar 180.0 UDMA100 8MB 7200	167.00	142.13
25T3PW	Caviar 200.0 UDMA100 2MB 7200	178.00	151.49
25T5PW	Caviar 200.0 UDMA100 8MB 7200	186.00	158.30
2GKXPW	Caviar 250.0 UDMA100 8MB 7200	260.00	221.28
2GKZPW	Raptor 36.0 SATA150 8MB 10000	130.00	110.64

External Hard Disks

quicklinx	IOMEGA	inc VAT	ex VAT
21FNPW	Portable 32431 20.0 USB 2	120.00	102.13
21FPPW	Portable 32432 40.0 USB 2	147.00	125.11
21FRPW	Portable 32427 40.0 FireWire	147.00	125.11
2HPDPW	32674 40.0 USB 2	114.00	97.03
21FTPW	32428 80.0 USB 2	139.00	118.30
2HPCPW	+PCI 32639 80.0 USB 2	147.00	125.11
21FWPW	32429 120.0 USB 2	175.00	148.94
21FXPW	32430 120.0 FireWire	175.00	148.94
	LACIE		
255KPW	80GB 7200rpm USB2 d2	151.57	129.00
255LPW	120GB 7200rpm USB2 d2	186.82	159.00
25L7PW	200GB 7200rpm USB2 d2	257.32	219.00
255PPW	80GB 7200rpm Firewire d2	163.32	139.00
255QPW	120GB 7200rpm Firewire d2	186.82	159.00
25L8PW	200GB 7200rpm Firewire d2	257.32	219.00
28VCPW	250GB Firewire d2	374.82	319.00
28VFPW	400GB 7200rpm Firewire d2	539.32	459.00
28VHPW	500GB Firewire d2	673.27	573.00
	MAXTOR		
14JQPW	MPS 3000LE 40.0 USB 2.0 5400	114.00	97.03
1Y53PW	MPS 3000LE 120.0 USB 2.0 5400	170.00	144.69
14JRPW	3000DV 60.0 Fire 2MB 7200	128.00	108.94
28MDPW	5000LE 80.0 USB 2.0 9.0 5400	135.00	114.90
2DK0PW	5000LE 80.0 USB 2.0 9.0 7200	143.00	121.71
2CG3PW	5000DV 200.0 USB/Fire 9.0 7200	243.00	206.81
2972PW	5000XT 250.0 USB/Fire 9.0 5400	244.00	207.66

Flash memory

quicklinx	DABSVALUE	inc VAT	ex VAT
KNFPW	32Mb Compact Flash 26x	9.50	8.09
KNJPW	64Mb Compact Flash 26x	16.00	13.62
KNKPW	128Mb Compact Flash 26x	25.00	21.28
1MPW	256MB Compact Flash 26x	45.00	38.30
14JXPW	512MB Compact Flash 26x	99.00	84.26
2CGQPW	1GB Compact Flash 26x	199.00	169.37
KN7PW	32Mb SmartMedia	8.00	6.81
LNQPW	64Mb SmartMedia	15.00	12.77
Z0CPW	128MB Smartmedia	27.50	23.41
TLNPW	32Mb MMC	12.00	10.22
14JVPW	64MB MMC	20.00	17.03
2999PW	64MB MMC + SD/MMC USB Reader	30.00	25.54
2BBFPW	128MB MMC	35.00	29.79
2BHPPW	64MB Memory Stick	29.00	24.69
2BHRPW	128MB Memory Stick	49.00	41.71
153SPW	64MB SD	25.00	21.28
153TPW	128MB SD	39.00	33.20
2BHNPW	256MB SD	88.00	74.90
24BHPW	6 in 1 Card Reader	16.00	13.62
153VPW	32MB USB Drive	12.50	10.64
153WPW	64MB USB Drive	18.00	15.32
153XPW	128MB USB Drive	27.50	23.41
28MSPW	256MB USB Drive	55.00	46.81

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£393.00 inc
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quicklinx 2LGKPW

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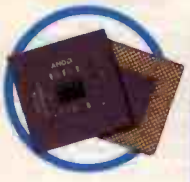

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2BP5PW	1800+ 1.53Ghz 256Kb 266Mhz	52.00	44.26
2BP7PW	2000+ 1.67Ghz 256Kb 266Mhz	55.00	46.81
2BP8PW	2100+ 1.73Ghz 256Kb 266Mhz	66.50	56.60
21X3PW	2200+ 1.8Ghz 256Kb 266Mhz	68.00	57.88
24T9PW	2400+ 2Ghz 256Kb 266Mhz	87.00	74.05
2BP9PW	2600+ 2.08Ghz 256Kb 333Mhz	127.00	108.09
28Z6PW	2700+ 2.17Ghz 256Kb 333Mhz	152.00	129.37
2CYGPW	2500+ 1.83Ghz 512Kb 333Mhz	104.00	88.51
2CYKPW	2800+ 2.08Ghz 512Kb 333Mhz	187.00	159.15
2CYLPW	3000+ 2.25Ghz 512Kb 333Mhz	272.00	231.49

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24SWPW	Pentium 4 2.67	512KB 533Mhz	167.00	142.13
24SYPW	Pentium 4 2.80	512KB 533Mhz	223.00	189.79
28LXPW	Pentium 4 3.06	512KB 533Mhz	338.00	287.66
2HNKPW	Pentium 4 2.4	512KB 800Mhz	158.00	134.47
2HNLPW	Pentium 4 2.6	512KB 800Mhz	195.00	165.96
2HNMPW	Pentium 4 2.8	512KB 800Mhz	238.00	202.56
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17BJPW	512MB 184Pin	DIMM PC2100	DDR RAM Non-Parity	CL2.5
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27TJPW	180GXP 123.5 UDMA100 8Mb 7200	95.50	81.28
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259JPW	Plus9 80.0 UDMA133 8Mb 7200	75.50	64.26
259YPW	Plus9 120.0 UDMA133 2Mb 7200	92.50	78.73
259ZPW	Plus9 120.0 UDMA133 8Mb 7200	102.00	86.81
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25B2PW	Plus9 160.0 UDMA133 8Mb 7200	141.00	120.00
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2FZSPW	Barracuda 120.0 UDMA100 7200	100.00	85.11
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2FZWPW	Barracuda 120.0 SATA150 7200	127.00	108.09
2FZYPW	Barracuda 160.0 UDMA100 7200	128.00	108.94
2G00PW	Barracuda Plus 160.0 UDMA100 7200	140.00	119.15
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2163PW	PocketDrive 20GB, USB2 cable	128.07	109.00
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2J31PW	AX4SG-N Intel 865G Socket 478 ATX	87.00	74.05
2J32PW	AX4SG Max Intel 865G So478 ATX	118.00	100.43
2J33PW	MX4SGI-N Intel 865G So478 MATX	79.00	67.24
2J34PW	AX4SPE Max Intel 865PE So478 ATX	116.00	98.73
2BRTPW	AX4R Plus E7205 Socket 478 ATX	117.00	99.58
2BRXPW	AX4PE Tube-G Intel 845PE So478 ATX	125.00	106.39
21X7PW	MX4GR Intel 845G Socket 478 MATX	68.00	57.88
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280CPW	AX4GE MAX Intel 845GE So478 ATX	98.00	83.41
280DPW	AX4PE MAX Intel 845PE So478 ATX	91.00	77.45
280CPW	AX4GER Intel 845GE Socket 478 ATX	73.00	62.13
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2CQWPW	AX45-4D MAX SiS 655 So478 ATX	103.00	87.66
280SPW	MX46 U2 SIS 650GX So478 MATX	53.00	45.11
2HCWPW	MX46-533GN SiS 651 So478 MATX	54.50	46.39
2HRTPW	MK77M-II VIA KM266 Socket A MATX	52.00	44.26
1YKSPW	AK77-333 (USB 2) VIA KT333 SoA ATX	59.00	50.22
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2J38PW	AK79D-400VN nForce 2 SoA ATX	86.00	73.20
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24NTPW	KD7-RAID VIA KT400 Socket A ATX	75.00	63.83
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293RPW	NF7-S nForce 2 18D Socket A ATX	95.50	81.28
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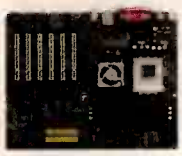

- Memory Slots: DIMM x 3
- Chipsets: VIA Apollo KT400+VT8235
- CPU Bus Clock : 333Mhz (EV6)
- AGP 8X/ DDR400*/ 5.1 channel/ ATA133/ LAN on-board

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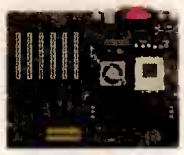

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- Max Bus Speed : 533Mhz
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SOA VIA KT400 ATX

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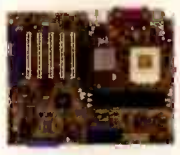

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2J73PW	P4i45G Intel 845G Socket 478 MATX	63.00	53.62
2J74PW	P4i45GL Intel 845GL Socket 478 MATX	48.00	40.86
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2J7DPW	X533 VIA P4X266E Socket 478 ATX	36.50	31.07
2J76PW	M810LMR VIA KL133A Socket A MATX	35.50	30.22
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2D1SPW	K7VM2 VIA KM266 Socket A MATX	42.00	35.75
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2J4YPW	P4C800/Deluxe Intel 875P So478 ATX	159.00	135.32
2B8LPW	P4C8X/Deluxe/GD E7205 So478 ATX	145.00	123.41
286SPW	P4SE/Audio SiS 645 Socket 478 ATX	47.50	40.43
2FFDPW	P4S533-X SiS 645DX Socket 478 ATX	48.50	41.28
2FFMPW	P4S8X-X/LAN SiS 648 Socket 478 ATX	57.50	48.94
2J64PW	P4SDX SiS 655 Socket 478 ATX	75.50	64.26
2FFNPW	P4S533-MX/LAN SiS 651 So478 MATX	53.00	45.11
2H3MPW	A7N266-VM/SE nForce 220D SoA MATX	45.50	38.73
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	INTEL		
2HR5PW	BOXD875PBZLK Intel 875P S478 ATX	137.00	116.60
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2BT6PW	K7NCR18G Pro nVidia nForce2 SoA ATX	96.50	82.13
2BT7PW	K7NCR18G nVidia nForce2 SoA ATX	90.50	77.03
2BT8PW	K7NCR18D Pro nVidia nForce2 SoA ATX	81.00	68.94
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29SYPW	GBN Max-FISR E7205 Socket 478 ATX	164.00	139.58
2H44PW	845PE Max3-FISR 845PE So478 ATX	115.00	97.88
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2BDCPW	845PE MAX-L Intel 845PE So478 ATX	74.00	62.98
221XPW	845E Max Intel 845E Socket 478 ATX	63.00	53.62
2BDDPW	845GE Max-L Intel 845GE So478 ATX	80.50	68.51
2FHKPW	655 MAX-FISR SiS 655 Socket 478 ATX	123.00	104.69
2BDGPW	KT4 Ultra-FISR VIA KT400 Socket A ATX	105.00	89.37
2869PW	KT4 Ultra-SR VIA KT400 Socket A ATX	84.50	71.92
2FHNPW	KT3V VIA KT333 Socket A ATX	55.00	46.81
2BDJPW	K7N2G-ILSR nForce 2 Socket A ATX	114.00	97.03
2BDKPW	K7N2G-L nForce 2 Socket A ATX	89.50	76.17
2BDLPW	K7N2-L nForce 2 Socket A ATX	73.00	62.13
2FHPPW	746F Ultra-L SiS 746 Socket A ATX	61.00	51.92
17TDPW	745 Ultra SiS 745 Socket A ATX	49.00	41.71
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2B7RPW	SV25 VIA PN133T FCPGA	127.00	108.09
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2B7TPW	SB51G Intel 845GE S478	230.00	195.75
2JCKPW	SB52G2 Intel 845GV S478	275.00	234.05
2B7WPW	SK41G KM266 Socket A	195.00	165.96
2C8HPW	SN41G2 nForce 2 Socket A	240.00	204.26

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28V3PW	10/100 USB	19.50	16.60
291WPW	802.11b+ 22Mbps PCI	47.00	40.00
291XPW	802.11b+ 22Mbps PCMCIA	38.00	32.34
178YPW	802.11b 11Mbps PCMCIA	26.50	22.56
178ZPW	802.11b 11Mbps USB	33.00	28.09
1790PW	802.11b 11Mbps PCI	49.50	42.13

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14XBPW	56k PCI Hardware Voice Intel	9.50	8.09
25BWPW	56k External USB	17.50	14.90
14XFPW	56k External Serial	21.00	17.88
86LPW	56k PCMCIA	25.50	21.71
28NJPW	ADSL USB + Filter + PSU	30.00	24.54
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2CWXPW	Intuit Quicken XG Advantage/Startup	19.97	17.00
2S1CPW	MS Money 2003 Standard	29.37	25.00
22YPPW	MS Money 2003 Deluxe Financial Suite	41.12	35.00
17XDPW	Sage Instant Accounts 8.0	104.57	89.00
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250KPW	McAfee VirusScan Professional 7.0	29.37	25.00
24V1PW	Symantec Norton Antivirus SB 5-user	175.07	149.00
247TPW	Symantec Norton Internet Security 2003	45.82	39.00
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28G7PW	Elby Clone CD+CDR's	24.67	21.00
YR4PW	Roxio GoBack 3.0	28.20	24.00
248BPW	Symantec Norton Ghost 2003	38.77	33.00
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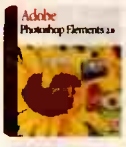

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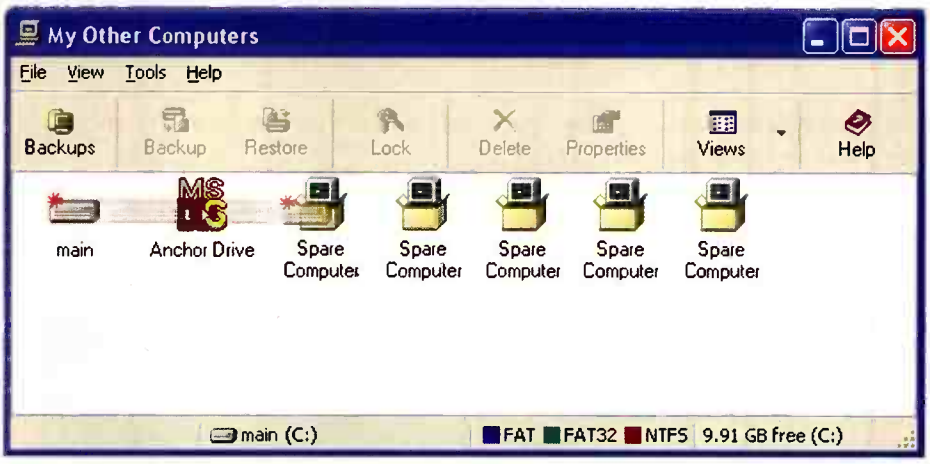
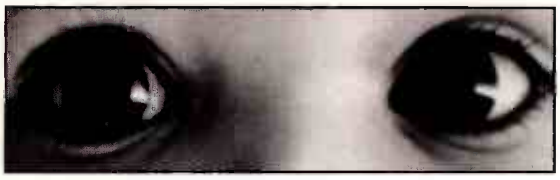
HyperOs can convert 1 Windows System into 2 Windows Systems in 5 minutes!

HyperOs clones your existing system with a fast sector copy to a different part of your Hard Disk, then reconfigures your second Windows system to run from this part of your Hard Disk on a new drive letter, and then enables you to swap backwards and forwards between the old and new systems with a double click without altering the way your PC boots at all.



Why 2 Windows are better than 1 ...



The advantages of having 2 Windows systems on your PC are too numerous to cover in one PC Magazine. But let's make a start and perhaps we'll get the job finished before the world runs out of rain forests!

1. Windows Crashes don't matter any more.
If something goes wrong with your first Windows system, you simply swap to your second with a double click.

2. Much faster performance.
Log off XP and then right click the link telling you how many programs are running on any users logon icon. A Microsoft message will appear informing you that the more applications one copy of XP is running the slower it will go. So by splitting your applications between 2 or more XP systems, each system will run faster. The same is true of course for all other versions of Windows.

