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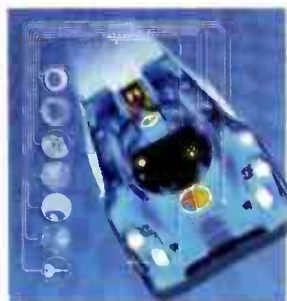
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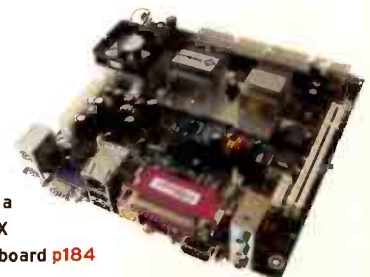
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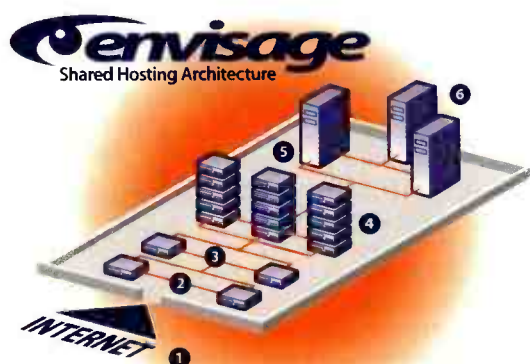


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Straitjacket gets more restrictive

Innovation will be sacrificed if the US has its way, including limits on us using and modifying IT kit



Here's an interesting question: if you pay hundreds, or even thousands of pounds for some software or hardware, and have a receipt to prove ownership, then you definitely own that product don't you? The answer of course is yes. Or is it? Apparently, in the world of technology the answer

isn't so clear cut.

Yes, we pay money and get to physically take the product home. If it's software, we can load it onto our PC and put the box and manuals on the bookshelf, and if it's hardware we can use it to our heart's content.

But the fact is that, more and more, we're no longer masters of our own devices, literally. Obviously, this has been the case with software for years with the varying types of licensing schemes that exist. One doesn't own software, per se, but is granted the right to use it (not that many of us ever fully read what rights we are entitled to before we click on the accept button). And this situation looks set to continue for an awfully long time now that copyright laws are tightening up in the UK and across the globe (see News, page 16).

However, an even more worrying trend is the emergence of restrictions on the use of hardware that we've purchased. It seems there are moves afoot to slowly, but surely, limit the way we use our paid-for technology, as well as what we decide to physically do with our purchases (see Whose PC is it anyway? – page 101).

An excellent case in point is the situation with Microsoft's Xbox. In the US, under the Digital Millennium Copyright Act, you can land yourself in jail by tampering with something construed as protecting intellectual material (News, PCW September 2003). This means that, technically, you can't open an Xbox and modify it, be it with a Linux operating system or a mod chip, in any way. If we take the emotive issue of piracy out of the equation, this situation seems to be absurd. As far as I remember, when you buy something like a house, car, even a stereo, you're free to do what you want with it. Drill those holes, soup up that engine. No-one is going to stop you, even the bank, which we all know is the real owner of your property until you pay off your debt. Tamper away is the motto.

Yet, if you project the Xbox scenario to the extreme, one could be charged for tampering or interfering with it by taking an axe to it, regardless of the fact that you bought the thing.

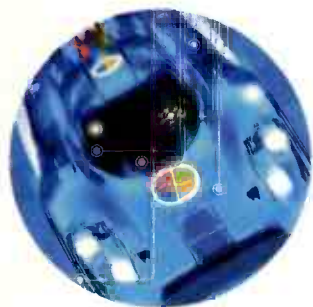
Putting extreme examples aside, the fact remains that there is an emerging trend that will limit our freedom to use, modify and enhance a rightfully paid-for product. In the long term, if the fat cats of the IT world get their way, we could all become renters, not owners, of technology products. We already have time-limited software, so is time-limited hardware that far off? All I can say is that if this trend continues, and our own laws give more power to the IT companies along the lines of those found in the US, we could see the days of home innovation and fun tinkering die away, and that would be a tragedy.

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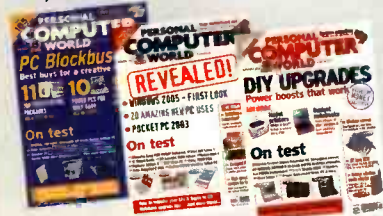
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Results explained

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

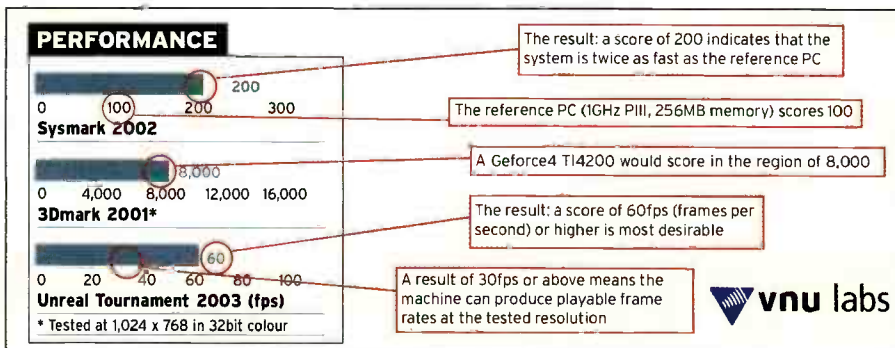
with Full Scene Anti-Aliasing (FSAA) and at 1,280 x 1,024, both in 32bit colour and textures, set to loop three times.

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.



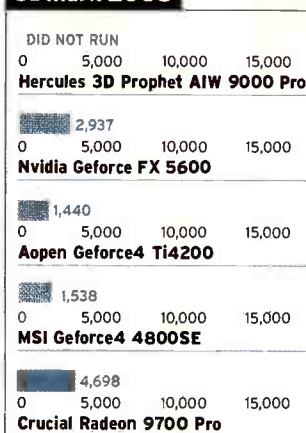


Unreal Tournament 2003 is used to test real world DirectX performance

3Dmark 2001



3Dmark 2003



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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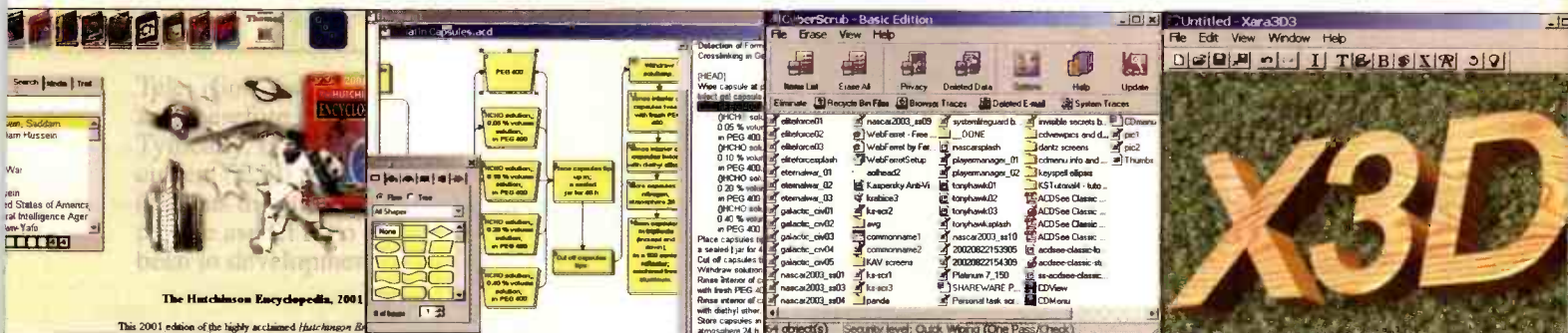
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Orlogix Simple Backup Lite

Orlogix Simple Backup Lite is an easy-to-use program for backing up your important files and restoring them if something ever goes wrong with your PC. To use Orlogix Simple Backup Lite, just open the program from the Windows Start menu and follow the on-screen instructions. The readme.txt file (with the program files) provides valuable additional information.

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Allclear Orgchart

Create an organisation chart in the time it takes to type the names or positions of the people who will populate it. You can use drag-and-drop boxes and groups, as well as typing directly into the chart. When you add or edit boxes Allclear redraws the chart, retaining the lines and links. Many box types and samples are available and you can save any jpeg file into your shape library.

Turn to p296>

Xara 3D v3.04

This is a 'slimware' Windows application designed for creating still or animated, high-quality, compact 3D text headings for the web. You can use any Truetype font or

imported metafile, altering lighting, foreground and background textures as well as colours. You can add realistic shadow effects and more.

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BONUS CD

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This great reference collection is on the bonus CD-Rom free with this month's *Personal Computer World*. Nine classic essential books from two of the UK's most trusted reference publishers are brought together in an interactive multimedia format. If you need to produce research papers, essays or reports, or you're simply looking to expand your general knowledge, The Penguin Hutchinson Reference Suite is packed with statistics, facts and figures to enliven and enhance your understanding of the modern world.

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On the DVD-Rom

Showshifter v1.55

Designed as an all-in-one media device, Showshifter allows you to watch and record TV (Tivo style), and play back video files, DVDs and MP3s. All video formats supported by Windows Media Player can also be played in Showshifter. The music jukebox now allows you to play music video files so you can create your own music channel, and the enhanced CD player module includes CD ripping and automatic Internet lookup of track and artist info. The controls and interface are simple and clear, as the software is intended for use either on your PC monitor or through your TV screen. A TV tuner card is needed to use this software.