3. Separate Key PC tasks
If your Music software corrupts Windows do you want to lose your ability to send and receive emails as well - we ask rhetorically? Or if your internet software corrupts Windows do you wish to be unable to run your business or do your home accounting? Plainly key tasks should each have their own Windows system. HyperOs makes this practical.

4. Give the Internet its own Windows system
The Internet is growing and growing and growing. There are 2.5 billion web pages out there right now. There aren't yet 2.5 billion software applications written to help you navigate around the net, or to protect your PC from viruses, or to send and receive and archive your emails, or just generally to help you really take advantage of this huge World Wide resource, but we are getting there! Surely the time has come to put all Web related software in its own Windows system? HyperOs was designed for this sort of thing.

5. Risk free software trials
Everywhere you look there are free 30 day trial software packages. If you install too many of them all into your one and only Windows system, it will crash and your trial will end. The best way to try out a new piece of software is in an experimental Windows system. I mean who marries a girl the minute he meets her (OK perhaps with Russian brides?) Is it not a good idea to see if you get along first? Well things are no different with software. See if the application does what you want before you risk installing it in your mission critical system.

6. Solve all software conflicts
It is true to say that most software applications will work fine in a virgin Windows system. But this does not mean that they will work fine in your Windows system. This is because every PC has its own unique combination of applications and hardware and peripherals, and a further new application may not work with your particular combination. In fact the more applications and drivers that you have installed, the more likely it is that the next application or driver will not install or run properly. The solution is of course to have several Windows systems, then your new wonder application will certainly work in one of them! Or if it is really fussy, you can give it a whole Windows system to itself.

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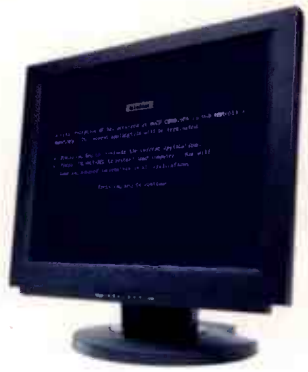
7. Quickly determine whether you have a software or a hardware fault



If one Windows system crashes then swap to the next and see if the same crash occurs again. If it does then it is looking like you have a hardware fault. If it doesn't then you have a software fault in the first system. HyperOs employs a double click fire and forget system swap, so it doesn't take a minute to find where the problem lies.

8. Who is the Boss in your PC?

With one Windows system installed, there is no question, Windows is the Boss. With two Windows systems the whole balance of power and of fear of malfunction is shifted. Windows can no longer hold you to ransom. If it plays up, forget it, move on to the next one. In fact, if you have 10 Windows systems installed then you can use them like disposable razors or ball point pens. Use it (via an ultra fast drag and drop image restore) then loose it (by instant system deletion).

9. True Reliability

HyperOs Systems Labs have carried out extensive trials to determine how many general applications each version of Windows can reasonably safely be expected to run. Our results were as follows:

We carried out tests using three different cover disks from UK PC Magazines. We loaded in 10 then 20 then 30 then 40 then 50 applications from these three cover disks into the three PCs. We ran the Ziff Davis Business Winstone 2002 Benchmark test on each PC at each number of applications to see if Windows was stable enough to perform. Business Winstone emulates a day in the office, it is a real world Benchmark. We found that Winstone/Windows crashed or the PC became unuseably slow, when the number of applications reached the limits above. Each Windows OS could run all the applications in smaller numbers. Business Winstone is a good real world Benchmark, it gives your PC quite a work out. You may be able to load more applications than the above safely into Windows if you don't intend to have several of them open at once, but why take that risk?

The full technical details of the tests can be found at www.hyperos2003.com/labs.html Our results also verified that the more applications you load it up with, the slower an

Operating System goes. Incidentally 2K was the fastest, and XP could carry the most load as the table above shows. So if you wish your PC to actually use more than 10% of a modern hard 80GB disk for software then you need more than one Windows system.

10. Take advantage of all the great software you like

Many consumers falsely believe that you can do this with any PC, but generally you can't. If your PC only has one Windows system installed and if you have a multi dimensional interest in life then you are going to run out of application space. However if you have several Windows systems, then you can try out as many new applications as your imagination desires and as your many Windows systems permit.

What is the purpose of having a computer and being able to run no more than 20 of the thousands of available applications on it?

The IBM PC dominates the MAC we are told, because of the enormous diversity of software applications that are available to it. But if you can only run 20 of these applications on your IBM PC, then have you not defeated the main advantage of going the Microsoft route in the first place?

Windows Operating System	Number of applications it can reasonably reliably run	Maximum Working load at 150MB per application
Windows 98SE	20-30	3.0 - 4.5GB
Windows ME	15-30	2.25 - 4.5GB
Windows 2000 professional	50-60	7.5 - 9.0GB
Windows XP	30 large or 75 small	6.0 - 7.5GB

HyperOs Multi Windows Products	Windows 95 & 98	Windows Me, NT, 2000 & XP	PartitionMagic included	Old system + up to 10 new systems	Old system + up to 20 new systems	RAM HyperDrive	RRP (Ex PP and VAT)
HyperOs 2003 R2	●		8.0	●		95,98	£99.00
HyperOs 2003 R3	●	●	8.0	●			£99.00
HyperOs 2003 R4	●	●	8.0	●		95,98,Me	£149.00
HyperOs 2003 R5	●	●	8.0		●		£149.00
HyperOs 2003 R6	●	●	8.0		●	95,98,Me	£199.00

Windows 95 must be OSR2

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HyperOs can convert one Windows XP system into 10 Windows XP systems in 14 minutes.

HyperOs can convert one Windows 98SE system into 10 Windows 98SE systems in 5 minutes.

HyperOs can run up to 21 Windows XP systems on one Hard Disk, without Multibooting, without Virtual PCs, and without hiding any partitions.

Or if you prefer, these 21 systems can be any mixture you like of Windows 95osr2, 98, 98SE, Me, NT, NTServer, 2000, 2000Server, XP or 2003.

Now that is real computational power. One Windows system is totally lame in comparison to the power, the flexibility and the capability of a HyperOs Multi Windows machine.

One Windows system can no longer handle the huge number of software applications that are available today.

13 years ago, in 1990, when Windows 3.0 first came out, there were only a handful of decent Windows applications available. At that time perhaps one Windows system was sufficient. But today there are thousands and thousands of interesting Windows applications on offer, so one Windows system is plainly inadequate as a means of experiencing even a small sample of them. No one wants to share a one room apartment with 25 other people. So why install your mission critical applications and your mission critical device drivers together with all your non mission critical device drivers and all your internet applications and all your network applications and all your games and all your office applications and all your educational applications and all your music applications and all your video applications into one copy of Windows?

Really, there is no need to live in such computational squalor!

It is well known that the more applications you load into Windows the slower it goes, the more difficult it is to find anything and the more likely it is to crash. But there is a very simple fix for this. Just add a second Windows system and you have a two roomed apartment, or better still, add another 9 Windows systems and you have a 10 roomed mansion. Now you are living in Beverly Hills.

You can spread your software load, you can avoid device driver conflicts, you can avoid software conflicts. You can run 5 different sound cards if you like, or 5 different network cards, in one PC. You just load the device drivers for the devices you need in each separate Windows system. In the past, Multi Windows systems have mainly been virtual PC environments or Multi Booting environments with multiple hidden primary partitions. But thankfully those days are over.

HyperOs boots your PC as normal from one Primary bootable partition, your regular C: drive. It boots just like a normal single Windows PC boots. Then it takes over the boot process and redirects your PC to run any one of up to 20 other Windows systems which are installed as normal in Logical partitions with drive letters E: to X:, all of which can be on the same Hard drive if you like. HyperOs keeps drive D: for itself.

HyperOs also incorporates what we understand to be the World's fastest sector copy program, which can backup/restore/copy/paste/image/clone Windows Systems at around 1GB per minute on a modern ATA100 Hard Disk.

So HyperOs can back up NT in around 7 seconds and XP in around 70 seconds.

HyperOs can copy any Windows system on your PC to any drive letter between E: and X: and then reconfigure that system automatically to run from that new drive letter. The copy is made by a simple drag and drop in the 'My Other Computers' window that HyperOs provides. You simply drag the icon for the E: drive (for example) to the icon for the F: drive (for example), and another Windows system is born.

You can also back up and restore whole Windows systems with a simple drag and drop. So with one image of XP, you can create 10 Windows systems in around 14 minutes (at 1GB per minute) allowing for drag and drop time, and 20 Windows systems in around 28 minutes, just by performing 10 or 20 drag and drop operations.

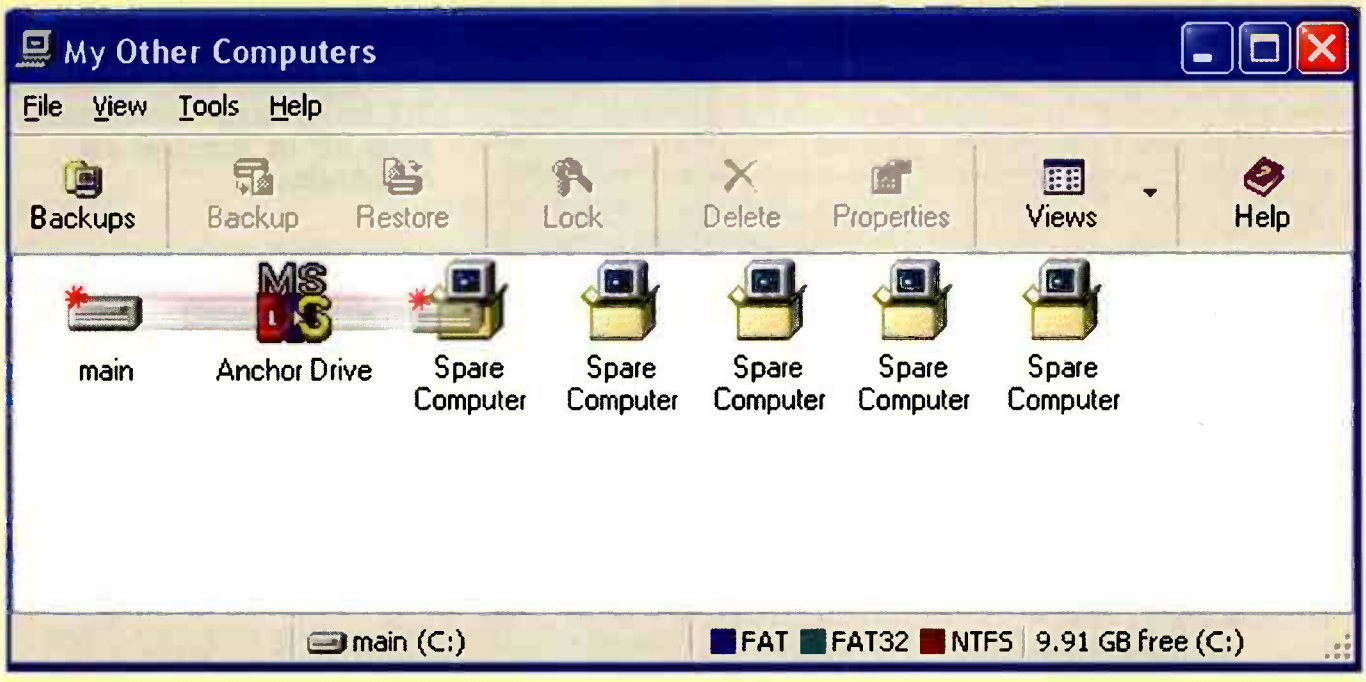
This is all possible because HyperOs manipulates one real Windows system from another real Windows system, rather than from a DOS boot disk as in the case of the famous Norton Ghost. Using the Windows environment for Windows system manipulations means that you can drag and drop whole Windows systems as if they were single files. It is wild.

HyperOs Systems

System Doubler

This is how you convert a 1 Windows PC into a 2 Windows PC without re-installing Windows.

1. Install HyperOs
2. Open PartitionMagic 8.0 integrated into HyperOs
3. Shrink your C: drive partition and create a D: drive partition and an E: drive partition
4. Restart Windows, open My Other Computers and drag the C: drive icon over to the E: drive icon.



Now you have two Windows systems. You have a backup system, you have an experimental system, you have doubled your software carrying capability, you have actually doubled the capabilities of your PC.

HyperOs Multi Windows Products	Windows 95 & 98	Windows Me, NT, 2000 & XP	PartitionMagic included	Old system + up to 10 new systems	Old system + up to 20 new systems	RAM HyperDrive	RRP (Ex PP and VAT)
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HyperOs 2003 R5	●	●	8.0		●		£149.00
HyperOs 2003 R6	●	●	8.0		●	95,98,Me	£199.00

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HyperOs vs. Multibooting vs. Virtual PCs

Traditional **multiboot systems** work by creating primary partitions and installing a copy of each OS in each bootable partition.

Then when you boot the PC you get a boot interrupt menu, which gives you the option to choose one of your bootable partitions by hiding all of the others.

This method means: -

1) You can only ever access one of your systems, all other systems are hidden.
2) You cannot backup, restore or delete or fix one Windows system from another, you have to use a boot disk.
3) You cannot clone Windows systems.
4) You cannot move a Windows system from one partition to another and then run it on the new partition.
5) You have to install each copy of each OS that you wish to run.
6) You can only run an OS (except OS2, Linux, NT4, 2K and XP) from a primary partition.
7) You can only have 1,2 or 4 primary partitions per disk (depending on your BIOS). So you can only have 1,2, or 4 OS's per hard disk.

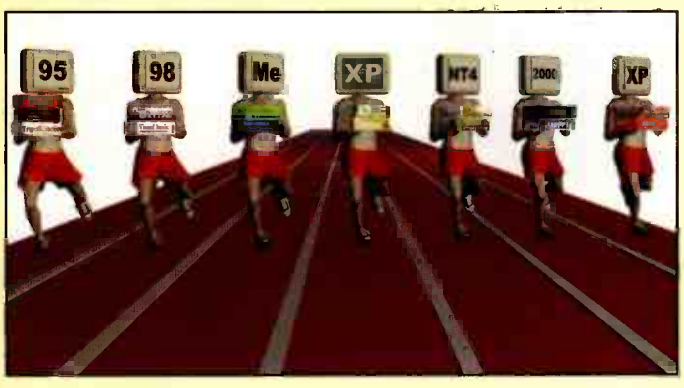
Virtual PC systems run your applications on one client Windows system which shares system RAM and CPU time with other client Windows systems. All of which run on emulated hardware, all of which runs on a host Windows system.

This method means: -

1) You can only run a virtual Windows environment on emulated hardware not a real Windows environment on real hardware.
2) You can only use a fraction of your PC's resources for any Windows system, so performance is drastically reduced.
3) You cannot be sure that any conclusion reached on a virtual Windows platform will be applicable to a real Windows platform.
4) Running several Windows on top of each other all competing for limited PC resources, is going to be less stable than running 1 Windows which gets all your PC's resources.

HyperOs 2003 works by creating only one bootable partition, your C: drive. It then redirects your PC to the OS you wish to run. You choose this OS from a windows icon called 'My Other Computers'.

This method means: -



1) You can access all of your systems, none are hidden.
2) You can backup, restore, copy, paste, image, clone, delete, fix, zip or unzip whole Windows systems from Windows. No need to use a boot disk. This means you can reinstall Windows XP from an image file in 60 seconds, rather than 60 minutes.
3) You can drag and drop whole Windows systems on to drives to clone them, and then run them from that drive.
4) You can move whole Windows systems from one disk to another or from one partition to another by dragging and dropping them within 'My Other Computers'.
5) When you boot your PC it will return to the last system used without a boot interrupt menu.
6) To change systems just double click the relevant icon in 'My Other Computers'.
7) Once you have installed one copy of any version of Windows, you can copy it to any other partition on any hard disk on your PC and HyperOs will run it.
8) You can run 95OSR2, 98, Me, NT, 2000, or XP from a logical partition.
9) You can have up to 21 operating systems on 1 hard disk.

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OneOs versus...

Which one crashes the most ?

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Which one is the fastest ?

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HyperOs 2003 R6	●	●	8.0		●	95,98,Me	£199.00

Windows 95 must be OSR2

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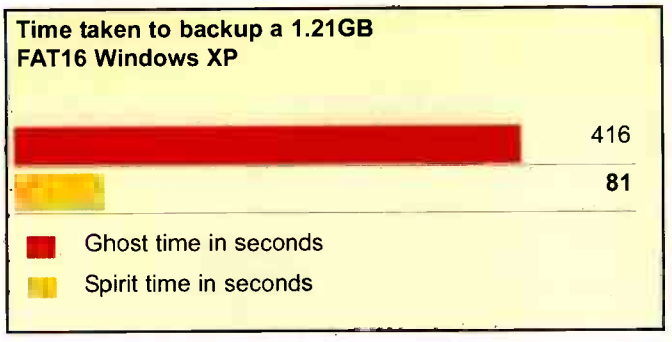
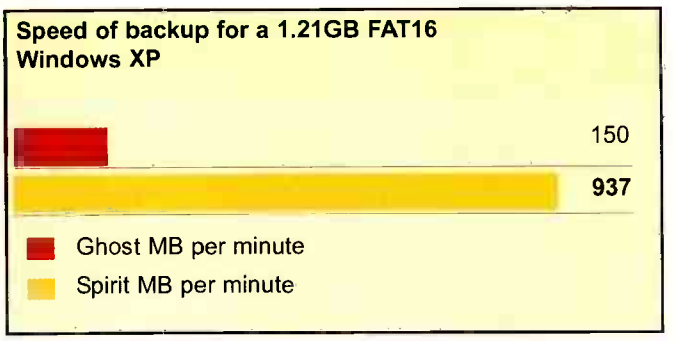
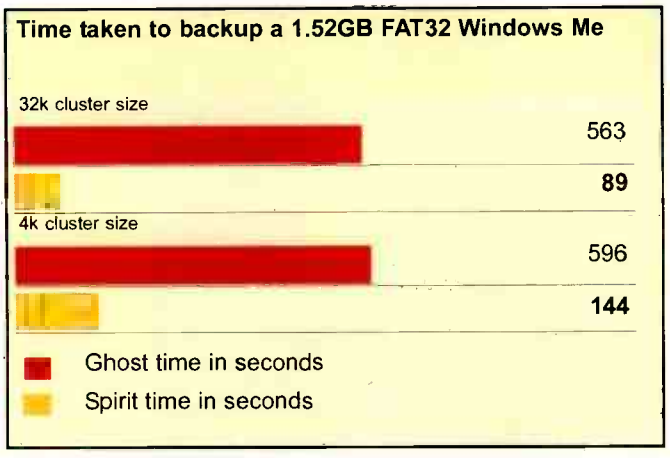
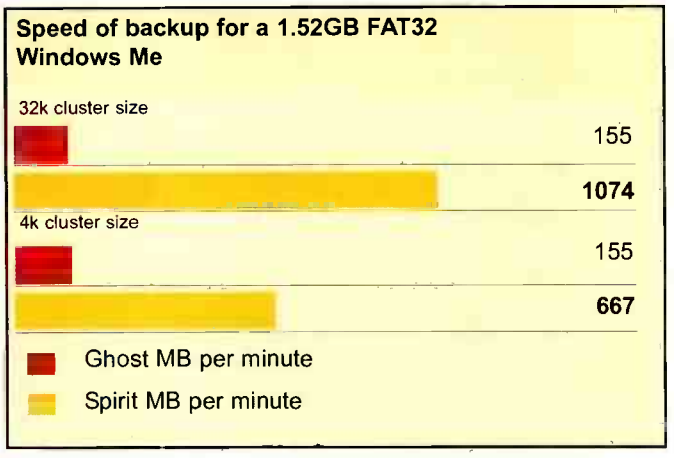
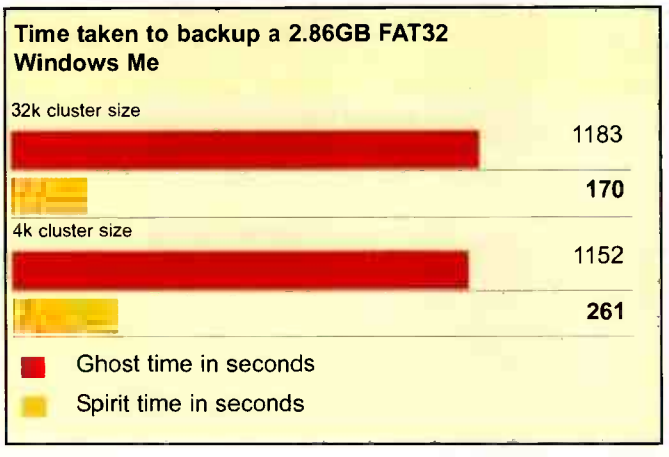
"HyperOs Spirit comes out 5X faster then Norton Ghost"

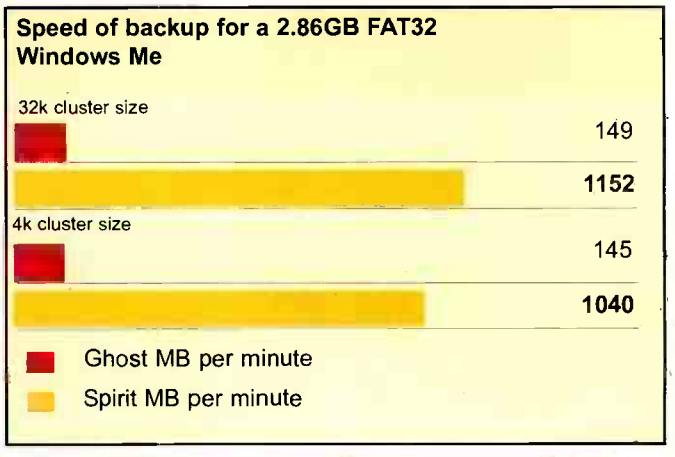


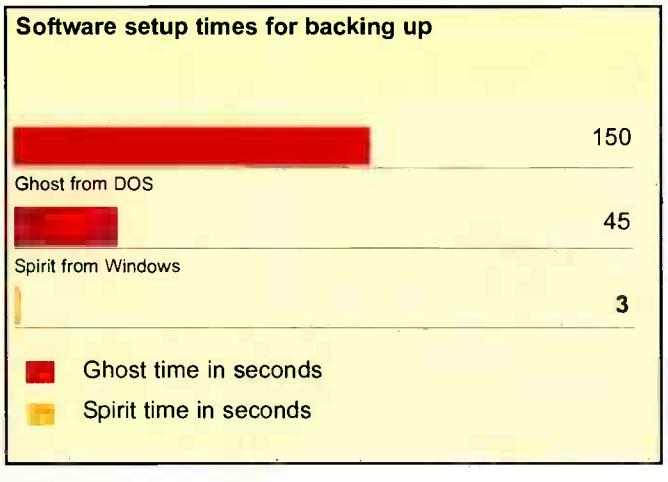












The results examined

The test machine for the Ghost vs. Spirit contest was an Advent machine purchased from PC World 2 years ago. It had an Athlon 550MHz CPU and 64MB of RAM running on the AMD 751 Southbridge and 756 Northbridge. We used the latest Bus Master IDE drivers for the Southbridge, which were available from the AMD website. With larger partitions, Ghost stops after backing up 2047MB (this is the 2GB DOS file size limit). You either have to watch the whole process and immediately start it off again, or as is more often the case, you will lose a few minutes before you realise that it has stopped and therefore restart it. Spirit does not have this problem, because it runs in Windows rather than DOS. Spirit performs over 4 times faster than Ghost with a small cluster size partition, and over 6 times faster than Ghost with a large cluster size partition.

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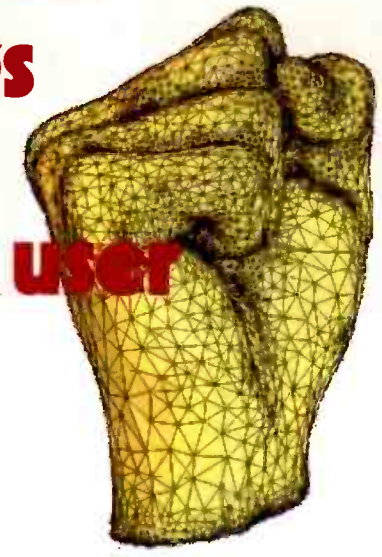
HyperOs Spirits drag and drop capabilities brings system backups within the grasp of the home user



Let us face it. Most PC users cannot be bothered to back up Windows using the traditional Norton Ghost software. This is why Microsoft are indefinitely introducing improved automatic backup solutions for Windows such as System Restore. This is because people in general don't back up their systems with standard backup software often enough. This is why System Restore is billed as an XP top 10 feature.

The reason that one does not back up Windows regularly is that the typical system with System Restore and Hibernate and the paging file and some data on one drive might be 3GB in size. And all industry backup software runs in DOS in PIO mode at a maximum of 100MB per minute. So we are talking about 30 minutes to back up a normal Windows system. And the user has to reboot to DOS and then use a DOS interface to set the backup going.

HyperOs can do this job in 90 seconds and this is how:

Firstly with HyperOs there is always another Windows system available to backup your first system with. So that rather than your

hard disk operating in PIO mode in DOS it is operating in UMDA 4 or 5 mode in Windows.

Secondly HyperOs backs up systems using HyperOs Spirit, which employs an intermediate RAM buffer, and an algorithm which reads data from the source drive in 6.4MB chunks into RAM, in such a way that it can be written out linearly to the target drive. In this way write times are much speeded up, because the writing head does not have to jump around all over the disk. HyperOs Spirit will back up and restore data at around 1000MB per minute on an IBM120GXP hard disk (which is a very fast IDE hard disk - a fantastic piece of IBM technology).

Thirdly, HyperOs disables Hibernate and System Restore, because the former is incredibly space inefficient (taking 12% of your hard disk space or more if it can get it), and is only useful with a very slow to start up and overloaded Windows. Also because the latter is performed better by the very process we are currently describing.

Fourthly, HyperOs setup moves your swap file and paging file to the C: drive. There is no need to back up these huge files, when you back up Windows. Windows will recreate them when you restore it. So what was a 3GB system on a one Windows PC will be between a 1GB and 2GB system on a HyperOs multi Windows PC (because your paging file/swap file and your hibernate file and your system restore folder generally take up more than 1GB between them).

So Spirit can back it up in between 1 and 2 minutes or typically in 90 seconds. As regards to NT, since it only takes up 120MB when configured as above, for HyperOs, it will get backed up in 7 seconds at 1000MB per minute. So it is not an exaggeration to say that what other backup and restore packages do in 30 minutes, HyperOs Spirit does in 90 seconds. This differential applies on all typical consumer PCs where the hard disk runs off the motherboard IDE socket. PCs with RAID and other fast SCSI hard disk controller will perform better in DOS and so the difference will not be so marked.

But that is not the best bit. The best bit, is that to back up a system with HyperOs, all you do is drag the system icon to the backups window of HyperOs's My Other Computers window and drop it there. It is a drag and a drop, that is it.

The difference between a 30 minute backup setup by an excursion into DOS perhaps after booting from a floppy disk, and a 90 second backup setup by a drag and drop from within Windows is monumental. This is one of the huge advantages of HyperOs over Multi Booting or Virtual PC software. With HyperOs, you can manipulate one Windows system from another Windows system. With Multi Booting you cannot even see any other Windows systems, and with Virtual PC software you can see them but you cannot access their data due to virtualisation and due to the fact that all these systems are being used at once.

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The HyperDrive - running Windows entirely in RAM

HyperOs 2003 does not require any extra RAM to be installed on your PC unless you intend to use it to run Windows in RAM. If you are going to run Windows in RAM then you will need 768MB of RAM to do it. But, if you intend to use HyperOs to run several Windows systems on your hard disk, then obviously you will not need any more RAM than the normal requirements for Windows (64MB / 128MB) to do it.

Most operations in a modern PC happen in silicon. In silicon there are no moving parts. Silicon transistors which control and store data can change their state (from 0 to 1) over 1 billion times in one second. But incredibly, all of the data which these transistors work on, is taken from and returned to a rotational mechanical device which whirls round and round at 7200rpm.

The hard disk is an obvious bottleneck in PC performance. If this article was merely a couple of paragraphs long we would say something like:

"Electronic devices can transfer information at near to lightspeed, which is 300,000,000 metres per second, whereas your hard disk is a rotational mechanical device which moves data around at between 4,200 and 15,000rpm"

But this is only a part of the hard disk dilemma. The imbalance in performance between RAM and a hard disk is actually far worse than what one might expect from their differing physical constitutions. This is because the hard disk controller, which is the interface between your disk and your PCI Bus, is often more of a bottleneck even than the hard disk itself. Truly, the hard disk controller is one of the unsung heroes or villains of PC performance. When you buy an ATA100 hard disk, and more laughably when you buy an 'ATA133' hard disk, you can easily be fooled into believing that it will read and write data at 100MB per second or even at 133MB per second. But just try and read or write 100MB of information, say from a 100MB file, you will discover that it will not take one second. Typical data transfer rates vary from 2MB per second to 50MB per second depending on your ATA100 drivers, your Southbridge and your hard disk controller.

If you have no ATA100 drivers, then the hard disk will operate in PIO mode, rather than UDMA mode, and it will transfer data at between 2MB and 8MB per minute (which is not much faster than a CD). If you have a Pentium4 motherboard with the latest Southbridge, then you may see data transfer rates in excess of 50MB per second from your ATA100 hard disk, which is not what you might hope for but is nonetheless a creditable effort.

However, all of this pales into insignificance when compared with the IO which is achievable from a RAM disk. HyperOs employs a real mode 16 bit RAMdisk, which we call a HyperDrive. With one of these, even if you are simply using plain old 100MHz SDRAM, you can transfer data at 200MB per second (100 million chunks of 16 bits, which is 2 bytes, every second).

If you are using 266MHz DDRAM, in a RAM Hyperdrive, then your transfer rate will be 532MB per second. What this means is that every application that you double click could theoretically open 10 times faster on the HyperDrive than it does on the fastest consumer hard disks available today. In fact due to timing limitations in software, Windows itself will start up around twice as quickly, and applications will open between 3 and 5 times faster.

Instant Desktop

The effect is that you feel like you have an instant desktop. If you look for files on a RAM disk, you will find them instantly. There is no benchmark that we know of that measures this "clicking around the desktop time". Yet if you use a PC for more than an hour a day at work, then this really is the time that needs to be reduced. By drastically reducing the time it takes for every Window of every application on your PC to open or close, you save yourself huge amounts of real user time. Benchmarks generally measure execution time, which is how long it takes *your PC* to run an application. They do not measure desktop time, which is how long it takes *you personally* to set up the application. The RAM HyperDrive reduces the time that it takes you to do things on a PC. This is often more important than reducing the time it takes your PC to run an application, because while it is running an application, you can be taking a phone call or setting up something else on your PC.

HyperOs Systems

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The HyperDrive rewrites history giving you total crash recovery

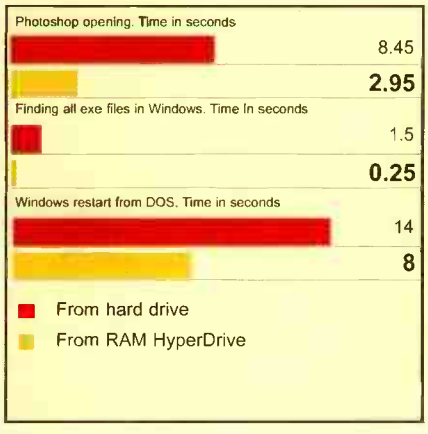
When HyperOs swaps to HyperDrive mode, it first sector copies the relevant hard disk partition (732MB maximum data size) onto the RAM HyperDrive (at speeds of up to 1900MB per minute). Then, it runs this copy of Windows and its applications from RAM. If, during your session in HyperDrive mode Windows crashes, then you have only corrupted the copy of Windows on the HyperDrive, you have not altered the copy on the hard disk. So, if you then swap back to hard disk mode, or exit HyperDrive mode and then reboot back into HyperDrive mode, the PC will have no knowledge of the crash and things will continue as if the crash had never occurred. You will have effectively rewritten history. As a result, the HyperDrive gives you an indefinite number of opportunities to screw up with impunity! This is heaven for experimenters.