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USING THE COVER DISC

The PCW cover disc uses a web-browser style interface, but you'll need to have 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:

FAULTY DISC > If the disc is physically damaged and will not load, return it to this address for a replacement:

PCW October 2003 cover disc
ABT, 306 St Mary's Lane
Upminster, Essex RM14 3HL

quoting reference 'PCW Vol 26 No 10'.

PROBLEMS INSTALLING/RUNNING THE SOFTWARE > Check the support page on the disc, or check the manufacturer's site.

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News

EDITED BY CLIVE AKASS

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PCW numbers.

To find out more information,
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story, go to www.pcw.co.uk
and put the number in the
box pictured here.

Fears over copyright law

Legislation due to be passed 'on the nod' this autumn will put new curbs on what is currently considered in practice (if not law) to be fair use of digital material, such as copying a music track to an MP3 player for listening to on the move.

The legislation, bringing UK copyright law into line with a European directive, should have been passed last December but was delayed. Even Patent Office officials helping to write it confessed that they did not know its full implications.

Since then the Office has been lobbied by both industry and consumer-rights bodies; campaigners fear it will turn out like the US Digital Millennium Copyright Act (DMCA), which has been criticised for legitimising restrictive practices.

Yet the legislation is to be introduced as a Statutory Instrument, which means it could pass into law without a parliamentary debate.

The Patent Office says the copying of digital material such things as DVD movies (see page 20) or music tracks is already illegal and the new law will not alter this. It would also 'not deal directly' with issues such as the 'modding' of Microsoft's Xbox player to allow it to run Linux and other legitimate software.



Apple's iPod player... users can buy tracks easily at a good price

Both these views were challenged by Ian Brown, of the Foundation for Information Policy Research, who as we went to press was about to publish a paper on the subject (see www.fipr.org). He said that currently it is illegal to sell ways of bypassing Xbox security, or even to tell anyone how, but the act of doing so is legal. The new law will make it a civil offence.

A similar issue has arisen in the US, where Lexmark is suing a print-cartridge cloner for reverse engineering a chip (see story opposite). Critics say this is copyright protection being misused to quell competition.

Brown agrees that movie and music copying is already illegal, though small-scale abuse is ignored. But the new legislation will spell out the situation and outlaw any bypassing of copy protection. If music publishers encrypt a track, anyone 'ripping' it for use on an MP3 player, or selling a means to do so, could face court action.

The British Phonographic Industry (BPI) appears to believe the law is relevant and is waiting for it to be passed before deciding whether to take action against UK peer-to-peer file sharers. In the US, service providers are being subpoenaed to provide the names of file-swappers for prosecution under the DMCA.

Few dispute that digital copyright must be enforced if a web economy is to flourish. But the music industry is realising the law alone cannot stop abuse: Apple has shown that people will buy tracks legally if they are sold online at a reasonable price; Iomega plans to follow its lead by offering tracks for sale. The software industry may be forced to face similar realities in poorer countries (see p20).

But the industry is fighting hard to get legislators to take a tough stand and the fear is that, like the DMCA, the new law will have unintended consequences.

Clive Akass

Sendo drops suit against Orange

UK smartphone maker Sendo has dropped its lawsuit against the mobile operator Orange and agreed to pay some of its costs. Details of the deal are secret but reports of a 'humiliating climbdown' by Sendo appear to be wide of the mark.

It seems rather to be connected with the fact that Orange supplier Texas Instruments had licensed disputed technology from Sendo. The UK firm is still suing Microsoft, with whom it was once lead partner in smartphone development.

The two companies had a spectacular bust-up after Orange launched a Microsoft-based smartphone manufactured by the Taiwan giant High Tech Computer (HTC). Sendo dropped its own Microsoft-based Z100 smartphone shortly before launch and announced that it was switching development to Nokia's operating software.

Wifi kit blind to UK slots

The small problem with Dell's Truemobile Wifi CF-card, which supported only 11 of the UK's permitted 13 channels, appears to be shared by other makes.

Reader Andy Borland, who spotted the problem when his Cisco router failed to see his Dell card, discovered that a Linksys card was also restricted to the 11 channels permitted in the US.

Linksys Europe blamed the Intersil Prism 3 chip, but Intersil said the hardware supported all

14 channels specified under the 802.11b Wifi spec. Channel 14 is used only in Japan. It seems that some vendors are not providing driver support for all the UK channels, even though their card specs quite rightly say the full spread is supported.

This will make little difference to most users most of the time – unless, like Borland, you hit a system set to channel 12 or 13. It can also reduce your options in heavily congested airspace.

Spotlight on print costs

The Dutch Consumers Association (DCA) did an about-turn last month over a call for a boycott of Epson-made inkjet cartridges. But the row has highlighted concerns about the cost of print consumables, a major and growing revenue earner for manufacturers (see page 20).

Manufacturers have been accused of putting chips on ink cartridges to prevent rivals making cheaper clones. In the US Lexmark has invoked the controversial Digital Millennium Copyright Act (DMCA), in a bid to prevent a company called Static Control Components from cloning a cartridge.

The DCA complaint was rather different. It claimed that Epson's Intellidrive chip indicated that cartridges needed renewing

when the cartridge was still up to 38 per cent full. It withdrew its boycott call after Epson argued that the extra ink was needed to keep the device in good order. The UK Consumers' Association also complained that many cartridges give apparently premature 'running dry' alerts. It worked out that the ink in a £29 HP colour cartridge cost £1.70 a millilitre – seven times more than vintage 1985 champagne.

Printer vendors argue that they have to factor in the cost of research and development and that their products are superior. They also hinted that refill or clone products can damage a printer.

But Robin Edwards, UK MD of printer vendor Tally, described this argument as archaic,

though he stressed that he could only speak with authority about laser clone supplies which were 'as good if not better' than official products.

Tally is offering consumables for most major makes of lasers, and Tektronix solid-wax, with claimed savings of up to 40 per cent – and a guarantee that any printer damaged from using them will be fixed free.

Tally does not plan to offer inkjet supplies. 'It is not our market,' said Edwards. 'and the cartridges are more difficult to produce.'

Tally is one of several printer manufacturers that make third-party consumables, including some who complain when others do so. Edwards said: 'Xerox and Lexmark make supplies for HP printers.'

>> Name thefts

Identity theft increased 79 per cent over the past year in the US, affecting more than three in 100 adults – with only one in 700 culprits being caught, says analysts Gartner.

It is far from being only a high-tech crime. In more than half the cases, victims were family members, room mates, neighbours or colleagues.

Thieves use social-security, driving licence, credit card and bank account numbers to obtain loans or credit accounts under the stolen identity, but use another mailing address to cover themselves.

PCW number 1142517

>> Buzz off...

South Korea's largest mobile network provider is selling a new ring tone that is inaudible to humans but unbearable for mosquitoes. SK Telecom claims it highly effective in keeping pests away, but it reduces battery life by 20 per cent.

>> Hans off...

Deutsche Telekom has applied to trademark the word 'hotspot', used for public Wifi access points. Telefonica has lodged a rival claim for the two words 'hot spot'. The UK Patent Office's Jeremy Philpott warned that any trademark has to be a 'distinguisher' rather than a generic term.

PCW number 1142542

>> Dell printers

Dell plans to start selling its printers in the UK later this year in a move that could challenge HP's dominance. It is already selling rebranded Lexmark printers in the US, while at the same time it stopped reselling HP models.

It is Dell's second move to diversify from its core PC business. It recently shook the PDA market with the launch of its low-cost Axims.

>> Virus alert

A new quick-spreading virus poses as a warning of changes to the victim's email address. It launches itself when an attached Zip file is opened.

Tosh ships its first £500 laptop

Toshiba has broken into the sub-£500 ex VAT price bracket in its latest range of laptops. The basic Satellite Pro A10 costs £499 with a network port, 256MB of Ram, a 2GHz Celeron processor, DVD drive, and 14in TFT screen.

An £899 ex VAT version has a 15in screen, a 2.4GHz Pentium 4-M processor and 512MB of memory. The A10 laptops weigh about 2.8kg.

Toshiba also introduced a new Centrino-based ultraportable, the M100 using the new 1.2GHz version of the low-voltage Pentium M, 12.1in display and 2GB of Ram. Prices start at £1,499 ex VAT. See review of the similar 900MHz R100 on page 57 – this costs £1,399 ex VAT and has a 12.1 TFT but only 256MB of Ram.

Yours for £499, the Pro A10



Bosses lack the IT factor

Britain's chief executives are better educated and have more international experience than ever, but not one in the UK's top 100 companies has an IT background, according to headhunters Hanover Fox International.

Elisabeth Marx, who researched the figures, said a preoccupation with the concerns of shareholders had led to tunnel vision among top bosses. But a trend towards diversity in the workplace would open up more opportunities at board level for IT people. 'When you look at the boards of the most admired companies, they have a much more diverse background.'

Marx said that with companies relying heavily on IT, anyone in the field who could 'make the link to general business objectives' had a much better chance of making it to chief executive.

PCW number 1142475

'Just our little joke. We have to keep those know-IT-alls in their place'

Linux stirred but not shaken

The claim by SCO to own part of the Linux kernel continues to cause reverberations. Analyst Gartner warned companies to delay implementing Linux on critical systems as SCO began to demand licence fees.

SCO says any firm using v2.4 of the Linux kernel or above could face legal action. Some firms said they would ignore SCO's demands until the status of the claims is established.

But Gartner research director Andy Butler warned: 'There is no legal precedent for what SCO is demanding and it is not clear what laws have been broken.'

The claim has not affected the use of Linux for web servers, which is still rising, according to netwatchers Netcraft.

SCO's claim was scorned as 'nebulous' by Columbia law professor Eben Moglen in a paper for the Open-Source Development Lab, home of Linux guru Linus Torvalds and the Linux kernel (see **PCW Number 1142749**).