Surf the net in HyperDrive mode

The first time you surf in HyperDrive mode with a 56K modem, that is with all of Windows and Internet Explorer or Netscape or AOL in RAM, you feel like you are surfing with Broadband. Various windows open and close so fast it is like there is no one else on the Net! But the advantages do not stop there. Any change to your system is discarded at the end of the session. So, if the Net takes over your machine and starts bouncing you around different websites, and filling your Windows system with cookies and unwanted favourites, or messing around with your home page, you are immune. Reboot, and things return to exactly the way they were before the session. Every change is lost when you exit HyperDrive mode unless, of course, you choose to save certain files that you have downloaded on to your hard disk, instead of leaving them on the desktop in RAM.

HyperOs for hardware and software reviewers, software designers, web developers and IT testers.

RAM HyperDrive vs Hard Drive



The results examined

The test system used was an Athlon XP1800+ on an Abit KG7 motherboard, 80GB 120GXP IBM HDD with 1024MB DDR RAM, GeForce3 and TX2 Promise controller.

We used the fastest hard IDE disk we know of, we used the fastest SCSI performance IDE hard disk controller we know of, and the HyperDrive still blew it away convincingly! Need we say more?

If you spend a significant part of your day clicking around your desktop, then the HyperDrive will make all the difference.

One Windows in these circumstances is again pretty much a no-brainer. If you are testing 10 graphics cards, each of which will have its own drivers, then you really need to install each driver for each graphics card into a new copy of Windows. If you do not do this, then you cannot be sure that bits of the drivers used to test your earlier graphics cards are not still lying around and conflicting with the new drivers being used to test your later graphics cards. HyperOs Systems recently supplied HyperOs 2003 release 6 to Computer Shopper Labs for just this purpose. In the past, their hard working engineers have had to reinstall Windows a dozen times to do the group test. But now, with HyperOs, they install Windows once, and back it up in around one minute. Then, they can either make as many copies of it as they want for the test, or they can simply keep restoring a clean image (again in around 60 seconds) before each new test. Big web design firms such as Rufus Leonard of Clerkenwell (an early customer of HyperOs) can gain huge benefits from multi Windows systems. Rufus Leonard used to have 20 PC's all of which ran different versions of different web browsers. These PC's were used to test website appearance and performance on every conceivable platform. With HyperOs, the whole test of all 20 browser types can be done on one PC, so that hardware differences can be eliminated from the equation, and the testing engineers can multiply their productivity, whilst decimating their hardware bill and freeing up some desk space as well!

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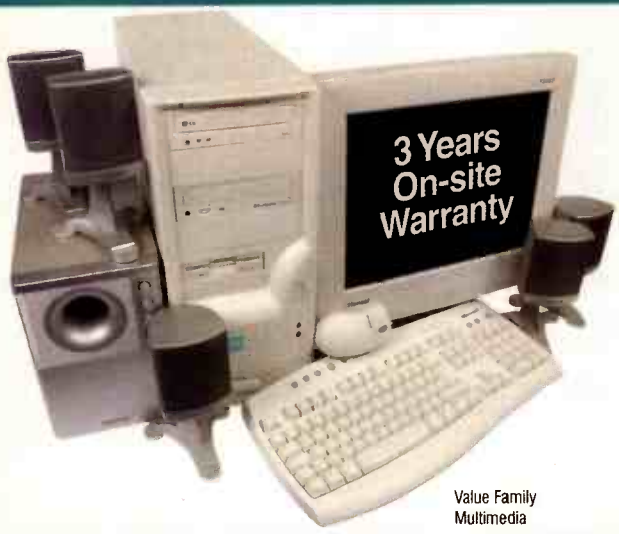

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Motherboard	Gigabyte GA 7VAX, 8x AGP, ATA133 USB2.0. LAN
Memory	256MB PC2700 DDR333
Hard Drive	80GB Hitachi/IBM Deskstar 7200rpm 2MB Cache 8.5ms
CDRW	Lite-On CD-R/RW Drive 52x24x52x, Smart Burn/X, Nero
DVD	NEC 16x48x DV-5800B DVD-ROM
Graphics	64MB Gainward GeForce 4 PowerPack Pro 600, MX440, 5ns DDR TV
Sound	Onboard 6 Channel AC97 Audio
Monitor	17" Philips 107T .25dp Real Flat, 1024x768@85Hz, LightFrame3
Software	**HyperOs Multi-PC software 5x**, Windows® XP Home, Sun Star Office, Cyberlink PowerDVD, Recovery System
Warranty	3 year On-site

AMD Athlon XP

£636.10 ex.vat £747.42 inc.vat

The benefits of this HyperOs Multi-PC and the enhanced value to family users are easily identified; **everyone can have their own Windows environment** without affecting one another. Today's large hard disks can easily be preconfigured to accommodate a Windows PC for every member of the family and if someone has a problem no one else has to suffer. Recovering from the problems of a multi-user PC are a thing of the past with HyperOs.

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Performance Gamer *HyperOs Multi-PC 8x*

Case	Simplicity Tower 4x 5.24 & 2x 3.5 Quick Release Bays, Front USB
Processor	AMD® Athlon® 2500+ XP (1.83GHz) 333MHz QuantiSpeed
Motherboard	Epox 8RDA+ Athlon nForce2, 8x AGP, 6 PCI, ATA133, 6x USB2, 2x IEEE 1394 Firewire, Dolby Digital Surround Audio, LAN
Memory	512MB PC2700 DDR333
Hard Drive	120GB Hitachi/IBM Deskstar 180GXP ATA100 7200rpm 8MB Cache 8.5ms
CDRW	Lite-On CD-R/RW Drive 52x24x52x, Smart Burn/X, Nero
DVD	NEC 16x48x DV-5800B DVD-ROM
Graphics	128MB ATI Radeon 9700 PRO DDR DVI TV
Sound	Pure Digital VideoLogic Sonic Xplosion DVD
Monitor	17" iiyama Vision Master Pro 1600x1200@75Hz
Software	**HyperOs Multi-PC software 8x**, Windows® XP Home, Sun Star Office, Cyberlink PowerDVD, Recovery System
Warranty	3 year On-site

AMD Athlon XP

£1024.96 ex.vat £1204.33 inc.vat

If you're passionate about gaming then this PC is perfect. The raw power of the **AMD Athlon 2500+** together with the **ATI Radeon 9700 Pro** are further enhanced by the HyperOs Environment. You can literally enjoy multiple PCs in one and configure them around your specific software and gaming requirements.

Play safely in one Windows and test in another, easily configure independent Windows versions without the need for multiple installation, check driver updates and stability. Take full advantage of **HyperDrive for Windows 9x editions** and load the whole system into memory.

The advantages of HyperOs are almost limitless to the PC gamer and the ultra fast drag and drop backup routines mean you can solve life's little problems without losing your data.

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HyperOs 2003

Ultimate Executive *HyperOs Multi-PC 10x*

Case	Simplicity Black Aluminium Midi Tower, 6x External Quick Release & 4x Hidden Bays, Front USB & IEEE 1394
Processor	Intel®Pentium®4 3.06 GHz PGA-478, System Bus 800MHz, 512KB L2-Cache, HT Technology
Motherboard	Asus P4C800 Deluxe Intel 875 (Canterwood) FSB 800MHz, DDR400, Multi RAID, Gigabit LAN, 2 x IEEE 1394, 4 x SATA, AC97 6 Ch Audio
Memory	1GB (2x512MB) PC3200 DDR400
Hard Drive	2x 180GB Hitachi/IBM Deskstar 180GXP ATA100 7200rpm 8.5ms
CD-RW/ DVD-R/RW	TEAC DV-W50E DVD-RW Drive 4x DVD-R, 2x DVD-RW, 16x CD-R & 8x CD-RW, Write Proof, (Black)
DVD	16x40x Pioneer 120S Slot DVD-ROM (Black)
Graphics	128MB ATI Radeon 9700 PRO DDR DVI TV
Sound	Pure Digital VideoLogic Sonic Xplosion
Monitor	18.1" iiyama 4612 Black 1280x1024 D-sub, DVI, audio option
Software	**HyperOs Multi-PC software 10x**, Windows® XP Home, Sun Star Office, Cyberlink PowerDVD, Recovery System
Warranty	3 year On-site

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If you want uncompromising performance, superior components and an ability to deal with specific software applications this PC is fully equipped for the job. Incorporating a **HyperOs Multi-PC** configuration provides the level of flexibility you should expect with a system of this type. Home, office, audio visual, graphics any **high powered tasks can be run with ease and confidence** within a HyperOs environment. All holly specifications are easily customised to your needs, choose from a wide range of quality components online or chat to us about the right configuration for you. Clients are our business and HyperOs allows us to harness all the power of an ultimate system for you.

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Lifestyle *HyperOs Multi-PC 6x*

Case	Green Acrylic ATX Midi Tower, Front USB 2.0 & IEEE 1394, 4x 5.25" & 2x 3.5" External, 5x 3.5" Hidden Bays
Processor	AMD Athlon 3000+ XP (2.17 GHz) 333MHz QuantiSpeed
Motherboard	Epox 8RDA+ Athlon NForce2 C18D/MCP-T, FSB333, 8x AGP, 6 PCI, ATA133, 6x USB2, 2x IEEE 1394 Firewire, 6ch AC97 v2.2, SPDIF, LAN
Memory	512MB PC2700 DDR333 CL2.5 Original
Hard Drive	120GB Hitachi/IBM Deskstar 180GXP ATA100 7200rpm 8MB Cache 8.5ms
CD-RW	Lite-On CD-R/RW Drive 52x24x52x, Smart Burn/X, Nero
DVD	NEC 16x48x DV-5800B DVD-ROM
Graphics	128MB ATI Radeon 9700 PRO DDR DVI TV
Sound	NForce Dolby Digital ALC650 6-channel full-duplex integrated sound
Monitor	15" iiyama Prolite E380S TFT LCD TCO'99 1024x768 D-Sub
Special	Includes Mod Pack UV Fans, 2x Cold Cathode, Cable management
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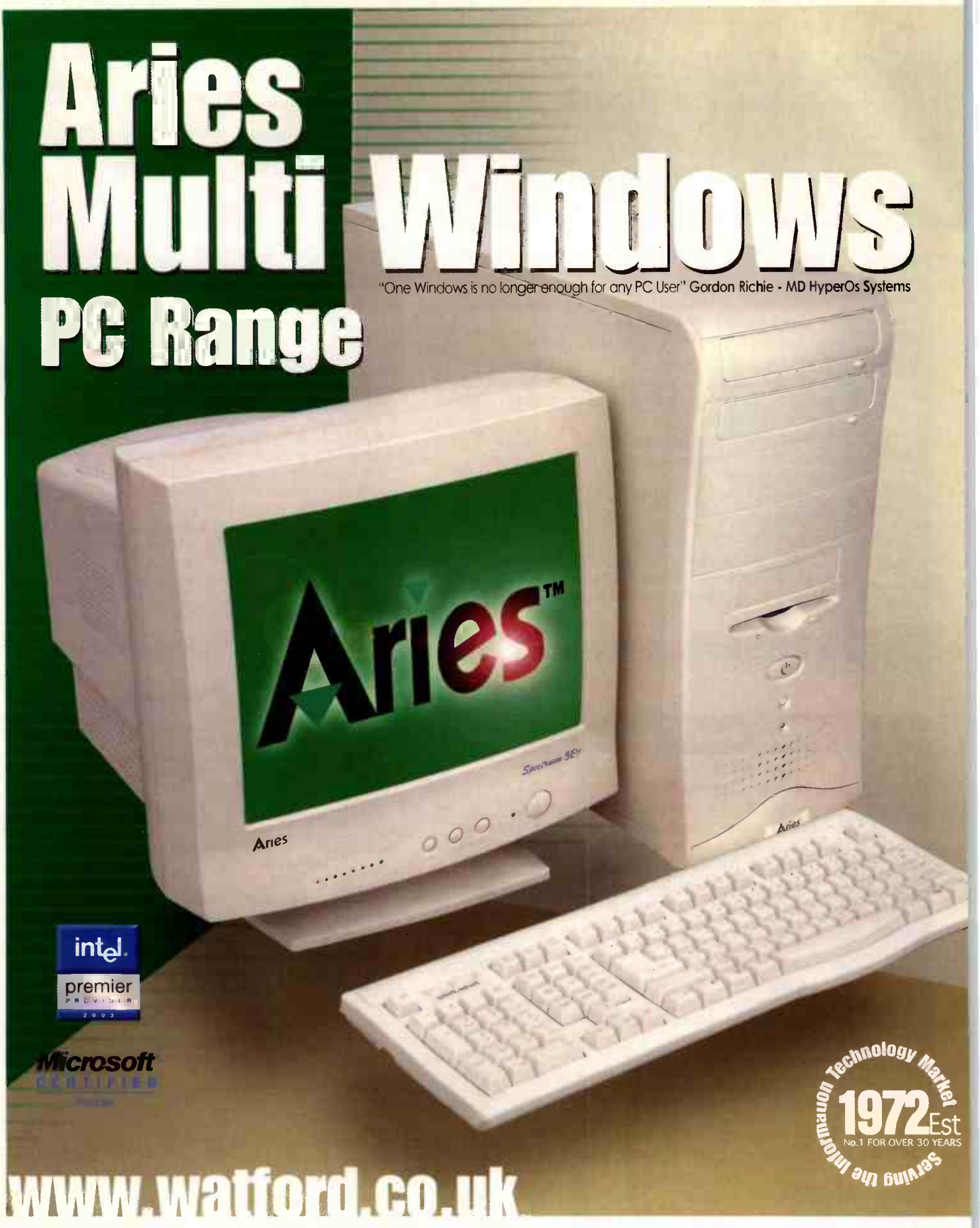

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HyperOs Testimonials

I'd seen all the ads for HyperOs over the last year or so and wondered what it was all about. My curiosity was rekindled about a week ago when I started to put a new system together to replace my aged (12 months old!!) Win2k system which was slowing sinking under the load of many dozens of installed applications. So I decided to take a look at HyperOs.

Like many people who use a PC for a living (hardware/software development) I gradually fill them up with all manner of applications and utilites until they end up a smoking unstable pile.

This time around I wanted things to be a little different, so with a brand new install of 2k in front of me I thought it would be a good time to try HyperOs. After asking a couple of questions here in the forum (thanks for the answers Dean and Jules), I took the plunge a couple of days ago and bought a copy.

It arrived this morning and was instantly installed. Installation was a doddle, so simple that for a while I was convinced I'd missed something out. What can I say, it works. As that advert says 'It does exactly what it says on the tin'.

Brian.

Dear Sir,

I would just like to express in writing how impressed I have been with your product since installing it 4 months ago. All of the information provided is correct - it has completely changed the way I use my computer and I am very grateful for this change. I am running 10 XP systems on my computer now and don't think it has crashed once - not something I could have said prior to installation - I think it crashed at least once a day before! Please pass on my thanks to the developers and entire team for the product and all of their help when purchasing.

In all a wonderful improvement to my use of my computer - Thank You.

With Warmest Regards, Gareth Barry.

I received a letter yesterday with the offer of the latest upgrade, I was wondering if it's worth the £23.50 as I purchased HyperOs 2002 when it came out and then purchased HyperOs 2003 revision 6 about 8 weeks ago, so far it has cost me around £290.00 including vat and delivery. I like to keep up with the latest versions or updates with all my software, could you let me know how much of a difference it is between build 54.35 and my software build of 54.03 as I feel that there is not much difference betwen builds, please could you reply a.s.a.p as I would be interested if there will be any major difference. As i have not sent any mails to you before now I'd like to say that this HyperOs 2003 is the best program I have ever come across and will never do without it keep up the good work and once again this programe is amaaaaaaaaazing.

yours, S G Morgans.

Just a few words in praise of HyperOs particularly the 2003 R4 version. I purchased it about a month ago and after a few uneasy moments I finally got it working to its potential. I made a few mistakes as most of us do when experimenting with new software but after carefully working out the best sizes and types of partition I installed Windows Me, I then slimmed it down to the bare system and copied it to five other drives. Finishing up with six in all not counting C: and D: The first drive E: is the largest, having internet access, e-mail, some word processing etc and antivirus software. Then I have F: with CD+ DVD software, G: with graphics, photo editing and H: for games. Then, two FAT16 partitions with bare internet access each using a different browser, these two systems are 282MB and 315MB respectively.
The performance has been staggering, for example the two FAT16 (internet systems) load into the HyperDrive in 6 and 7 seconds at a transfer rate of 2479.54 MB/Min. This transfer rate is no flash in the pan, these times are consistant and repeatable in fact the worse rate I have yet seen is 2462.40, and the best (only once) after defragging and restarting was 2515.05. Backing up is not as fast for obvious reasons but I regularly get around 2000MB/Min and around 1900MB/Min for copying systems. Stability is also excellent and all my programs are running better than ever. The printer and scanner also seem to be performing a lot faster than ever before.
A big thank you to HyperOs Systems for what is in my view the biggest step forward in the way we use computers in many years, if not ever.

Geeby

Hi all, I am a new user to HyperOs and I've got to say I am impressed I've had it 3 hours and I'm up and running with XP Pro on another drive which doesn't affect my main OS, which is great cos I'm not too keen on XP at the moment to buggy. I've only got 1 issue and I will contact the tech help line who I'm sure will sort it. Anyway it does what it says and I am impressed with the Operators Manual, it's simple to follow and not complicated like some manuals. Money well spent on my behalf, good job the wife doesn't know tee hee. So any whingers out there, stop whinging and contact HyperOs. Well done HyperOs for great long awaited product.

Scottie.

For Home Use..best bit of software bought in years!!

A.Jack.

Why did I worry!! Just installed HyperOs on a clean install (used my own PM 8 to make my partitions) used the wizards and within 10 minutes I had 5 working copies of XP renamed to my liking and for good measure installed win98 flawlessly within minutes!! All of my hardware went straight in (XP) still have 98 to do yet (need to sleep, at work in 5 hours but can't drag myself away!) and I can reboot between OS's no problem at all not one error have I encountered at anytime, I only have a limited knowledge of dos but I didn't need it at all. Well done, HyperOs! My ways of computing suddenly changed today with a whole new ball game to play with. To any potential buyers out there read this thread! I knew nothing of this software until I saw the ad, now I have it and it's absolutely amazing!!

Yorkshireman.

You are invited to view these and more HyperOs testimonials on the HyperOs independent forum site found at:
www.HyperOsForum.co.uk

HyperOs Systems

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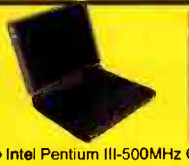

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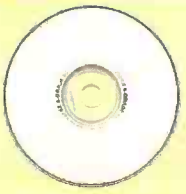

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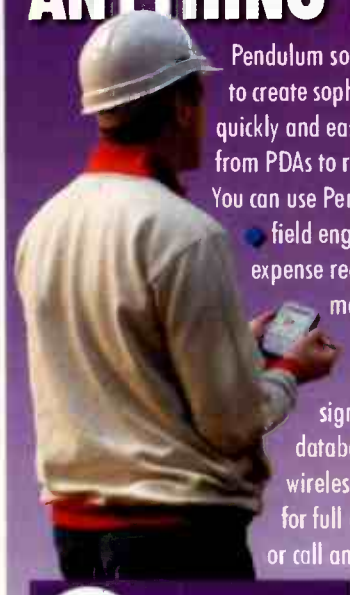

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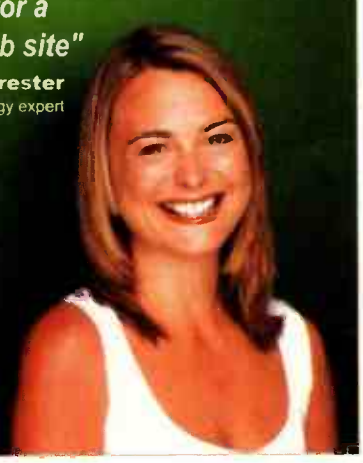

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S041121	5" x 8" Photo Quality Inkjet Card	£4.99
S041122	8" x 10" Photo Quality Inkjet Card	£9.99
S041144	A6 Photo Sticker Paper	£3.99
S041147	A6 Photo Qual Inkjet Notecards w/envs	£5.99
S041148	5" x 8" Photo Quality Inkjet Card w/envs	£5.99
S041149	10" x 8" Photo Qual Inkjet Card w/envs	£8.99
S041177	A4 Photo Paper Cards	£4.65

Canon Ink Cartridges

BC01	Mono	£13.99	BCI3eBk	Black	£7.99
BC02	Black	£13.99	BCI3eC	Cyan	£5.99
BC05	Colour	£16.99	BCI3eM	Magenta	£5.99
BC06	Photo	£13.99	BCI3ePBk	Photo Black	£6.99
BC20	Mono-only	£16.99	BCI3ePC	Photo Cyan	£6.99
BC21e	Colour	£29.99	BCI3ePM	Photo Mag	£6.99
BC22e	Photo	£15.99	BCI3eY	Yellow	£5.99
Canon Ink Tanks			BCI6Bk	Black	£6.99
BCI21Bk	Black	£4.99	BCI6C	Cyan	£6.50
BCI121C	Colour	£9.90	BCI6M	Magenta	£6.50
BCI-24Bk	Black	£5.39	BCI6PC	Photo Cyan	£6.50
BCI-24C	Colour	£9.99	BCI6PM	Photo Mag	£6.50
			BCI6Y	Yellow	£6.50

Canon Paper

FM-101	Glossy Photo Cards - 4" x 6"	£5.39
GP301N20	A4 Glossy Photo Paper	£6.99
HR-101	A4 High Resolution Paper (200)	£16.99
HR-101	A4 High Resolution Paper (50)	£4.99
PR101	A4 Photo Paper Pro	£9.29

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12A1980	30ml Colour	£14.75
AJ050	35ml 17G0050 Black	£14.65
AJ060	30ml 17G0060 Colour	£14.65
AJ45	42ml 51645A Black	£11.50
AJ49	24ml 51649A Colour	£14.99
AJC78	39ml C6578 Tri-colour	£15.99
AJC14	40ml C6614 Black	£11.90
AJC15	42ml C6615 Black	£11.90
AJC25	39ml C6625 Tri-colour	£15.95

hp Ink Cartridges

HP No.29 - 51629A	40ml Black	£17.99
HP No.41 - 51641A	40.5ml Tri-Colour	£17.99
HP No.45 - 51645A	42ml Black	£17.99
HP No.49 - 51649A	22.8ml Tri-Colour	£17.99
HP No.23 - C1823D	30ml Tri-Colour	£23.99
HP No.78 - C6578A	38ml Tri-colour	£40.49
HP No.78 - C6578D (lite)	19ml Tri-colour	£23.99
HP No.20 - C6614D	28ml Black	£17.99
HP No.15 - C6615D	25ml Black	£17.99
HP No.17 - C6625A	15ml Tri-colour	£17.99

hp Paper

HP C1847A	A4 Glossy Photo Paper	£5.49
HP C6040A	A4 Premium Glossy Photo Paper	£5.99
HP C6042A	Matt White Greeting Cards	£4.99
HP C6045A	Glossy White Greeting Cards	£5.99
HP C6818A	A4 Brochure and Flyer Paper	£8.99
HP C6832A	A4 Prem Plus Glossy Photo Paper	£9.99

LEXMARK Ink Cartridges

10N0016	Black	£17.99
10N0026	Colour	£17.99
12A1970	Standard 30ml Black	£17.99
12A1980	Standard 24ml Colour	£25.99
12A1990	Photo Colour	£27.99
15M0120	24ml Standard Yield Colour	£26.99
17G0050	Black	£17.99
17G0060	Colour	£17.99
18L0032	Black (No 82)	£24.99
18L0042	Colour (No 83)	£27.49

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BCI-21	Black Tank	£2.70
BCI-21	Colour Tank	£3.99
BCI-24	Black Tank	£2.99
BCI-24	Colour Tank	£4.99
BCI3	Black Tank	£3.50
BCI3	Cyan Tank	£3.50
BCI3	Magenta Tank	£3.50
BCI3	Photo Black Tank	£3.50
BCI3	Photo Cyan Tank	£3.50
BCI3	Photo Magenta Tank	£3.50
BCI3	Yellow Tank	£3.50
S020089	Colour Cart	£3.99
S020093	Black Cart	£2.50
S020110	5-Colour Cart	£3.99
S020138	4-Colour Cart	£3.99
S020187	Black Cart	£2.50
S020189	Black Cart	£2.50
S020191	Colour Cart	£3.99
S020193	5-Colour Cart	£3.99
T007	Black Cart	£6.29
T008	Photo Colour Cart	£6.49
T009	Photo Colour Cart	£6.49
T013	Black Cart	£2.50
T014	Colour Cart	£3.99
T017	Black Cart	£6.29
T018	Colour Cart	£6.49
T019	Black Cart	£2.50
T020	Colour Cart	£3.99
T026	Black Cart	£5.99
T027	5-Colour Cart	£6.99
T028	Black Cart	£4.99
T029	3-Colour Cart	£6.99
T0321	Black Cart	£6.99
T0322	Cyan Cart	£5.90
T0323	Magenta Cart	£5.90
T0324	Yellow Cart	£5.90
T0331	Black Cart	£6.49
T0332	Cyan Cart	£6.49
T0333	Magenta Cart	£6.49
T0334	Yellow Cart	£6.49
T0335	Photo Cyan Cart	£6.49
T0336	Photo Magenta Cart	£6.49
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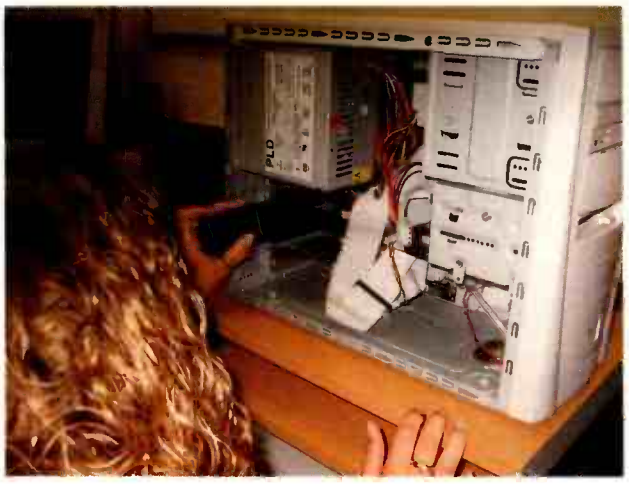

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BCO2 Black	BJ200/200e/220e/220ex/230/ BJC150/210/240/250/1000	£ 9.35	£ 8.23	£ 1.50
BCO5 Colour	BJC150/210/240/250/1000	£12.75	£10.99	£ 1.50
BCO6 Photo	BJC240/BJC250/BJC1000	£13.75	Top Up Kits refill carts up to 3 times	
BC20 Black	BJC2000/2100/2110/4000/4100/4200/ 4300/4400/4550/4650/5000/5500	£11.99		1.50
BXO2 Black	FAX B320/3410	£ 9.99		.50
BXO3 Black	FAX B100/110/MP10	£ 9.99		.50
BJC4000 Twin	2000/4000/5000 (BCi21B & BCi21C)	£ 4.39		
BJC3000/6000	Black	£ 4.49		
BJC3000/6000	Each Individual Colour	£ 4.49		

HP Compatibles

Cartridge Ref.	Suitable for Use in Printers			
51626A Black	500/510/520/540/550C/560C	£10.25	£ 8.99	£ 2.00
51625A Colour	310/320/340/540/550/560	£12.99	£10.99	£ 1.00
51629A Black	600/660/690C/695C	£10.45	£ 9.99	£ 3.00
51649A Colour	600/610C/612C/660C/690C/695C	£14.99	£10.99	£ 2.00
51645A Black	710C/720C/820CXI/850CXI/870CXI	£ 9.95	£ 9.99	£ 1.00
51633A Black	310/320/340	£10.45		£ 1.00
C6614ABlack	610C/612C	£10.75	£ 9.99	£ 1.50
C6615ABlack	810C/840C/843C	£11.75		£ 1.50
C1823AColour	710C/720C/810C/815C/820C/895C	£15.49	£10.99	£ 1.00
C6578AColour	970CXI/930C/950C/1220C/P1000	£16.99	£11.75	£ 2.00
C6625AColour	840C/843C	£16.99		£1.00

LEXMARK Compatibles

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13619HC Colour	1000/1020/1100/2030/2030PE/2050/ 2050PE3000	£15.29	£10.99	£ 1.20
13400HC Black	1000/1020/1100/2030/2050/3000/ 4076/Execjet 11/11C	£13.89	£ 9.99	£ 2.00
12A1980 Colour	3200/5000/5700/5770/7000/7200/ Z11/Z31/Z43	£15.29	£10.99	£ 2.00
12A1970 Black	3200/5000/5700/5770/7000/7200/ Z11/Z31/Z42/Z51/Z52/Z53/X73/X83	£13.89	£ 9.99	£ 2.00
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Instant Dry Gloss	180 gsm	50 sheets	£12.99
Instant Dry Gloss	210 gsm	20 sheets	£18.99
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Instant Dry Gloss Self Adhesive		20 sheets	£ 6.49
Double Sided Gloss		20 sheets	£10.99
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Coated Matt	100 gsm	100 sheets	£ 5.99
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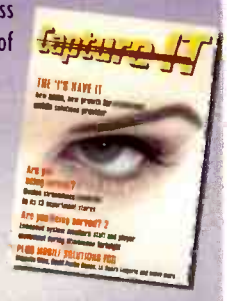

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S020189	Epson Stylus Color 740/760/860/1160	Black	£14.99	£2.49	£6.99
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T028401	Epson Stylus C60	Black	£21.79	£5.79	£16.99
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LOADING...

Dictator dilemmas

Petrilla Entertainment has launched Quest for Saddam. If you have a fancy for roaming the Middle East searching for renegade dictators, why don't you download a time-limited trial or buy the full version at **www.questforsaddam.com/main.htm** but we're not entirely sure that it's in good taste.

Elsewhere in the world of entertainment, the biggest games event, E3 Expo, took place in Los Angeles in May. Among the announcements was the news that Valve is still working on Half-Life 2, Doom3 is near completion, and most incredibly, Eidos is on the verge of releasing Republic after years in development. Expect a review in the next issue of *PCW*.

Enter the Matrix

More than just a game, this is part of the 'Matrix experience'...

There is more to the Matrix in 2003 than a movie, such as the nine animations that make up the Animatrix DVD, and the game Enter the Matrix which has been released on Playstation 2, Xbox, PC and Gamecube. You may be surprised to see that the publisher is listed as Atari. Infogrames officially changed its name in May, resurrecting this venerable name.

On paper, Enter the Matrix has the potential to be fantastic, as the script was written by the Wachowski brothers, the creative force behind the whole Matrix project. It includes new movie footage shot specifically for the game, as well as footage from the movie itself. Rather than being the game of the movie, it should be taken as part of the whole Matrix experience.

For instance, you may wonder how the humans in the movie know that the machines are boring down to invade the city of Zion. The answer is in the game's first mission when you have to collect a package left by a team of your comrades who have information about the attack.

You may be surprised to find that you don't play as Neo, Trinity or Morpheus, but instead take on the role of a minor character, either Niobe or Ghost. The game is somewhat disappointing with poor graphics and, although the characters have some excellent Kung Fu moves, the third-person view just takes you through an endless series of fights.

Niobe gets to do loads of driving while Ghost, in the role of her tail gunner, shoots lots and lots of guns so there is more to your choice of character than gender. Unfortunately the AI (artificial intelligence) is more A than I, and the controls are very fiddly, particularly when changing weapons. You'll be shouting at the screen, trying to draw and aim while the opposition is turning you into Sushi.

A huge undocumented section, Hacking, lets you unlock features, but you really need to pay £9.99 for the official Brady Games strategy guide in order to have much chance of understanding the controls, or even the point of Hacking. In many ways Hacking sums the game up as it is a neat idea that is far too complicated and annoying to be fun. In trying to be far more than a game, Enter the Matrix fails to be much good in this PC versiom, but we have a suspicion that our verdict will fail to deter true Matrix enthusiasts.