The dispute has also touched Unix users, particularly IBM customers, who may also be subject to a SCO claim. Yankee group analysts warned them to check their licence small print to see if they are at risk.

Europe goes for open source

National Government IT systems across Europe should use open source software to ensure that they can operate together, a European Commission working paper has recommended.

The planned European interoperability framework should be 'based on open standards and encourage the use of open source software,' it said.

Andy Butler, vice president at analyst Gartner, described it as 'a loaded statement' and warned that open source did not equate to open systems, and that proprietary applications are sometimes preferable.

He said that to some people in Europe 'Linux is not an operating system but a religion and they could start to go over the top.'

PCW Number 1142411

Exchange goes mobile

Microsoft's next-generation message-hub software will let companies and phone operators offer instant email delivery to mobiles in a service similar to that available on the Blackberry handheld we reviewed last month.

In fact Exchange Server 2003, due for release later this year, offers more features than the Blackberry service run by Research in Motion (Rim), according to Microsoft Mobility products manager James Langridge. It supports attachments on files and folders, and the ability to delete and sort email held on the server.

Mobiles, or at least those running Microsoft software, will have a number of email options including scheduled or instant delivery. But Exchange has to send an SMS message to 'wake up' the mobile, though a GPRS link is theoretically always on.

Langridge admitted that the Rim system does not require this call, which could prove costly for companies talking frequently to hundreds of



Blackberry faces competition from Exchange

devices. But he claimed that Rim could not 'scale up' like Exchange to serve many thousands of users because its system needed to maintain an IP link with devices. He said deals would be done to get a good rate for the SMS calls.

A spokeswoman for Rim said: 'We do not comment on rival products.'

Microsoft has a long history of absorbing good ideas from rivals. Laplink developer Traveling Software, which invented plug-and-play PC links, and Symantec, owner of the once must-have Norton

Utilities, have had to reinvent themselves over the years as their features got copied and absorbed into Windows.

Last month alarm bells rang in the anti-virus industry, including at Symantec, when Microsoft announced that it was buying Romanian AV specialist Gecad. Microsoft has long said that it would rather leave anti-virus work to third parties, but the continual updates required fit neatly with its more recent attempts to sell software as a service rather than a product.

It is keeping quiet about its plans for Gecad but many analysts believe the next-generation of Windows will include AV features.

● Microsoft has unveiled a road map detailing how it intends to evolve .Net Framework and the Visual Studio .Net development platform. A new version, codenamed 'Whidbey', will allow faster code development and enhanced debugging.

See also Microsoft 'should be split up' – Viewpoint, page 31

Firms 'overwhelmed' by security fight

Microsoft's claim to have improved security in Exchange Server 2003 has already taken a bashing with the revelation that beta installations had a serious vulnerability – albeit one shared by Windows XP, 2000 and NT.

A patch was quickly released for the flaw, but it did not stop hackers from posting code on the web that could be used to penetrate unpatched systems.

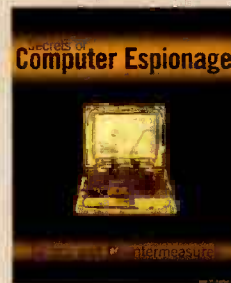
The latest flaw exploits the Remote Procedure Call (RPC) interface, which is designed to allow one computer to use services on another. It could allow hackers to introduce and run rogue code on a system.

The security testing firm NTA Monitor warned firms to block port 135, a communication channel involved in this and other vulnerabilities, as a matter of course.

Meanwhile there were warnings that hackers are

Spies in your PC

If you need to get a grip on security, Wiley has just published a reasonably digestible treatise on the subject. Much of *The Secrets of Computer Espionage* (ISBN 0-7645-3710-5, £24.50) will be of interest to hackers, police and security staff alike. Author Noel McNamara discusses physical as well as technical security, knowing people are as likely to be insecure as machines. Some tips, like how to get into a system you have locked yourself out of, will be useful to every PC user. The legal section will, however, fall flat for UK readers as it covers US law and predates the recent scary anti-terrorist legislation.



targeting home-based workers using broadband links to their offices in a bid to find a back door into company systems. Experts say the proliferation and dispersal of machines makes it harder to keep pace with security updates. Security

vendor Internet Security Systems said the number of serious security incidents rose by 17.3 per cent in the three months up to July, and that the increase threatened to overwhelm companies who cannot keep up with patches.

Crusoe takes on Centrino

New UK 'flexi-screen' project

Transmeta will launch a new low-drain Crusoe chip in the autumn that it claims will match or outperform the Pentium-M-M powering Intel's Centrino mobile platform – whether on energy efficiency or speed was not made clear.

It was Transmeta – which, until recently, employed Linux guru Linus Torvalds – that put power drain on the agenda for Intel and AMD by launching the first Crusoe chips.

The aim was not simply to increase battery life: low-drain processors are used in racked

servers to keep heat down, and in desktop PCs to reduce fan noise.

Crusoes run PC x86 code but are very different from Intel chips. Code is 'morphed' into Very Long Instruction Words (VLIW) that allow the processor to execute the equivalent of several x86 instructions per clock cycle. This means clock speed cannot be taken as a direct measure of processing performance.

The new Crusoe TM8000 Astro has a faster morph engine, and a longest-yet 256bit VLIW. Transmeta's chief technology office David Ditze says it will be

47 per cent more energy efficient than current Crusoes. Chief executive Matthew Perry said 1.1 GHz TM8000 samples has been well received by customers.

He said the new chip can execute up to eight instructions per cycle, making it 50 per cent faster on running 'real-world applications' and up to 80 per cent faster on multimedia at any given clock rate.

'The combination of higher clock speed and improved efficiency should allow us to expand our server market,' he said in a company statement. www.transmeta.com

Another British company has joined the race to make flexible screens that could lead to scroll up displays allowing a notebook to fit in your pocket.

BTG, which specialises in shepherding technologies to market, has signed a deal with the Industrial Technological Research Institute of Taiwan to develop organic screen technology licensed from Ohio State University.

Spokesman Keith Johanns said: 'The ultimate goal of the collaboration is to develop the technology for use in flexible products where the display can be a 'flex many' without loss of overall functionality.'

First screens will be for small displays for PDAs or phones. 'We also believe the technology can be developed for... low or high resolution, large displays.'

Cambridge Display Technology is working towards similar goals using technology developed at Oxford and Cambridge universities. www.btgplc.com

Opteron beats Itanium 2 on 64bit

AMD's Opteron processor performs compute-intensive tasks better than Intel's latest Itanium chip, according to tests by our sister publication, *IT Week*.

The 64bit Opteron, launched in April, ran encryption software 10 per cent faster than a 64bit Itanium 2 with 3MB cache. It ran legacy 32bit x86 software at about the same speed as a 2.4GHz Xeon processor; the Itanium cannot run x86 natively.

USR 11g 'steers clear of 11b slow lane'

US Robotics has launched a double-speed 802.11g wireless networking range that it claims does not suffer the notorious performance hit caused by the presence of older 11b clients.

Standard 11g cards are rated at 55Mbit/sec, five times faster than 11b, though you are lucky to get a third of these speeds in practice. Both use the same 2.4GHz bands, and 11b is effectively a subset of 11g as the cards can operate in 11g cells.

On early implementations, the presence of one 11b client slowed the whole cell to near 11b speeds. Chipmaker Texas Instruments claimed this hit was unnecessary. The USR kit uses an TI chipset with an ARM9



USR AP-router... double standards

processor, which marketing manager Maxime Grandchamp says is fast enough to juggle between 11g and 11b without affecting performance. It also had the headroom to cope with planned Wifi changes, such as improved encryption.

The products have four modes: 11b and 11g, and two turbos

rated at 22Mbits and 100Mbits that only work with similar kit.

Oddly USR's access point (AP) is more expensive (£119.99 inc VAT) than its combined AP-router (£99.99 inc VAT). This is because the AP also functions as a bridge, client, repeater and network manager. PCI and PC Card clients cost £59.99 inc VAT.

Grandchamp says USR does not believe there will be a big market for cards combining 11g and 11a, which boasts the same data rate at the 5GHz band.

But with the 2.4GHz band getting crowded, the message from other observers is: 'Buy 11g if you want a wireless network now; if you are upgrading from 11b, wait a few months until combo cards get cheaper.'

Wireless labels could point way for future ebooks

Bistable displays, which retain an image without the need for power, look like finding an initial use as updatable shelf labels. The technology, developed by Zinithal Bistable Displays (ZBD), could eventually be used for ebooks and other mobiles.

ZBD has teamed up with electronic-label specialist Eldat to prototype the system, pictured right. The label is powered by a button battery that will last up to 10 years because it does not need to maintain display power. Changes can be made using either an infra-red beam or low-frequency wireless.

The wireless draws only about 20 per cent of the total power, according to ZBD. It reckons the system,



greyscale version of its screens which could lead to colour versions suitable for mobile computers. They are particularly suitable for ebooks because they do not waste power while a page is being read.

www.zbddisplays.com; www.eldat.com

available next year, could halve labelling costs in big stores – not counting the labour costs involved in changing labels. ZBD recently demonstrated a

Dial-up price cut

Watchdog OfTel has ordered BT to cut its wholesale dial-up prices by 17 per cent after Cable & Wireless claimed that operators had to pay for services they did not want. How much of the cut will be passed on to users depends on individual providers.

OfTel dismissed a complaint by Freeserve that BT had abused its dominance by using phone bills to promote broadband. OfTel said rivals could use other marketing channels at a lower cost.

Airlines rapped

Airlines are effectively barring disabled people from booking flights online because of poor website design, says the charity Abilitynet. It looked at nine leading UK airline sites, but not one satisfied guidelines to enable access to people with visual impairment, dyslexia or physical disability – an estimated 15 per cent of the population.

Easyjet came out best, but scored only two out of five, as did BA and Monarch. The remaining six scored one. Virgin, which was deemed the worst, apologised and pointed out that it had won an Ease (Ease of Access, Service and Employment) best airline award for the past four years.

Rover Woz here

A network combining wireless base stations and satellite positioning is being developed by Apple co-founder Steve Wozniak, with the idea of tracing lost children, pets, cars and anything else you don't want to lose.

Wozniak got the idea when he lost several dogs and set up a Silicon Valley company called Wheels of Zeus (derived from his nickname Woz). Base stations will be used to locate tagged targets at a distance of up to two miles. Each tag will cost less than \$25 (£18).

Apple profits down

Apple profits dropped 40 per cent to \$19m (£11.8m) in three months up to June compared with the same period last year, shipping 771,000 Macs over the period. Fred Anderson, chief financial officer, said: 'We are very proud to have exceeded our revenue target... despite the difficult economic backdrop.'

PCW Number 1142390

GPS dongle

This may look like some kind of mouse but is actually a GPS smart antenna that can give you your position to within 25m.

The £99 device can communicate with any PC or PDA with a USB or RS232 port, but the software supports only pre-XP Windows.

www.sequoia.co.uk

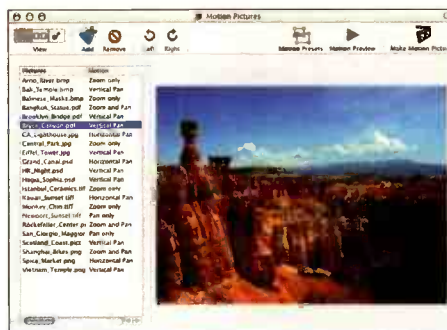
DVD copier 'anti piracy'

The chief executive of the company behind DVD X Copy, which allows you to duplicate copy-protected DVD movies, said during a visit to London last month: 'I am against piracy. I have to be, I run a software company.'

Rob Semaan, of 321 Studios, said the purpose of DVD X was to make back-up copies of DVDs rather than to pirate them. His company says this is 'fair use', but it has taken nine US movie companies to court in a bid to get a legal endorsement of the fact. Those companies are, in turn, counter-suing 321.

To hear Semaan talk you'd think it a wonder that any DVD disk makes it to a player. Disks are scratched, sat on, chewed by the dog, dropped down the toilet... a catalogue of disasters demonstrating an absolute imperative to buy DVD X and make yourself back-ups.

'I've tried to get the movie companies to talk about this, he



Roxio has released a new version of its Toast 6 DVD and DVD burner software for MacOS. Unlike DVD X Copy, this does not copy commercial movie disks, but will burn MP3 tracks. Roxio has its sights set on selling music for burning onto CDs (see page 16)

said. 'We can work something out that suits us all. But they don't answer my calls.'

He says no commercial pirate would use DVD X to copy disks because they would effectively incriminate themselves. It has to be registered before use when it is given an activation code. The user's personal and machine details are then used to fingerprint each copy, identifying the source, and copies cannot be made of copies.

Semaan says the system might even be adjusted to provide

revenues for the movie industry. His latest release, DVD X Copy Xpress, (£37.49 inc VAT from www.dvdxcopy.com), claims to back up a DVD within an hour, and to remove material such as foreign translations and pack a movie onto a single disk (movie DVDs use two layers to give them more storage).

Semaan says that if he loses the case he will simply drop the DVD ripper, which extracts the encrypted data. 'Users will be able to get a ripper off the web,' he said.

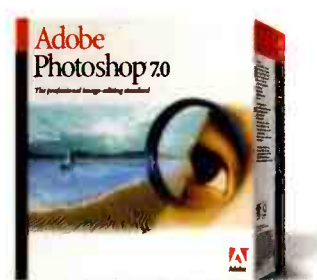
Companies are the worst offenders

Industry anti-piracy fighters have been celebrating a series of successful court cases in Europe, but they say copyright abuse has risen in Britain for the first time since 1994. Just over one in four applications used by UK companies is unlicensed, an increase of one per cent over last year. Much of this illicit use is not deliberate, according to the Business Software Alliance (BSA).

'The good news is that many companies now take this seriously and are coming to us for advice on how to audit their software,' said BSA chairman, Mark Floisand.

But some IT staff see under-licensing as a way of keeping costs down. 'Often it happens when a company goes through a period of sudden growth, or merges with another, that has been using different software,' Floisand said.

Company piracy is far more widespread, at least in Europe, than black market software, but that too is still big. A 23-year-old



Photoshop: one of the world's most pirated applications

man was jailed for 18 months last month for selling pirated software over the web. Days later a man got three years in Germany for selling up to 30,000 compilation CDs. On the same day, Italian police claimed to have closed a ring with a turnover of £70m a year.

Floisand said that anti-piracy pressure is mounting in unlikely places, like Uzbekistan, as people realise that they can't start their own software industry without protection. What the software industry won't discuss, at least on the record, is the extent to

which piracy is a form of promotion. Many of today's licensed users were yesterday's copyright abusers.

This may be less the case in the UK today, when major apps are taught at school, but in poorer countries piracy may be the only way someone can learn an application. In this context it begins to look more like music piracy: a problem as much of the business model as of the law, and one which would be better contained if the products were better priced.

Software vendors in the past have exaggerated lost revenues by claiming every pirated copy as a lost sale – as though every kid using a dodgy copy of Photoshop was in a position to buy the real thing.

Floisand said statistics are now a lot more realistic, and he pointed out that vendors now commonly adjust their prices according to the customer, so that a students can buy at a fraction of what a company has to pay.

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- SoundBlaster Compatible 6 Channel Audio
- Stereo Speakers integrated into TFT monitor
- Internet Ready V.92 56Kbps data/fax/voice modem
- Microsoft Windows XP Home
- Logitech Internet Keyboard & Optical mouse
- FREE Microsoft Works 7.0
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Matrix M3000+

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- 512MB DDR 333 Memory
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- Internet Ready V.92 56Kbps data/fax/voice modem
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| • 120GB 2MB to 160GB 8MB buffer Hard Drive | £40 EX VAT | (£47.00 INC.) |
| • 15" to 17" SHARP Multi-media TFT Screen | £85 EX VAT | (£99.88 INC.) |

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| • 17" TFT to 18" NEC 1860 TFT monitor | £100 EX VAT | (£117.50 INC.) |



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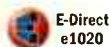
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- 120GB 7200rpm with 2MB buffer
- 128MB NVIDIA GeForce FX 5200, TV out, DVI, DX9
- 15" SHARP TFT Flat Panel Monitor with stereo speakers
- SONY 16x DVD-ROM Drive
- 52x CD Re-Writer Drive
- Dolby Digital 5.1 Audio with Soundstorm™ technology
- Creative Sound Blaster SBS250 Speakers
- Internet Ready V.92 56Kbps data/fax/voice modem
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- Logitech Internet Keyboard & Optical mouse
- FREE Microsoft Works 7.0
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- Midi Tower Case (2tone), Plus A Series Features



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- 512MB DDR 333 Memory
- 120GB 7200rpm with 2MB buffer
- 256MB NVIDIA GeForce FX 5600 SE, TV out and DVI
- 17" SHARP TFT Flat Panel Monitor with stereo speakers
- SONY 16x DVD-ROM Drive
- 52x CD Re-Writer Drive
- Dolby Digital 5.1 Audio with Soundstorm™ technology
- Creative Labs Inspire 5300 5.1 Speakers & Subwoofer
- Internet Ready V.92 56Kbps data/fax/voice modem
- Microsoft Windows XP Home
- Logitech Internet Keyboard & Optical mouse
- FREE Microsoft Works 7.0
- FREE Pinnacle Studio 8 SE Video Editing Software
- Midi Tower Case (2 tone), Plus A Series Features



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- Athlon™ XP 3000+ to 3200+ Processor **£150** EX VAT (£176.25 INC.)
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- Replace 52x CDRW with SONY Multi-burner **£105** EX VAT (£123.38 INC.)



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- 512MB DDR 333 Memory
- 160GB 7200rpm with 8MB buffer
- 256MB NVIDIA GeForce FX 5600 SE, TV out and DVI
- 17" SHARP TFT Flat Panel Monitor with stereo speakers
- SONY 16x DVD-ROM Drive
- SONY Multi format DVD Writer**
- Creative Labs Sound Blaster Audigy 2 ZS
- Creative Labs Inspire 6700 6.1 Speakers & Subwoofer
- Internet Ready V.92 56Kbps data/fax/voice modem
- Microsoft Windows XP Home
- Logitech Internet Keyboard & Optical mouse
- FREE Microsoft Works 7.0
- FREE Pinnacle Studio 8 SE Video Editing Software
- Midi Tower Case (2 tone), Plus A Series Features



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On-Board features include

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- 6 USB 2.0 ports
- 1 S/PDIF out + 1x Surround L/R audio Jack + CNTR/LFE
- 1 Serial port & 1 Parallel port
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- 2 RJ-45 jack
- Slots include 5x PCI & 1x AGP 8x

Additional features include

- 1.44MB 3 1/2" floppy disk drive
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- DVD includes decoding software
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10/100 LAN USB 2.0