Leo Waldock

DETAILS

PRICE £39.99 inc VAT
CONTACT Atari
www.enterthematrixgame.com
SYSTEM REQUIREMENTS
Windows 98SE/ME/2000/XP, Pentium III 800MHz, 128MB Ram (256MB recommended), Geforce256/Radeon 8500 or more recent graphics, 4.3GB hard drive space, DirectX 9
VERDICT
Enter the Matrix is a decent beat 'em up, but you deserve far more for £40 and, though it tries hard, it fails to deliver
OVERALL ★★★★★

WIN!

Competitions
Win an Acer TM C110 Tablet PC or one of four Mypal A620 Pocket PCs
For your chance to win one of these prizes, turn to page 266

Devastation

Technology geeks unite to save the world

Devastation is a first-person shooter (FPS) set 72 years in the future where the world is nearly devoid of technology (besides, thankfully, a load of guns and ammo), and we technology geeks are few and far between. Having discovered some secret government plot or other, it's up to you to lead a gang of tech-minded individuals and stop the end of the world. Luckily the largely clichéd plot is often ignored; besides a couple of neat twists, it's seemingly used as an excuse for the next battle. Easy to get to grips with, the gameplay is just hard enough to be a good challenge but not a frustration.

However, we felt the AI was a touch unfinished – some bad guys would die at the drop of a hat, while others would be a challenging kill. Also, being the leader of this team of rebels, you can command the other computer-controlled members of your gang to attack, defend or follow, but we found our commands were often ignored. We hope these blemishes will be adjusted in a patch download.

Graphically it's excellent, as you can interact with the majority of the scenery. For example, if you shoot a bad guy into a pile of garbage, it caves in around him very convincingly. The characters' speech is a little flawed though, and the mouths move rather unrealistically.

Oddly, the plot finishes about halfway through and it descends into a deathmatch-style romp. This provides some great action, allowing the characters to shoot the hell out of each other while you perform your missions, and you can join in if you wish.

Devastation offers many multiplayer options, with all the weapons any gun-toting FPS fan could need. By the end you are left wanting, with plot flaws and the AI being obvious culprits. Also, don't believe the system requirements, as our 2GHz P4 with a Geforce2 TI struggled to play it smoothly, and load times are horrendous. Its redeeming feature is that it is good fun.

Mark Walsh

DETAILS

PRICE £29.99 inc VAT
CONTACT Novalogic
www.devastationgame.com
SYSTEM REQUIREMENTS
Windows 98/ME/2000/XP, Pentium 1GHz, 256MB Ram, 64MB graphics card that is DirectX 7 or later
VERDICT
A good few sparks make this an interesting buy, but flaws in AI and graphics make it far from special
OVERALL ★★★★★

Colin McRae Rally 3

An impressive update of this classic game

We've been waiting a long time for an update to this classic driving game. Believe it or not, Colin McRae Rally 2 for the PC came out in February 2001 and version 3 has been available for the PS2 since April of this year. Version 2 could run on a 233MHz Pentium with 32MB Ram, and it could even run from the CD with only 5MB of hard disk space. Well you can forget about all that as version 3 is a hardcore modern game that needs all the PC power you can give it.

Amazingly the controls give you the option of driving with the keyboard. You can forget that too, as the only way to get into this game is with a steering wheel and pedals. You have to fiddle about to get the response rate and dead time of the controls set up correctly, but once you do it pays dividends.

It may seem like stating the obvious to say that you drive as Colin McRae, but version 4 for the PS2 is due at the end of the year, and you'll be able to choose who takes the wheel. It'll be interesting to see what they call that version of the game.

You can choose from a dozen different cars, including the Focus, and race through eight countries in your fight for the championship. We preferred the chase cam (third-person view) to the bonnet cam or cockpit cam, as you can see all the scenery as well as Colin working away at the wheel. The attention to detail is excellent, the physics of the scenery and track are convincing, and the car gets more battered as it bounces off trees and barriers.

As you progress through the game you unlock more features which give you more options for car setup before each race. We are unimpressed that you can call a premium phone line to get the code for the Baja buggy and hovercraft, as well as access all stages and countries – we feel that they should either be free or a reward for beating a particular time in a particular stage.

Leo Waldock

DETAILS

PRICE £34.99 inc VAT
CONTACT Codemasters
www.codemasters.com
SYSTEM REQUIREMENTS
Windows 98/ME/2000/XP, Pentium III/Athlon 750MHz, 128MB Ram, 32MB graphics, DirectX 9 sound card, 3.5GB hard disk space, DirectX 9
RECOMMENDED SYSTEM
Pentium 4/Athlon 1.4GHz, 512MB Ram, 64MB graphics
VERDICT
A classic driving game that has been successfully updated
OVERALL ★★★★★

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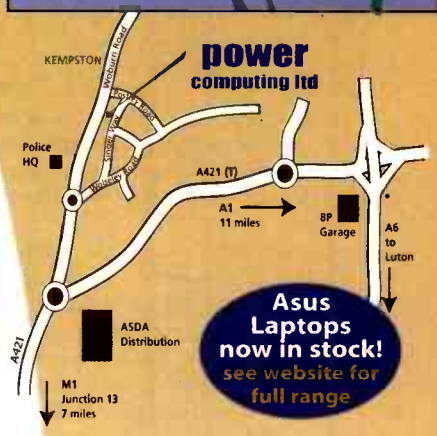

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PCW AUGUST 2003 ACER COMPETITION ENTRY FORM

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June winners

The three winners of the 17in LCD monitors from Hitachi are Steve Blincoe from Ringwood, Cristina McDowell from Teignmouth and P L Cunnington from Englefield Green. The four winners of the upgrade packages from MSI are Roger Fawkes from Norwich, Simon Smillie from Keighley, Brian Lindsay from Essex and S McLean from Antrim.

Four Mypal A620 Pocket PCs

This month Asus is offering four *PCW* readers the chance to win their very own Mypal A620 Pocket PC. This product is so new it is not yet available in the shops, so this is an exclusive chance to get your hands on one.

The A620 has superb video performance, with the fast Intel PXA 255 400MHz CPU performance optimisation giving smooth video playback at a fantastic 60fps, with a 3.5in TFT LCD screen running the brand new Microsoft Pocket PC 2003.

As if this wasn't enough, the A620 is also the world's lightest Pocket PC, and has a CF (Compact Flash) type II slot. With the A620 there is no need to worry about losing any important data, as the unique Asus Smartkeeper technology steps in when you are running low on battery power and will automatically back up your data – a function which is only available on the A620.

Another feature is the Smart Power Saving technology, which allows you to lengthen battery life for up to 19 hours. For more detailed information on the Mypal A620 and other Asus products go to **www.asustek.co.uk**.

All you have to do for a chance to win is to answer this simple question and follow the instructions below on how to enter:

The A620 comes with a new Asus technology, but what is it called?

a) Gatekeeper
b) Smartkeeper
c) Datakeeper

How to enter

Fill in the coupon and send to the following address by 28 July 2003:
Acer or Asus August competition, *PCW*, VNU Business Publications, 32-34 Broadwick Street, London W1A 2HG
Or **enter online** at **www.pcw.co.uk/Competition**.
Or **text** your answer to **85100**, ensuring you put the keyword **PCW3** for the Acer competition, and **PCW4** for the Asus competition at the beginning of your text, followed by a space, then your answer, then a space, then your name (eg PCW1 B John Smith). **Please send separate messages for each competition.**

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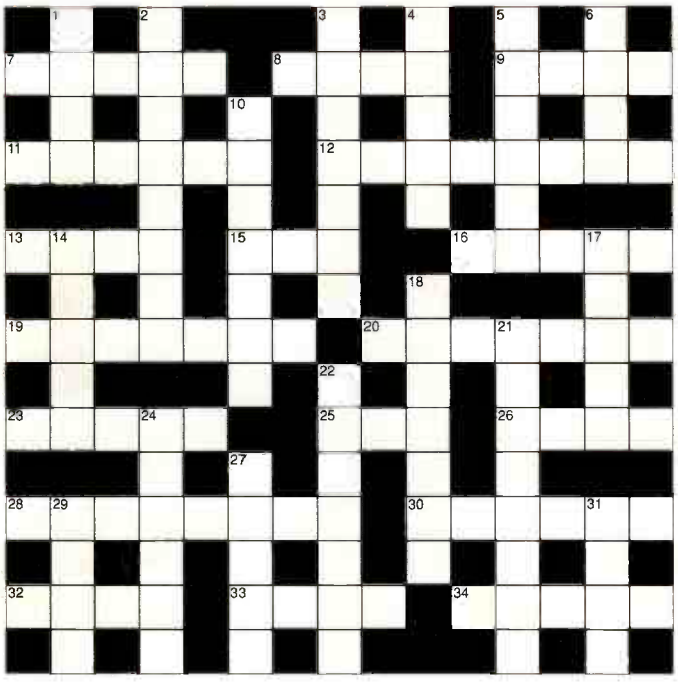
Mindbenders

These puzzles will keep you amused for hours, and if you solve them you could win a Concise Oxford English Dictionary or a copy of Microsoft Encarta Premium Suite 2003

Prize crossword



ACROSS

7 ___ stream, flow of information from a keyboard (5)
8 Reference line on a chart (4)
9 The O of ROM (4)
11 Access ___, communications fee (6)
12 Sends data in another direction (8)
13 Options list (4)
15 Section of a curve (3)
16 Early valve computer (5)
19 Java Virtual Machine security area (7)
20 Family of low-cost Pentium chips (7)
23 Metallic electronic connectors (5)
25 Easy – as a chart? (3)
26 Internet chat (4)
28 Current-limiting electrical component (8)
30 Screen position indicator (6)
32 ___ to Live, header field for an Internet package (4)
33 Embracing more than the usual, transcending (4)
34 Heavenly electrical store? (5)

DOWN

1 Creep, sidle (4)
2 Enclose (8)
3 Remove a tooth maybe (7)
4 Employers (5)
5 Nelson's ___, landmark (6)
6 Abscond, run (4)
10 Six-sided shape (7)
14 Shirk (5)
17 Coral island (5)
18 Attack's opposite (7)
21 Outside (8)
22 Do surgical work (7)
24 Rubbish, nonsense (6)
27 Penny Black, eg (5)
29 Give out (4)
31 Done, finished (4)

Each month, one *PCW* crossword entrant will win a copy of *the Concise Oxford English Dictionary*, and the brainteaser winner gets a copy of Microsoft Encarta Premium Suite 2003.

Send your completed crossword to: '*PCW* August – Prize Crossword', VNU, 32-34 Broadwick Street, London, W1A 2HG, to arrive no later than **15 July 2003**. Send the answers to the brainteaser to: '*PCW* August – Prize Puzzle', at the address above, to arrive no later than **28 July 2003**.

Please state clearly on your entry if you DO NOT wish to receive information about other products and services from VNU Business Publications Ltd. Please state if you DO NOT wish your details to be passed on to other carefully selected companies for marketing purposes. No purchase of the magazine is necessary to enter the competition.

June's winners

The winner of June's crossword is Alan Sherratt from Inverness-shire, and Peter Morris from Oxon won the brainteaser puzzle.

Missing links

This kriss kross diagram isn't quite completed – the letters below still have to be inserted to form an interlocking pattern of familiar words reading across and down. No word may be repeated but two-letter words are allowed.

A A C C D E E E E E E
G G I I I I I L N N O O
O R R R S U U U V

R		C	O	N				
E	V	E						
G		N					M	
A	R	T				L	A	
I					T	I	N	
N						V		
	B	I	S		S	E	R	E
N	O		K				U	
		N	I	T			E	

SOLUTIONS

July crossword

ACROSS: 7 Dolby 8 Null 9 Raid 11 CD Roms 12 Linefeed 13 Swim 15 LAN 16 Using 19 Hewlett 20 Country 23 Black 25 Hex 26 Task 28 Hologram 30 Alt-tab 32 ISDN 33 View 34 Zooms

DOWN: 1 Sold 2 Abnormal 3 Bus lane 4 Blunt 5 Crofts 6 Lime 10 Isolate 14 Wheel 17 Narks 18 Coaxial 21 Notation 22 Chamber 24 Clowns 27 Drive 29 Oust 31 Army

June brainteaser

3	6	4	1	2	7	5
6	5	1	3	7	4	2
4	1	7	5	6	2	3
1	3	2	6	4	5	7
7	4	3	2	5	6	1
5	2	6	7	3	1	4
2	7	5	4	1	3	6

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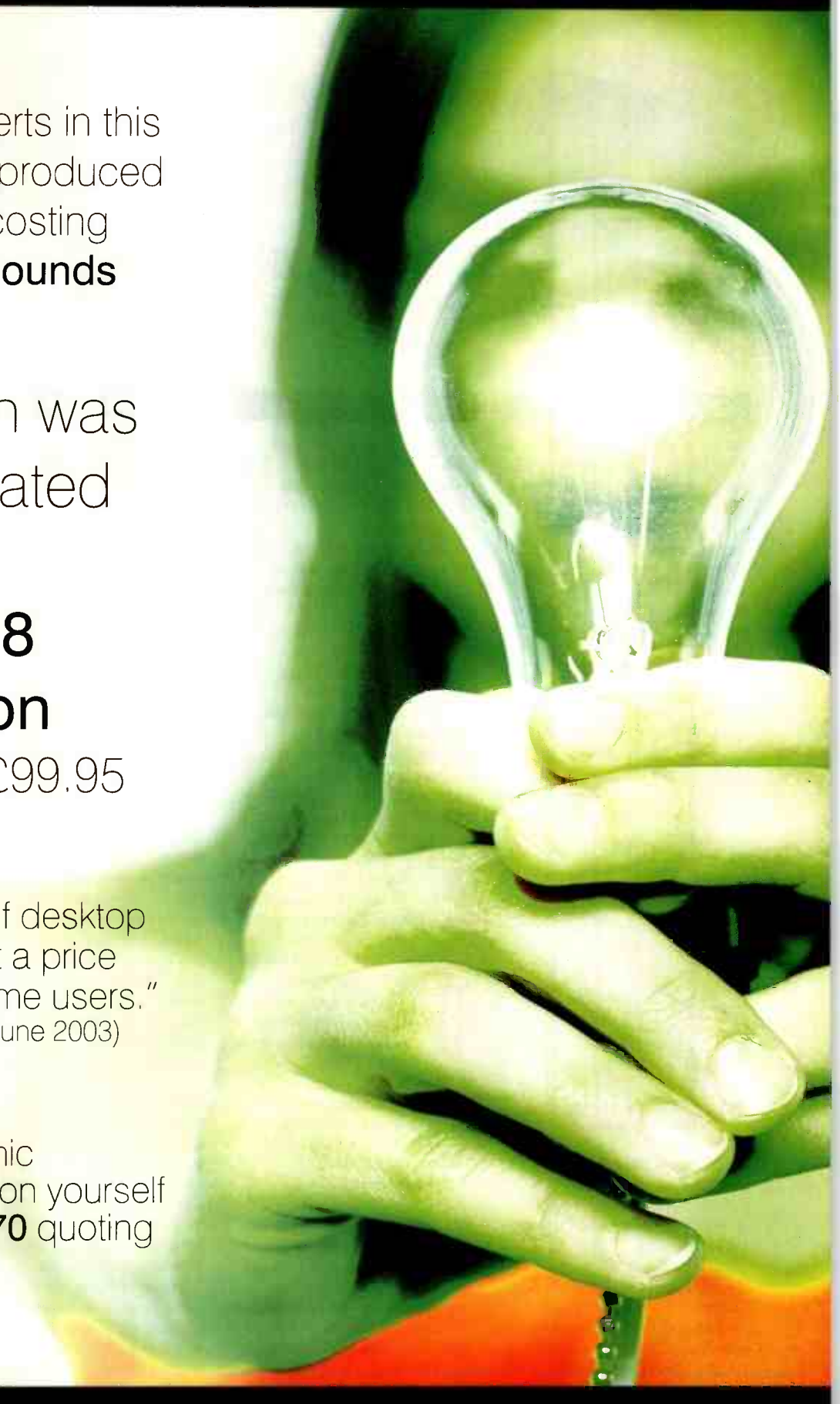

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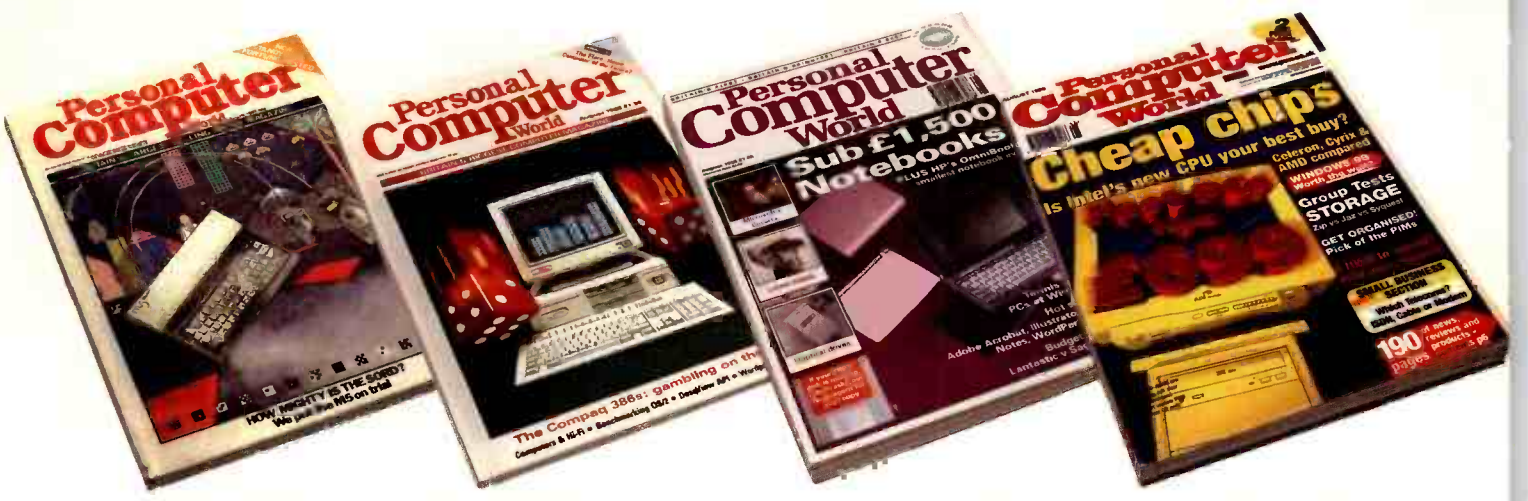


AUGUST 1983

Your starter for 10. Was the Pertmaster: (a) an exercise machine that gave you buttocks of steel or (b) project planning software from the dark ages of computing, 1983? If you said B, you're right. Once again, trawling through the issues of 20 years ago throws up a whole host of ill-advised product names, equally crazy hairstyles and two green and red computers that were no doubt the Imacs of their day.

The big news of the month, though, was the move to colour. Sord had just released its first full-colour sub-£200 computer with 'superb sprite graphics', while John Gold had written to the letters page to ask if *PCW*

The Imac of the day: this green screen computer from Cortex was part of the move to colour in the early 1980s

could recommend a book on using colour on his TRS-80. Clearly the future was bright, orange and every other colour under the sun.

Meanwhile, in a rather discriminatory review that could have seen *PCW* pulled from the shelves countrywide by irate newsagents, Peter Rodwell declared that the biblically named Fortune 32:16 was 'quite definitely not a machine for the corner newsagent', perhaps because of its massive 1MB of Ram – a lot for its day.

AUGUST 1988

Microsoft made a substantial inroad into the Mac world this month by releasing its first version of Word for the Mac platform. It was a cut-down version of Word, but at least made inroads into getting the brand recognised in that arena.

At the time, Guy Kewney wasn't exactly keen on the idea, feeling that there wasn't space for another office app in what was already a reasonably crowded marketplace. There was no doubt in anyone's minds that this would be a profitable move for Microsoft, though. Fifteen years on and Office is the best selling package for the Mac, as well as the IBM PC.

Processor-wise, Intel's 80386SX chip was launched, but at the time was more commonly referred to by its codename, P9. It was a mainstream 32bit chip, aimed at those not willing to make the leap to 32bit architecture, but still came with many of the features and benefits that a 32bit chip provided. However, when it came to clock speed, it maxed out at a mere 16MHz – the 80386 was already at 25MHz and counting.

Overall impressions were excellent though, and the Compaq system featuring the chip that we reviewed in this issue was met with much praise.

AUGUST 1993

The world was changing in 1993 and so was *PCW*, with a new column in Hands on, dedicated to the expanding world of multimedia. Chris Cain gave us the lowdown on multimedia hardware requirements. According to Microsoft, a 386SX processor, 2MB of Ram and a 30MB hard disk constituted a basic multimedia setup at this time.

Our preview of Adobe Acrobat promised a product that could do the seemingly impossible. Acrobat would allow you to send a file to any PC or Mac user and they would then be able to open and read the file. In the past 10 years we have moved to version 6 of Acrobat and the idea of cross-platform file formats doesn't seem so radical, but back in 1993 this was rocket science.

We also reviewed the first version of Microsoft's Encarta. You may find it hard to believe that a pre-Encarta era ever existed, but here's the proof. We even had a word of warning that you needed to set aside 7.8MB of hard drive space for the full installation and at least 2MB of memory. For the current Deluxe 2003 version you need 300MB of hard drive space and at least 64MB of memory for Windows XP – how times change.

In one of our group tests we compared six inkjet printers, the cheapest of which was £299 with the most expensive at £379, and cartridges averaging out at £20. Since then printers have dropped in price quite dramatically, while the price of cartridges has increased.

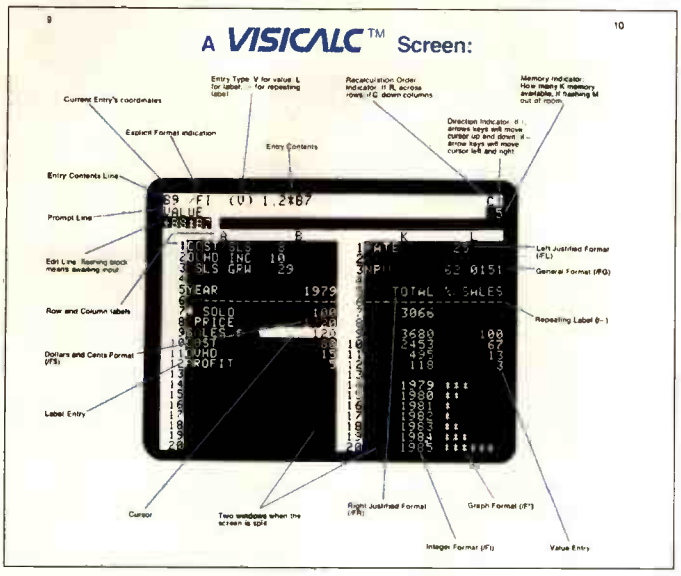
AUGUST 1998

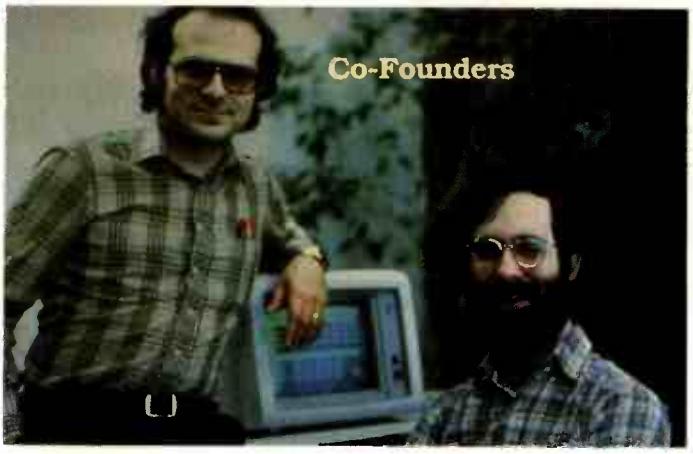
Back in April 1998, Intel decided the time had come to make its play in the low-cost processor market, dominated at that time by AMD and Cyrix, with high-performing chips bearing small pricetags. Enter the Intel Celeron processor, built without the pricey Level 2 cache in an attempt to give Intel a foothold in the sub-£1,000 PC market.

In the August issue we decided to pit systems built around Intel's new creation against PCs featuring an AMD or Cyrix chip, to see just what impact the omission of that L2 cache would have on system performance. Each one of the five participating manufacturers submitted two identical machines, one based on a Celeron processor and one with an AMD or Cyrix chip at its core. In each case, the Celeron chip was far outclassed by similarly priced AMD and Cyrix processors, and the Watford Perfecta K6 98 with its 266MHz AMD CPU won the day.

Meanwhile, we gave five *PCW* writers a grand to spend on their ideal computer. Thankfully, they all managed to resist the temptation to do a runner to South America and came back with some interesting and varied purchases. Gordon Laing bought himself a complete mobile computing solution including a Psion Series 5 handheld, HP Deskjet 340CBI, a Nokia 6110 mobile phone and a Nintendo 64, while Adele Dyer plumped for the DIY option, building herself a Pentium II-based PC from scratch.

The *PCW* team





Above: Bob Frankston (left) and Dan Bricklin, co-founders of Software Arts

Left: One of the reference cards which came with the original Apple II version of Visicalc

Facts and figures

Visicalc was the world's first electronic spreadsheet and a true killer application

The year 1977 may have marked the launch of the Apple II, Tandy TRS-80 and Commodore Pet, but the world had to wait another year to see what these groundbreaking personal computers were truly capable of doing. In 1978 the world saw the launch of a program dubbed the first killer application for personal computers. This was the year of Visicalc, the world's first electronic spreadsheet.

By definition, spreadsheets are tables that display numbers in rows and columns. Paper-based spreadsheets have been around for many years, but changing one number had the subsequent disadvantage of having to recalculate entire portions of the table by hand.

The first example of harnessing computers to deliver automatic electronic spreadsheets came in the early 1960s. Richard Mattessich, then at the University of Columbia at Berkeley, described the concept of computerised spreadsheets for business accounting in a 1961 paper, then later in two books published in 1964.

A program based on Mattessich's books was written by a pair of his research assistants, although Bob Frankston (Visicalc's co-creator) claimed it had not the slightest influence on their work, arguing the Mattessich program was tuned specifically for business accounting. But we're getting ahead of ourselves...

The story begins with Dan Bricklin, studying for his MBA at the Harvard Business School in 1978. In Bricklin's online memoirs he remembers daydreaming in Harvard's Aldrich Hall, imagining a heads-up display where he could move numbers around with a mouse and circle them to complete calculations.

Faced with the hardware of the day, Bricklin replaced the mouse with arrow keys and the heads-up display with a conventional two-dimensional monitor. Bricklin then approached Dan Fylstra with his idea. Fylstra had previously graduated with a Harvard MBA at the same time Bill Gates was a freshman, and was now running his own company, Personal Software. Seeing the potential, Fylstra lent Bricklin the only computer he had to hand, an Apple II. Bricklin then wrote his first prototype over a weekend in Apple Basic.

The prototype illustrated Bricklin's concept, but to produce more powerful commercial code he teamed up with Bob Frankston, a friend and brilliant mathematician. Frankston coded Visicalc in assembly language for the 6502 processor of the Apple II, and ran tests using the multi-user MIT Multics typesharing system.

Bricklin and Frankston then set up their own company, Software Arts on 2 January 1979 and made a deal with Fylstra to publish their software. Frankston coined the name Visicalc, short for Visible Calculator, which was applicable to a variety of tasks without specific ties to just accounting. Bricklin was the first to put Visicalc through its paces, but had to copy his first set of results by hand, as the version he used was unable to print.

Visicalc was first demonstrated at the San Francisco West Coast Computer Fair in May 1979, and announced one month later at New York's National Computer Conference. Bricklin and Frankston spent early royalties polishing their code, with the first version 1.37 ready for sale in October 1979. It measured 20KB and shipped on a 5.25in floppy disk in a brown vinyl folder.

Fylstra initially priced Visicalc at $100, but quickly increased it to $150. It was a great success, selling an estimated one million copies over its lifespan.

In the early 1980s, Software Arts fell into legal conflict with its then publisher Visicorp. During this same period an earlier Visicalc product manager, Mitch Kapor, formed a company with venture capital and proceeds from software he personally designed. Kapor's company was Lotus, which launched its own spreadsheet – 1-2-3 – and then acquired Software Arts in 1985 and discontinued Visicalc.

While both Bricklin and Frankston made money out of Visicalc, they did not become the millionaires you might expect. Sadly for them, it was virtually impossible to patent software until a new ruling in 1981, by which time it was too late. Bricklin and Frankston can, however, enjoy the acclaim of not only inventing the spreadsheet, but also the first true killer application for PCs. The 1981 PC version still works today, so if you fancy a taste of history, go to **www.bricklin.com/history/vcexecutable.htm** to see that a killer application really can run in just 27KB.

Gordon Laing

August Cover Disc

Serif Webmanager www.serif.com

PCW EXCLUSIVE! Not yet in the shops

The right picture in the right place can be priceless. Managing the pictures and photos on your PC can be tricky, but Serif can help. As the name suggests, Webmanager doesn't limit you to working with the files already on your computer – its integrated download manager can help you to search for media files on the Internet. Webmanager can even 'spider' from your chosen site, reading the links on that site and then following them to download similar images from related pages – you just need to specify which site you want to download.

Browsing your media files is made faster. Webmanager's Explorer-like interface makes it simple to find photos, clipart, sounds or video files, and the automatic thumbnail views help you to locate what you are looking for in seconds. You can also share your photo albums with friends via the Internet with Webmanager's online albums feature.

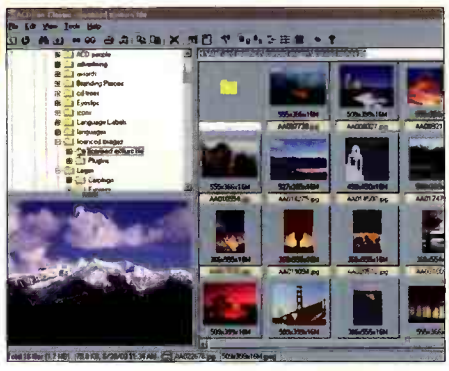
You can turn your digital photos into slideshows – create impressive on-screen presentations of all your photos, without the need for design experience.

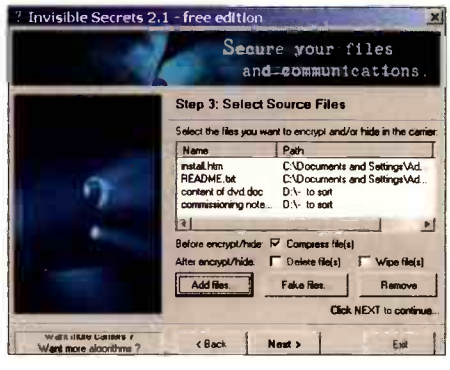
As well as helping you to organise your pictures into themed albums and publish them to the Internet, Webmanager also enables you to print your albums on your desktop printer, so all your favourite photos can be stored for posterity, or given as gifts.

For UK users to register this product and have access to technical support and upgrades, install the program and, when prompted by the registration wizard screen, call 0800 3765467 quoting the installation number and registration code that appears on-screen. Note that the program must be installed for a registration number to be given. If you are outside the UK then you will be directed to the registration page online during the installation procedure.