IEEE 1394 SERIAL ATA

5.1 DOLBY DIGITAL AUDIO

On-Board features include

- Dual Channel DDR 400 support
- Dual 10/100 Ethernet LAN
- 2x IEEE 1394 Firewire ports
- 2x Serial ATA connectors supports Raid 0/1
- 6 USB 2.0 ports
- 1 S/PDIF out + 1x Surround L/R audio Jack + CTR/LFE
- 1 Serial port & 1 Parallel port
- 1 Audio I/O & 2 RJ-45 jack
- Slots include 5x PCI & 1x AGP 8x

Additional features include

- 1.44MB 3 1/2" floppy disk drive
- TISCALI Internet & E-mail Access
- Microsoft Internet Explorer (v.6.0)
- DVD includes decoding software
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- 120GB 7200rpm with 8MB buffer
- 128MB NVIDIA GeForce FX 5200 Personal Cinema
- 15" SHARP TFT Flat Panel Monitor with stereo speakers
- SONY 16x DVD-ROM Drive
- 52x CD Re-Writer Drive
- Creative Labs Sound Blaster Audigy 2 ZS
- Creative Labs Inspire 6700 6.1 Speakers & Subwoofer
- Internet Ready V.92 56Kbps data/fax/voice modem
- Microsoft Windows XP Home
- Logitech Navigator Cordless Keyboard and Mouse
- FREE Pinnacle Studio 8 SE Video Editing Software
- FREE Games Bundle - Joystick - Game Pad + Tomb Raider2
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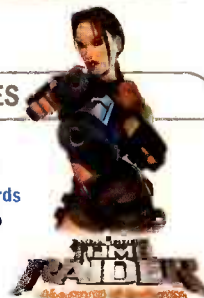
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- 160GB 7200rpm with 8MB buffer
- 128MB NVIDIA GeForce FX 5200 Personal Cinema
- 17" SHARP TFT Flat Panel Monitor with stereo speakers
- SONY 16x DVD-ROM Drive
- 52x CD Re-Writer Drive
- Creative Labs Sound Blaster Audigy 2 ZS Platinum
- Creative Labs Inspire 6700 6.1 Speakers & Subwoofer
- Internet Ready V.92 56Kbps data/fax/voice modem
- Microsoft Windows XP Home
- Logitech Navigator Cordless Keyboard and Mouse
- FREE Games Bundle - Joystick - Game Pad + Tomb Raider2
- FREE Pinnacle Studio 8 SE Video Editing Software
- Black Midi Tower Case, Plus X-treme Features

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|--|-------------|----------------|
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X-treme 3000+

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- 160GB 7200rpm with 8MB buffer
- 128MB NVIDIA GeForce FX 5600 Personal Cinema
- 18" NEC 1860NX TFT Flat Panel Monitor
- SONY 16x DVD-ROM Drive
- SONY Multi format DVD Writer**
- Creative Labs Sound Blaster Audigy 2 ZS Platinum
- Creative Labs Inspire 7.1 - 77700 Speakers & Subwoofer
- Internet Ready V.92 56Kbps data/fax/voice modem
- Microsoft Windows XP Home
- Logitech Navigator Cordless Keyboard and Mouse
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- 15" SHARP TFT Flat Panel Monitor with stereo speakers
- SONY 48x CD Re-Writer & 16x DVD-ROM Drive (Combo)
- Dolby Digital 5.1 Audio with Soundstorm™ technology
- Creative Labs I-Trigue 2.1 3300 Speakers + Subwoofer
- Internet Ready V.92 56Kbps data/fax/voice modem
- Microsoft Windows XP Home
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- 160GB 7200rpm with 8MB buffer
- 256MB NVIDIA GeForce FX 5600 SE, TV out & DVI
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- Internet Ready V.92 56Kbps data/fax/voice modem
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| • 160GB to 200GB 8MB Buffer Hard Drive | £50 EX VAT | (£58.75 INC.) |
| • 18" to 19" SHARP TFT monitor | £125 EX VAT | (£146.88 INC.) |

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ATA 133 **AGP 8X**

10/100 LAN **USB 2.0**

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- Dual Channel DDR 400 support
- 1x 10/100 Ethernet LAN
- 2x IEEE 1394 Firewire ports
- 2x Serial ATA connectors supports Raid 0/1
- 2 USB 2.0 ports
- 1 S/PDIF out + 1x Surround L/R audio Jack + CNTR/LFE
- 2 Serial port
- 1 Audio I/O
- 2 RJ-45 jack
- Slots include 1x PCI & 1x AGP 8x

Additional features include

- TISCALI Internet & E-mail Access
- Microsoft Internet Explorer (v.6.0)
- DVD includes decoding software
- CDRW includes burning software
- Windows XP is a full version - OEM
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Elite Features

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ATA 133 AGP 4X

10/100 LAN USB 2.0

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- 4 USB 2.0/1.1 ports & 1 VGA port
- 2 Serial port & 1 Parallel port
- 1 Audio I/O
- 1 RJ-45 jack
- Slots include 3x PCI & 1x AGP 4x

Additional features Include

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- Microsoft Internet Explorer (v.6.0)
- DVD includes decoding software
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- Sound Blaster Compatible Multi channel audio
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- Microsoft Windows XP Home
- Logitech Internet Keyboard & Optical mouse
- Black/Silver Mini Tower Case, Plus Elite Features



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- SONY 48x CD Re-Writer & 16x DVD-ROM Drive (Combo)
- Sound Blaster Compatible Multi channel audio
- Stereo Speakers integrated into TFT monitor
- Internet Ready V.92 56Kbps data/fax/voice modem
- Microsoft Windows XP Home
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- Black/Silver Mini Tower Case, Plus Elite Features



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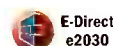
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| • 256MB NVIDIA FX 5600 SE | £25 EX VAT | (£29.38 INC.) |
| • 15" TFT to 17" SHARP Multimedia TFT | £85 EX VAT | (£99.88 INC.) |



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- 17" SHARP TFT Flat Panel Monitor with stereo speakers
- SONY 48x CD Re-Writer & 16x DVD-ROM Drive (Combo)
- Sound Blaster Compatible Multi channel audio
- Stereo Speakers integrated into TFT monitor
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- Microsoft Windows XP Home
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| • CDRW/DVD combo to SONY Multi-burner | £89 EX VAT | (£104.58 INC.) |

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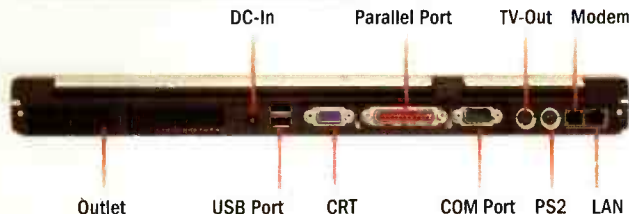
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>> SMS fax

The latest version 11 of GFI Faxmaker for Networks allows users to send SMS messages from their desktop and receive faxes in pdf format. A 25-user version sells for \$675 (£427). A trial version is available at www.gfi.com/ffn.

>> PC accents

The new Textaloud MP3 reads text out with a choice of British or Indian accents, as well as its standard US voices. It will also speak in Spanish, German and French and readings can be stored as MP3 file for playing on the move. Prices start at \$24.95 (£15.80). www.nextup.com



>> 19in flat panel

The 19in Gallery 1900 OX is the latest flat-panel display from Formac. It has a maximum resolution of 1,280 x 1,024 and will sell for around £525 ex VAT.

>> 3D maths aid

A new 3D package is designed to help children improve their maths skills. Learn Math 3D on Orbital One is set on a space station and topics include counting, addition, subtraction, division, multiplication, 2D and 3D shapes, simple fractions and telling the time. It costs \$29.95 (£18.62) from www.pajersoft.com.

>> Contribute 2

Macromedia has shipped Contribute 2, which allows individuals and teams to update and manage content on sites. The Windows and Mac OS X versions each cost £69 from www.macromedia.com (£6.99 as an upgrade). See our review on page 81.

>> HP price cut

HP has cut its ink laser cartridge prices by an average 8.5 per cent, which it attributes to the strengthening Euro.

Licence to print money?

Vendors of printers and (especially) printer consumables are falling over themselves to capture a huge emerging market, as analysts predict that digital cameras will virtually displace film cameras within five years.

Throwaway single-use film cameras will remain popular but even they will face competition from digital equivalents says a report from Infotrends. The trend to digital is being driven by the fact that high street shops now print directly from digital files, according to Michelle Slaughter, director of Infotrends research in this area.

'The consumer photography industry is just beginning to feel the impact of the transition,' she said. Companies like Kodak have long seen it coming and were among the pioneers of digicams and digital printshops. But they are bound to see a slackening of revenues from developing and printing films, a major source of their revenue.

They face competition from companies like HP, which sell low-end printers virtually as loss-leaders to lock users into long-term, highly-profitable purchases of inks and photograph-quality paper. A



HP claims says this paperback-sized £70 Photosmart 1200 is the world's first mobile flatbed scanner. The top comes off to help you scan pictures and text away from your desk. There's no hint yet of HP reprising its wonderful Capshare mobile scanner in a affordable form, but PCW lives in hope

new feature of these printers, capable of impressive colour print quality, is that they can be used even by people who do not have a computer. Typical is the HP PSC 2175 multifunction printer we reviewed last month, which also acts as a copier, fax machine and scanner. It has four slots so you can print directly from all major makes of memory cards used in cameras.

It also prints a thumbnail set, so you can choose which to print. HP says this makes up for the high cost of home prints: some around 50p for one a little larger than a postcard, compared to less than £5 for all 36 shots on a 35mm roll (often with a new film thrown in).

Expect to see variations on this theme over the next few months, with other products aimed at the same market. TVs and monitors are sprouting card slots for viewing stills; for older models there are devices like Sandisk's Digital Photo Viewer (see below).