Right: Webmanager saves you time by locating appropriate media files

Left: The interface design makes it easy to view and select images





Top to bottom:
ACDSee 2.43
Smartstore.biz Startup 3.1
Invisible Secrets 2.1
Omnipage Pro 12

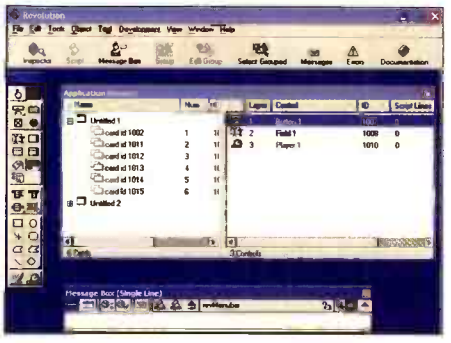
Full versions

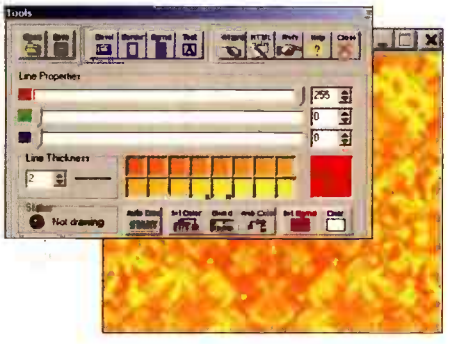
ACDSee 2.43

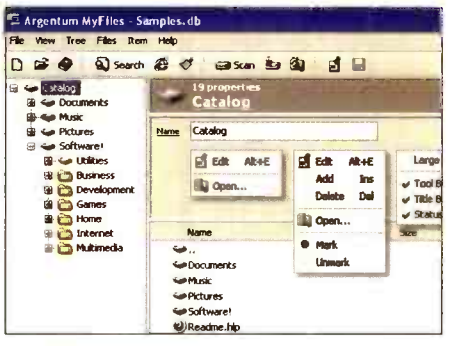
www.acdsystems.com

ACDSee Classic is a fast and easy-to-use image viewer and browser from ACD Systems. This award-winning software lets you view over 15 image formats in high resolution. Plus you can organise pictures and graphics with personalised descriptions, so you can find them quickly. Crop images and rotate jpegs without losing image quality, convert batches of files to different formats, and play wav sound files. The program's flexible and efficient user interface features lots of shortcut buttons. To get your serial number, you need to register by visiting: www.guildsoft.co.uk/cmp/307GUPCW.

Top to bottom:
Revolution
Kaleidoscope Designer
Argentum My Files
Mystical Lighting
Kaspersky AV Personal







Smartstore.biz Startup 3.1
www.smartstore.com

You can create your own online store without any HTML knowledge with Smartstore.biz. Just enter product and store details and the software creates pure HTML code. You don't need to set up CGI, PHP or ASP scripts; and you won't run into host/ISP restrictions or server-side applications.

You can access admin tools offline and organise your product catalogue by dragging and dropping categories and products, then defining colour, size, quantity discounts, cross-promotions, and so on.

In addition to an integrated HTML editor, several professionally designed and modifiable store templates are included. You can customise these to your corporate design, and download more design templates for free.

To activate the program, go to **www.smartstore.com/uk/vnu/pcw0803** and enter the Campaign ID: **ukvnupcw0803**.

Free versions

Invisible Secrets 2.1
www.invisiblesecrets.com

If you have sensitive data you want to keep secret, this program will encrypt and hide them in sound, image and data files.

This method of disguising data, called steganography, isn't infallible, but it is an effective way of hiding data when it is in a visible place, such as a website or an email attachment. When you convert the carriers to another format it is possible to lose the encrypted message from the original carrier, so you should test your conversion software before you use it in anger.

Also on this disc is a trial of the latest (and more secure) version – Invisible Secrets 4.

Common Name
www.commonname.com

This software modifies your browser, enabling you to navigate directly to websites using simple names and keywords rather than having to type in long website addresses. For example, instead of http://www.ibm.com, you just type *ibm*. This relies on websites having registered their 'common name' with the service (which they pay for on a 'cost-per-clicks' basis). You can also see the results of one search from 17 leading search engines.

Trial versions

Omnipage Pro 12
www.scansoft.co.uk

Omnipage Pro 12 converts scanned documents into electronic files that can be edited. It offers a powerful set of proofing and sharing tools to streamline OCR (optical character recognition). This version features three redeveloped OCR engines that are 35 per cent more accurate than Omnipage Pro 11 – for overall accuracy of over 99 per cent.

Virtual PC 5
www.connectix.com

You can run multiple PC-based operating systems by creating separate 'virtual machines' on top of your Windows desktop. Each virtual machine emulates a complete hardware system in a self-contained, isolated software environment, enabling otherwise incompatible systems to work together.

Mystical Lighting
www.autofx.com

Apply photo-realistic lighting and shading effects to digital images. This program includes 16 visual effects and over 400 presets, and works as both a Photoshop plug-in and a standalone application for Windows or Mac.

Kaleidoscope Designer
www.organicsw.com

Build backgrounds, buttons and scalable borders from any jpg or bmp graphic kaleidoscope-style. You can import or draw your graphic (or let the Autodraw feature do it for you) and use the results in word processing, desktop publishing or graphic design backgrounds and buttons.

Revolution
www.runrev.com

This rapid software development tool gives point-and-click access to leading database packages such as ODBC, Oracle, MySQL, Valentina and Postgres, multimedia formats, Internet protocols, XML, Soap, report generation, Unicode and more.

Argentum My Files
www.argentuma.com

Organise files, music and photos with My Files. After building catalogues with images of your media, search to find specific files.

Activesite Compiler
www.intorel.com

Compile a complete ASP or ASP.net website or service into a standalone executable file that can run on any Windows platform.

PLUS: Anti-virus packages

This month's anti-virus group test reviews 10 packages and the cover disc includes a full version of AVG Antivirus 6, plus trial versions of Norton Antivirus 2003, Panda Platinum 7, Kaspersky AV Personal, and McAfee Virusscan 7. Try them out and protect your PC from gremlins.

What's on the DVD

If you bought the DVD edition of *PCW*, you'll have all the CD-Rom has to offer, plus the programs below

Full versions

Mandrake Linux 9.1

www.linux-mandrake.com

Mandrake has always been one of the easiest distributions to install, and now it's even simpler as most hardware devices are automatically recognised and configured. Power users can access advanced configuration options at any point of the installation.

Mandrake's new 'Mandrake Galaxy' desktop theme provides visual coherency between KDE 3.1 and Gnome 2.2 (the default graphical desktop environments).

Another advanced feature in Mandrake Linux 9.1 is 'supermount', which lets users access removable media (CD-Rom, floppy, Zip, and so on) instantly and transparently without having to use the traditional 'mount/unmount' commands.

USB2 and hotplug support has been added, with new hardware automatically recognised and configured while the system is running, and there's ACPI support for better power management with laptops. You'll also find support for a number of Wifi devices.

Note: some of these features and modules may not be available in the basic distribution on this disc. You should check the Mandrake website for full details.

Trial versions

Keyspell Ellipsis

www.keyspell.com

One difference between Ellipsis and other spelling checkers is that it adapts to the individual user. In addition to its comprehensive dictionary (350,000 words), it can be split into groups. An inexperienced writer (a child, for example) could reduce the number of suggestions produced by choosing a lower level (the Junior dictionary, for example). A doctor could reduce suggestions by choosing the Medical dictionary.

Playable game demos

Six playable demos this month...

Nascar Racing 2003 This demo puts you in the driver's seat of a 750 horsepower stock car. Features include dirt and oil that accumulate on your windshield as well as realistic sun glare. The detailed track surface mapping lets you feel every bump, dip and rumble strip. The game's enhanced physics model is based on data obtained from technical partnerships with the Goodyear Tire & Rubber Company and Jasper Motorsports.

Tony Hawk's Pro Skater 4 The new release from the king of the skateboard features huge free-roaming levels, 190 (in the full game) progressively harder goals and no time limits.

Star Trek Elite Force 2 Federation ships and colonies are being attacked throughout the galaxy by hordes of nightmarish creatures. It's up to you and the Hazard Team to respond.

Galactic Civilisations This single-player space-based strategy game puts you in control of humanity's destiny... it's a bit like Sim City in space.

Player Manager 2003 This management sim puts emphasis not just on the planning and management side of things, but also on the match itself, where personality, moods and physical and mental condition of the players have a bearing on the outcome of the game.

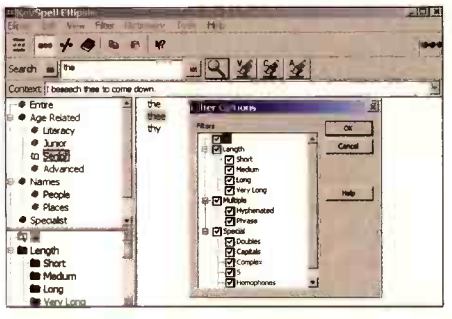
Eternal War: Shadows of Light A hard-hitting first-person shooter that pitches the player against an assortment of demons.

70 essential utilities and add-ins

In our regular section you'll find more than 70 of the top must-have programs and add-ins, sorted into five main categories: Internet, Office, Creative, Utilities and Others. Recent examples of products included are: Sun Open Office.org (Windows and Linux); PC Maclan; Zonealarm ; Opera browser v7; Musicmatch Jukebox 7.5; and Windows Media Player 9.

PCW workshops and product tests

You'll find a huge selection of past group tests and workshops in the Editorial section on the DVD-Rom. Two years of product tests from the pages of *Personal Computer World* include desktop PCs, CD writers, digital cameras, hard drives, image editors, motherboards, DVD-Rom drives, scanners, and much more.

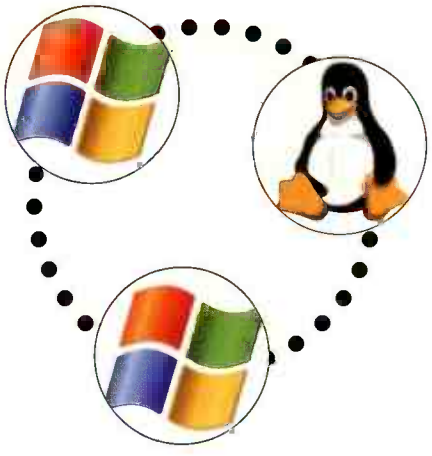


Top to bottom:
Mandrake Linux 9.1
Keyspell Ellipsis
Nascar Racing 2003
Tony Hawk's Pro Skater 4
Star Trek Elite Force 2

PERSONAL COMPUTER WORLD

Next Month

on sale 24 July 2003



Follow our guide to networking over mixed-OS systems, to make the most of your machines

PC upgrades that count

Upgrading your PC is nothing new these days – everyone's doing it, but do the benefits outweigh the costs? We cover all you need to know about upgrading and renewing your old PC, and tell you just how much bang you really get for your buck.

Networking in a mixed environment

If you have two or more computers, chances are you've switched the older one across to Linux. It's cheaper than Windows, and almost as easy to use. So, now that you're a mixed-OS home, it's time to learn how to link your machines together – our step-by-step guide will show you the way.

Inkjet printers

Photo-quality colour printing has never been so good. *PCW* rounds up and reviews the latest crop of inkjet printers for your perusal.

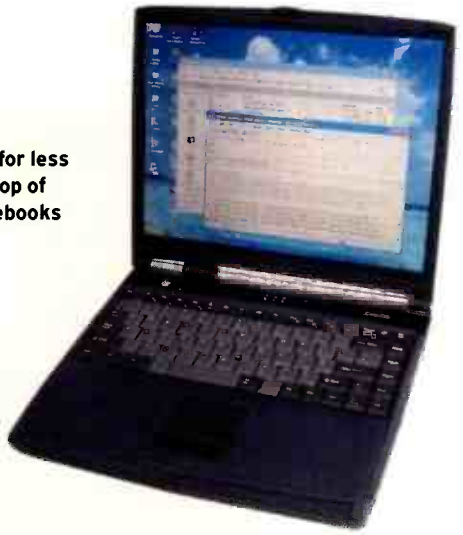
Budget notebooks

Mobile computing is now mainstream, whether at home or in the office, but does it have to be so expensive? We gather the best of the budget brands to see how well they compare.

We review the latest selection of inkjet printers on the market

There's lots more in September's *PCW*, don't miss it...

Get mobile for less with this crop of budget notebooks



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Settling for style over substance

With Linux under threat, Ed Henning campaigns for the survival of open-source software

edwardh@pcw.co.uk

In writing about operating systems last month, and in particular usability concerns, I didn't mention some of the other factors that had pointed me in that direction. I had experienced a couple of bad crashes myself, and a seriously distressed friend of mine rang to seek assistance. When she was upgrading her Windows XP laptop system online from Microsoft, something had interrupted her connection. The result of her crisis was an apparently useless hard disk and the loss of all data since her last backup. Whenever this sort of thing happens, your backup is never recent enough, is it?

But it is outrageous that such a thing should be possible. The question is: why does Microsoft allow things like this? The focus of its Windows development seems to be directed far more towards PR and marketing than the quality of code that is written. The result is that Windows is 'just good enough' to ship, and breaks down frequently enough to infuriate a few people – but not too many of them, and not too often. What a disgrace.

Microsoft's PR and marketing focus explains why it has concentrated so much on usability issues – and rightly so – but in my opinion, it is not sufficiently stable or reliable to be described as a solid operating system.

Microsoft is aware of these problems, and in 1998 Steve Ballmer promised to put software quality at the top of the agenda. Some progress has been made, but nowhere near enough.

Of course, the developing threat from Linux was the most likely reason for the priority change, as the most significant benefits to come from the open-source movement are high-quality code and solid OS stability.

The current threatened legal action against IBM by SCO brings this contrast to the fore once again. Although I do in fact consider SCO's claims to be bogus, rather than discussing the details of the case (see News, page 28), I would like simply to point out two general areas of concern that it has highlighted for me.

The first is that this tendency to put PR and marketing before quality of product – a sort of IT equivalent to New Labour's 'style over substance' – is not limited to Microsoft, and is alive and well in the commercial software world. That world seems driven by a mistaken premise – that software has to 'keep up with' and 'fully utilise' the latest high-performance hardware. The logic here is upside down, and the result is bloatware filling so many hard disks.

Modern hardware enables more complex tasks to be performed, with new and useful functionality – think of 3D rendering and the like – but this does not mean that artificial bloat needs to be added to straightforward software-like word processors and operating systems. It's no wonder that software companies have to resort to a 'keep up with the Joneses' level of marketing to intimidate customers into buying the stuff.

The second point that concerns me is based on the previous legal battle between Microsoft and the US Government. It was clear that the judges had great difficulty understanding many of the issues involved – and how would they understand them without any specific training or experience?

How can judges be expected to understand the subtleties of an action like that being taken by SCO, without a thorough background knowledge of the struggle between open-source and commercial software? SCO is already trying to load the dice in its complaint by referring to open-source developers as 'hobbyists' – surely that might give a judge the impression of spotty kids undermining a respectable commercial organisation?

For those involved in or around the industry, it's easy to see through SCO's complaint. But the specialised nature of the issues involved means that the skill of the lawyers and the presentations of key witnesses are likely to hold even more sway than normal, as the actual facts of the case will be way over the heads of the judges. God forbid, SCO could win.

'Open source has blown a beneficial cool breeze through the world of software development'

Such an outcome would be one of the worst things to happen to the PC industry since it began, and I'm not just referring to the specific damage it would do to the Linux operating system – although that would be bad enough. After all, considering the majority of users, I am sure that Windows is a better product today than it would have been had Linux never existed, and it is in everybody's interests – particularly Ballmer's – for that competitive pressure to be maintained.

What concerns me more is the potential effect on the open-source software movement as a whole. While I do not expect that one day all software will be open source, hopefully some balance between commercial and open source might eventually be achieved. Open source has blown a beneficial cool breeze through the world of software development, to the extent that even users who have never used a piece of open-source code, or perhaps have never even heard of Linux, have benefited. Ironically, the threat posed by open-source software and in particular the Linux operating system has made the likes of Microsoft more focused on the operating needs of their customers (proper stable operating systems anyone?). And that can only be a good thing.

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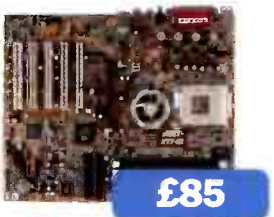

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Abit NF7-S V2.0 mainboard for Socket A

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- *nForce2-SPP/MCP-T, 1394*
- *SATA KIT*

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- *AGP, "PRO/660TV-DVI"*
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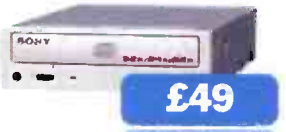

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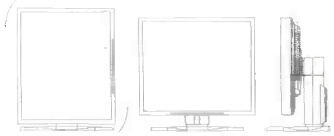

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