But Slaughter believes these will be bought by people with a computer rather than those without, whom she reckons account for only some three per cent of digicam sales. 'It is easier for a group of people to gather around a TV than a PC monitor,' she said.

● Jessops is linking its camera shops so people can send digital photographs in for printing. www.infotrends-rqi.com.

Pally way to look at your pictures...

A great advantage of digital photography is that it allows you to zoom in easily on details and pan across a picture – something previously seen only when still images were featured on TV. Computers are rarely set up to do this simply, and tend to make viewing an individual rather than a social activity.

So there is something to be said for Sandisk's Digital Photo Viewer, which lets you screen your pictures on a TV and scroll, zoom and pan through them using a remote-control. But it is likely to appeal most to people who are not unfamiliar with PC graphics packages. At £59.99



Digital Photo Viewer
... a sociable way to look at pictures, but it lacks archive access

(inc VAT) it is not cheap, but naive users are unlikely to be bothered with more capable devices like the Archos Video AV320 reviewed on page 47.

PC adepts will be frustrated by the DPV's lack of a network or USB port, allowing them to swap files back and forth from

archives. The DPV includes four slots for the major memory-card formats (CF, SD, Memory Stick and MMC) but has no way of archiving files.

On the sample we were sent, we hit one of those problems with a ludicrously simple solution that takes an age to crack. We could not get the DPV to see jpeg files on an SD card and spent days consulting Sandisk until we realised a tiny switch was set to NSTC instead of PAL. Why this use of the wrong TV standard gave us an on-screen message saying 'No jpegs' is something Sandisk is trying to work out. So if you buy a DPV, be a Pal and check the settings. www.sandisk.com

Iomega 1.5GB minidrive

Iomega is to launch a new 1.5GB minidrive using what it calls Digital Capture Technology (DCT) and making removable disks around 3cm across – slightly smaller than the 1GB Hitachi microdrive.

But the Hitachi, soon to be available in 4GB, uses a standard Compact Flash slot; the DCT drive seems to be a new format, though Iomega has released few details. Its 40MB Clik disks, later called Hipzips, also use a non-standard format and have not taken the world by storm.

They were another bid by Iomega to repeat the spectacular success of the Zip drive. That too used a proprietary format but it launched at just the right time, when hard-disk capacities on online speeds were low, and the Zip was welcome as an exchange and archive medium.

The DCT drives, which use a magneto-resistive read-write head, are not expected to appear



Iomega's collaborator Fujifilm makes cameras too, of course. This is its new 2megapixel Finepix A205S, which has a 3x optical zoom and a 16MB xD card. It ships in September

in products until next year, when the market is likely to be even more competitive than today, with the steadily rising capacities and falling prices of solid-state memory modules.

Both the Zip and the DCT use technology developed by

Fujifilm. Zip discs use a Fujifilm metal particle coating offering data densities of up to 500MB per square inch; DCT uses what Fujifilm calls a nano-cubic medium consisting of a nanometre-scale film of magnetic particles promising data densities of up to 10 times greater.

Iomega chief executive Werner Heid said the new drive would 'provide high capacity, rugged, shock resistant storage at low power consumption for small portable devices such as camcorders, personal video recorders and tablet PCs.'

The drive was the company's second surprise announcement in as many months. It scooped a prize at Cebit New York in June with the first DVD burner to support all three rival formats.

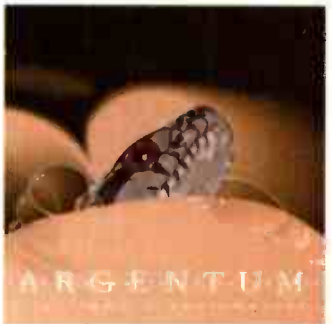
www.iomega.com

>> 64bit D-day

AMD's new 64bit Athlon64 processor will be launched in San Francisco on 23 September, the company has announced. Systems using the chip's high-end sibling, the Opteron, are already available.

>> Fast sensor

Nikon has developed an image sensor that can be read twice as quickly as current devices, allowing pictures to be taken at a rate of about eight per second – twice as many as standard CCD sensors, say the Japanese reports. It will be installed in some cameras sold this autumn.



>> Cool database

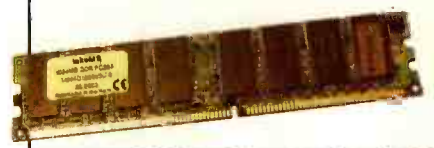
Argentum's Coolbase 2.3 is a tree-like database that claims to manage and store any kind of information, such as text, numbers, links, pictures and music. The new version will export data in XML or CSV formats. It costs \$35 (£21.60) from www.argentuma.com, where a limited trial version is available.

>> Xscale coder

New Intel compilers will help C++ developers write better applications for wireless-connected mobiles using Xscale processors, the company says. **PCW Number 1142512**

>> 1GB module

German memory maker Memorysolution is selling its 333MHz 1GB PC2700 TakeMS module (pictured below) for around £240 (£169) ex VAT. www.memorysolutions.com



IBM kit helps you talk and write to your handheld

IBM has launched a toolkit for creating applications that support a mix of input methods such as voice and pen. Future computers will certainly use advanced multimodal input, which can require considerable computing power and perhaps fuzzy logic to translate what may be contradictory signals.

The technology is being driven by the lack of a good input method for mobiles. IBM's new toolkit, the Websphere Everyplace Multimodal Environment, is designed for applications using Embedix, a

version of Linux designed for small or embedded devices. It can be used to develop applications for Sharp's Linux-based Zaurus S600 handheld, and uses a simulator based on the Opera 7 browser.

It uses IBM's Embedded Vlavoice speech-recognition and text-to-speech engines. IBM regards multimodal input as being key to the success of 3G systems, because they would enable phones to have a new class of applications. You would be able to book a plane, for instance, using a combination of voice and pen input.

PC and chip sales on the rise

Worldwide semiconductor sales totalled \$12.5bn (£7.75bn approx) in May, two per cent up on April and nearly 10 per cent higher than May last year, according to the Semiconductor Industry Association (SIA). It was the third consecutive month of growth.

The trend was confirmed by market watcher Gartner, which claimed that use of production facilities worldwide is approaching the peak levels of

2000 and is expected to top the 85 per cent mark this year.

But Joe D'Elia, research director at Isuppli, warned that the demand could spark shortages by early 2004. 'Once you get above 85 per cent utilisation, you are in a shortage situation. If you start getting above 90 per cent you're approaching panic proportions,' he said.

Another sign of the upturn is that PC shipments have

returned to double-digit growth for the first time in three years. Gartner says 32.8 million PCs were shipped worldwide in the three months up to July, 10 per cent more than last year. Dell boasted the strongest growth of the top tier-vendors with a 29.5 per cent increase.

Three of the other top-tier vendors – Hewlett Packard, IBM and Fujitsu – also achieved growth rates that surpassed the industry average.

The age of Explorer is over...

...what we need, it seems, are web apps locked into Windows. But there's a buzz around managed code, a SQL sequel and... er... open source. Tim Anderson reflects on Tech Ed

Microsoft reckons we are losing interest in web browsers. That seems rather a stretch, given the importance of web browsing to most users. However, it's based on the idea that HTML, the language of web pages, is now mature. According to Microsoft, there's no future in extending the capabilities of HTML with future versions of Internet Explorer.

'Right now, the way HTML exists, you can create some very exciting content on the web,' Robert Hess, platform-strategy group manager, told me at the European Tech Ed in Barcelona.

'But to move any further than that, you're getting into deep system-level capabilities, where you're actually creating applications. Those applications are actually better written as applications.'

What Robert didn't say is that if you use Microsoft's technology to write those applications, they will run only on Windows, whereas HTML-based applications can usually be designed to run anywhere. It's a strategy that assumes the continuing dominance of Windows on the desktop. Once

again, at a time when cross-platform support is increasingly important, Microsoft shows little interest in enabling it.

Yukon do it

Future versions of Windows could get a smarter file system as a result of work being done on Microsoft's SQL Server relational database system, the next version of which is causing a considerable buzz. The plan is to release the new version, codenamed Yukon, in the second half of next year.

Microsoft is increasingly using SQL Server technology in its other products. Euan Garden, product unit manager for SQL Server Tools, told me that a future version of Exchange (see page opposite) will use Yukon as a data store, although no timescale has been announced.

The technology will also show up as part of the Windows file system. 'Yukon is not being put into the operating system,' says Euan. 'But they are going to leverage some of the code that we have.'

Another interesting Yukon feature is deep support for XML, the 'grown-up' sibling of HTML that can be used to exchange structured data. SQL Server 2000



Shadow over Tech Ed: visitors showed a tactless interest in open source

could map relational data to XML automatically, but Yukon goes further by storing and indexing XML as a native type. This will make it feasible to save XML directly to the database without losing too much query performance.

Another aspect is integration with the common language runtime (CLR), the engine used by the .Net Framework to run intermediate code generated by the .Net development languages. This is a big deal for developers, since you will be able to run C# or Visual Basic code within the database, for example to validate or process data.

Other database vendors, such as IBM and Oracle, provide Java stored procedures, so once again Microsoft is turning to its own technology to meet a similar need.

It is not yet clear whether J#, Microsoft's Java-language product, will run inside Yukon. Apparently SQL Server's stringent requirements may make this difficult, although it is a long-term goal.

Is .Net working?

Code run by .Net Framework's CLR is called 'managed',

because a runtime engine similar to a Java virtual machine looks after memory management and enforces security requirements. This is distinct from native code applications that run standalone. Along with its other benefits, managed code should run with little change on 64bit Windows when it comes.

Microsoft is trying to persuade developers to move to managed code, but the runtime imposes a performance and processing overhead that has slowed its adoption.

The old Visual Basic 6, which generates code that does not use the CLR, is still widely used and even Microsoft's own applications are largely based on the old native Windows API, causing some to question the company's commitment to its own technology.

Microsoft insists this is changing. The press at Tech Ed were told: 'The trend within Microsoft is towards managed code. The majority of the new work that we're doing now is in managed code.'

Longhorn

This even extends to the operating system itself. The API of Longhorn, the next version of Windows, is a managed set of code, according to group manager Hess.

He told me: 'Some of that code is a layer around an unmanaged portion of the system. However, much of that code is going to be fully managed.'

Hess admitted that the transformation is only partial. 'Windows is a very large code base, and there's no way we're going to turn all of Windows into fully managed code.'

Still, Longhorn should boost .Net technology. Yukon's management tools are also built on the Framework, so after long delay Microsoft is finally going public with some .Net applications.

Open source too hot to handle

Can Microsoft handle the open source movement? Clearly it is worried. There were daily talkback sessions on the subject at Tech Ed and they were packed with delegates. Despite Microsoft's shared source Initiative, giving some organisations most of the Windows source code, it has no intention of open-sourcing its products.

'We're in the business of developing intellectual property and selling it. That's what our company does,' said Jason Zlons, solution architect for Unix migration.

Microsoft may lose some sales to the likes of Open Office, or Linux servers running Apache, but for many the key issue is interoperability. One delegate was trying to use the Windows-based Active Directory from workstations running Unix. Another wanted to use Microsoft Passport with non-Windows clients.

The real issue here is Microsoft's reluctance to develop software for other operating systems. The company is relying on XML web services for interoperability. It's a lot better than nothing, but it is not always the best solution.

Break it up now!

The world's richest software company has become far too big for anybody's good, including its own, and should be split into two unequal parts, argues Clive Akass

A couple of years back, at a time when the US authorities looked serious about reining in Microsoft, there seemed a real possibility that the company would be broken up. There was a precedent in the 1984 break-up of the US phone giant AT&T into seven 'Baby Bells', and it was argued that Microsoft had similarly grown too big for anybody's good.

There was also a very good argument for holding the company together. Microsoft gained its near-monopoly because computing needed a standard platform; and, whatever you may feel about its business practices, it has done a pretty good job over the years in providing a mix of stability and innovation.

I fear, nevertheless, that the US courts did both Microsoft and the industry a disservice by not forcing it to split into two. I got to thinking about this after hearing Palmsoft chief executive Dave Nagel talk about the next-generation PalmOS, codenamed Sahara, which is clearly designed to head off Microsoft's encroachment into mobile devices.

A major reason for the success of Palm handhelds, apart from their groundbreaking pen interface, was the ease with which they shared information with a base machine. Contacts and appointments data held on the base and mobile machines would be reconciled on both whenever you slotted the Palm into its cradle. The word synchronisation was misapplied to this operation, but I guess we are stuck with it.

Nagel boasted that Palms are still better than Microsoft's own pocket software at synchronising with Windows apps such as Outlook. I won't argue the toss on that one, but it begs the real question of how long vendors using Palmsoft, Symbian, Linux and other



mobile software can compete with Microsoft if it exploits its dominance of desktop and backend systems to gain a competitive edge for Microsoft-driven mobiles.

In a normal company this would be a legitimate business practice, but Microsoft's extraordinary position was recognised at last year's anti-trust trial, when it was forced to undertake to open its application programming interfaces (APIs) to rivals. Unfortunately it has almost infinite scope to fudge the issue.

Earlier this month I went to a briefing on Microsoft's Exchange Server 2003, the latest version of its enterprise-level 'post office' software which, among other new features, has been tailored to provide remote synchronisation with a variety of mobile devices.

Microsoft's UK mobility business manager James Langridge told us that Microsoft was 'considering what to do' about opening the Exchange APIs to allow rival vendors equivalent facilities to Microsoft client software.

Pressed about this later, he said: 'The trouble is that there are no standards for this kind of thing. Nokia and others agreed SyncML but that is their proprietary standard.'

I suggested that there was no global standard because Microsoft had avoided signing up to one. Langridge pointed out that Microsoft is a member of the Open Mobile Alliance, the industry body that is supposed to sort out these matters. I recalled the hollow laughter among representatives of that body at Comdex last year when I raised the question of its participation.

Now, for all I know, Microsoft may be behaving entirely honourably in this matter; but the longer it obfuscates and delays, the greater the edge it can give its Pocket PC software, and the stronger the suspicion that it is doing so on purpose. You can be sure that it would already have those standards set, and the APIs open, if it saw this as being in its interest. If, for instance, its mobile operations had been sold off as a completely independent company.

There is a natural demarcation between fixed infrastructure and the mobile; desktop and particularly back-end systems are older and necessarily set in their ways because they are too important for rapid radical change. The mobile, in the broadest sense of an untethered networked machine, can use any hardware or software so long as it can

communicate with the global infrastructure in a standard way.

Microsoft would argue, as it has in its subtle campaign to stifle Java, that it can produce more powerful software by using non-standard features in client devices and servers. This would be a valid point for just about any other company; but when Microsoft goes proprietary, even (saints preserve us) with the best of intentions, it is necessarily locking people into its software.

You may think that I exaggerate Microsoft's strength. Exchange leads its market, but with a share of only 32 per cent. IBM, which has a respectable 25 per cent with Notes, has a collaboration deal with Palm. So does Novell, which claims 30 million users for its Groupwise. There is also a promising Opengroupware.org open-source messaging project (see **PCW number 1142439**).

Nevertheless it seems to me that both Microsoft and computing would be better off if the company drew a big white line at the desktop and sold off everything beyond it. Microsoft does not need the mobile market in order to make money. It will earn more than enough by allowing mobiles of all makes to link with its desktops, and use its back-end systems and its vaunted .Net services (which also favour Microsoft-driven mobiles).

Both Microsoft and its spin-off would be freer to innovate, because they could do so without being accused of anti-competitive practices, and the entire industry could share the innovation.

Of course any split-up would be a complex operation, with much to sort out in the small print (a laptop, for instance, is both a desktop and a mobile) but Microsoft could choose the terms if it split voluntarily; otherwise, there may come a time when others will choose the terms for it.

>> Then again...

If you're interested in Gurunet (see right) you may also want to look at Practisearch v1.21, which also launches searches from any application. It offers dictionaries, translators, news and software archives as well as accessing search engines. It costs \$24.95 (£15.40) from www.practisearch.com where an trial version is available.

>> PDF Editor

A major snag of pdf files is that you need a costly full version of their parent Adobe Acrobat to edit them. But pdf is an open format and you do not need to stick with Adobe.

The latest version of PDF Editor, from Cad-Kas, allows you to add, delete or change pictures or text in any font. The source code (a language like HTML) is editable, too.

It costs \$39 (£24.70) from www.cadkas.com, where an evaluation copy is available.

>> Imagine this

While on the subject of pdf, Kendata is offering a £42 ex VAT utility called Topdf that translates a set of image files into a single pdf document. Details and a trial version are available at www.kenda.co.uk/kendata/topdf.



>> FX Pro 5

The latest Hollywood FX-Pro 5, from Pinnacle Systems, adds 25 new effects to the 400-plus in previous editions. It works with Pinnacle Edition, Pinnacle Studio and Adobe Premiere and costs a recommended £149 inc VAT. www.pinnaclesys.com

>> Video defrag

Cyberlink's Powerproducer 2 video suite packs a defragmenter that concentrates files on a DVD rewritable disk to one area to give a single contiguous space for large video files.

www.gocyberlink.com

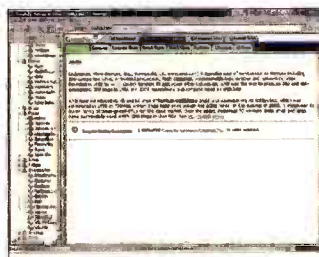
Online guru a click away

The ability to call up reference material to a computer screen has been seen as a form of amplified intelligence. But even with advanced search engines it is never quite satisfactory on the open web because of the weight of information and the fact that the good is mixed with the bad.

Encyclopaedia services like Britannica, Encarta and the Oxford Reference Library offer a quick route to high-quality information, but not necessarily of the type you require. An excellent utility called Gurunet, just launched in Britain, may fill the gap for some people.

It is more US-oriented than Britannica or Encarta, but in a couple of weeks' use its hit rate has been remarkable in fetching the information needed in the office of a computer magazine.

Like the ORL it offers you a search of a number of reference works, but they have a different



Gurunet tabs give you access to further information on a topic

slant. Its celebrity and legal sources will have limited use in Britain but the computing and company references are useful and up-to-date. Founder Bob Rosencheim is looking for UK partners willing to license reference works to Gurunet.

Its best trick is that it can be summoned by alt-clicking a word in any Windows app (clearly an always-on web link is a must). It assesses not only the word, but its context, to establish what you want, and it presents

the results in a clear, structured way with tabbed auxiliary material. If in doubt, it offers you a choice of meanings, and defaults to Google when its own sources are stumped. You also get a 14-language translation of any word you look up – a purpose for which the system was originally designed.

You can browse information using a category tree, or enter a query in a tiny box, which is redundant if you are using a word processor.

Oddly, for a system that is constantly updated, Rosencheim is charging a flat \$40 (£24.69), for a full system – about the price of a decent dictionary. He hinted that he may move over to a subscription system next year, but pledged: 'We are not going to penalise early buyers.'

You can find a free version giving access to a dictionary, thesaurus and translations at

PCW Number 1142747

GIS a job for fleet navigator

This system pictured right is a step up from the common PDA-based in-car navigation systems. The Infowave 728 is a Strongarm-powered tablet, running either Windows CE or embedded Linux, and marries GPS tracking to mapping, wireless, voice links and a geographic information system from Aberdeen-based Positioning Resources.

This is based on PocketGIS, originally developed for field surveying, and offers features such as searches to locate assets or destinations. The system is designed for vehicle fleets that need comms and computing power as well as navigation. www.infowavemobile.com



The Infowave 728 offers more than a simple navigation system

Quark quakes as rivals gain ground

The latest Quark Xpress 6 has finally been launched in Britain, as the package's position as de facto standard publishing software for the UK newspaper and magazine industry looks the shakiest for a decade.

Quark became market leader when publishers finally moved to full desktop production in the late 1980s, consigning a wide range of printshop skills to history's wastebasket.

Few staff were computer literate and no-one wanted the complication of having to train

people or learn in more than one package; so the industry simply consolidated around Quark, then the new kid on the block and generally agreed to be a few steps ahead of Pagemaker, the original desktop publisher.

But Quark failed to stay ahead of the game. It was backward in delivering tiny usability features that were taken for granted in other software; it was slow to adapt to the multi-format publishing needs of the webbed world and it was late bringing out a version for Mac OS X.

On top of that, its UK prices were relatively high – higher than those in the US, where it faced more competition.

But its competition is gaining ground here. *The Guardian* newspaper has just switched over to Adobe's Indesign, a move which may cascade to other publishing houses where IT skills are no longer in short supply. The new Quark is good, as our group test on page 145 shows, but so is Indesign – and Indesign costs less.

www.quark.com

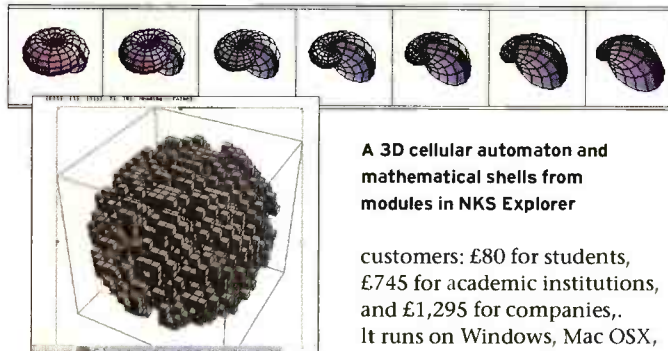
New kind of Mathematica

Stephen Wolfram made such an impact last year with his sweeping theories on the mathematics of nature (**PCW number 1135223**), that it overshadowed his role as the developer of a software bestseller.

Mathematica has become a standard tool in universities, schools and companies across the world. It has just been launched in what is said to be a much speeded-up version 5, with a new generation of algorithms for a wide range of operations.

New users can find it a little daunting, mostly because it operates a little differently from most Windows programs. The basic form of interaction is via notebooks, which are rather like a cross between a spreadsheet and a writing pad.

You can write text as if on an ordinary notepad, but if you set down a mathematical problem in the program's fairly straightforward notation, and



A 3D cellular automaton and mathematical shells from modules in NKS Explorer

press Shift & Enter, it gets solved for you. You can also call up visualisations.

This mix of text, graphics and active mathematics results in a unique type of narrative that is possible only on a computer.

Most astonishing to anyone who spent their student days grappling with integrations, differentiations and complex algebraic manipulations is that Mathematica can take the work out of these as easily as add up a list of figures. It is priced very differently according to

customers: £80 for students, £745 for academic institutions, and £1,295 for companies. It runs on Windows, Mac OSX, Linux and various flavours of Unix.

Good news for monied fans of Wolfram's *A New Kind of Science*, published last year, is that you can buy a \$50 (£31) add-on called NKS Explorer that allows you to play with the examples mentioned in the book.

The add-on is not easy going if you are not familiar with Mathematica, which is a pity because it could and should be made more accessible to non-specialists. Maybe it will inspire someone to do a friendlier front end. www.wolfram.com

>> MacPPC kit

PocketPC developers can extend their market to Mac users with a free install kit at www.pocketmac.net/pocketpcdeveloper.htm. The utility allows PPC apps to be loaded from a Mac.

>> Picture this

DTLink's Neophoto 1.1, which allows you to build digital family photo albums that can be turned into webpages, costs \$29.95 (£18.50) from www.neophoto.com.

>> SMS deal

We gave the wrong contact address last month for the £49.99 utility SMS Press, which allows you to send and manage SMS messages from your PC. It should have read www.dynmark.com.

>> 3D Browser

Version 2 of Browse3D, which claims to facilitate surfing by showing multiple views, is now available for \$29.95 (£18.50) from www.3dbrowse.com.

	Cable	ADSL	ISDN	Wireless
Vigor 2104P	•			
Vigor 2300	•			
Vigor 2200X	•		•	
Vigor 2200WP	•		•	•
Vigor 2200We	•			•
Vigor 2600		•		
Vigor 2600We		•		•
Vigor 2600X		•	•	
Vigor 2600W		•	•	•

Check web site for explanations of compatibility for each model.

Vigor Broadband Routers

- Broadband sharing routers for ADSL, cable-modems (NTL/Telewest), ISDN2e or BT Highway/Midband
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- UPnP Support for Microsoft multimedia applications
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- Easy configuration/monitoring from your browser
- Optional built-in Wireless Access Point
- Built-in 4-Port 10/100BaseT Ethernet switch
- Features vary with each model, so see website for the full specification on the complete range and an in-depth explanation of all of the features available

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Internet

VoIP

Coming soon, the Vigor2600V - an ADSL router with added Voice over IP (VoIP). Two phone ports on the back enable you to use your ADSL connection to make regular voice calls to another Vigor2600V or any other compatible VoIP device or PC software, hence making the most of your ADSL line. For more details, visit www.draytek.co.uk

VPN

The Vigor router ranges supports VPN - Virtual Private Networking - enabling you to link private networks via the internet, using industry standard IPSec/3DES encryption, providing both flexibility and cost savings over traditional remote office and teleworker linking methods.

Available from
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0870 745 8550
www.seg.co.uk

www.draytek.co.uk
Dealer enquiries welcome

Specification subject to change. *Varies with model.

Your vote counts!

This is your chance to vote on which companies you think deserve a **PCW Technology Award** for 2003.

Whether it's for great service, remarkable technical performance or true innovation, we want to hear from you. You can vote in any or all categories, from PCs to monitors to graphics cards and more in our 10 categories. And you'll also have a crack at winning one of our £10,750 worth of prizes (see below and right). Plus, the companies that win and the runners-up will be highlighted in a special

feature in our January issue, on sale 20 November 2003, just in time to help you make any important IT buying decisions. So make your vote count!

How to enter

All you need to do is go to our website at www.pcw.co.uk and click on our **PCW Technology Awards** link or go straight to the voting form at www.pcw.co.uk/awards. Either way, you can make your vote count and be eligible to win a great prize, too.



Hitachi DZ-MV350 >>

This is a camcorder for those of you who like to be at the forefront of trends, or who find the gadget factor one of a camcorder's most appealing options.

We have just one Hitachi DZ-MV350, worth £690, to give away. It dispenses with videotape and records directly to DVD. This means you can play back your recordings by dropping the disc into your DVD player or PC. It has a Flash memory card and its USB connection allows speedy, advanced editing on a PC. Despite being half the size of its predecessors, the DZ-MV350 offers much more. This is a stylish piece of kit with first-class positioning of controls, an



HITACHI Inspire the Next

intuitive on-screen menu and responsive disc navigation. Hitachi invented the DVD camcorder and this, its third-generation camera, is a pleasure to use. For more information go to www.hitachidigitalmedia.com.

Matrox RT.X100 Xtreme >>

Up for grabs by one lucky voter is the RT.X100 Xtreme video-editing card worth £868. It incorporates the Power of X, an architecture that leverages the scalable power of your CPU with the explosive performance of dedicated hardware for the ultimate realtime video-editing experience.

Its professional features are ideal for event videographers, digital filmmakers, high-end hobbyists and more.

RT.X100 Xtreme empowers Adobe Premiere to give you a new level of video-editing performance. You get full-quality, full-resolution, realtime editing and professional



matrox
Digital Video Solutions

DVD authoring at a price that is comparable, or even lower, than other software-only applications. The RT.X100 Xtreme builds on the success of the RT.X100 realtime editing platform that has won numerous awards – see www.matrox.com/video.

Two Creative audio bundles >>

We're giving away two Creative audio bundles worth £250, including a Soundblaster Audigy 2 NX USB sound card and a set of Inspire 7.1 T7700 speakers.

The Audigy 2 NX delivers high-definition sound and 24bit/96KHz audio recording through a USB connection. Supporting 7.1-channel sound as well as Dolby Digital EX and DTS ES decoding, the Audigy 2 NX will improve your gaming and multimedia experience. The Mediasource software is a one-stop digital music centre that lets you play, record, organise and burn audio CDs.

The T7700 speakers are the ideal complement to the Audigy 2 NX, delivering 7.1-channel



surround sound. They include two-way satellite speakers with tweeters and mid-range drivers for sharper, more precise sound. An upmix facility enables you to enjoy a 7.1 experience from 5.1 or 6.1 content, while a wired remote puts you in control.

CTX PV722E flat panel >>

The CTX PV722E monitor, worth £450, builds on the quality of its predecessor, the PV722i, but adds USB2 and audio to the 17in screen, Ultravision panel technology and DVI input compatibility.

It has a native resolution of 1,280 x 1,024, high contrast ratio of 500:1, low response time of 25ms and wide viewing angles of 170 degrees in both directions. The panel also boasts a movie mode feature, which optimises picture quality for superior DVD viewing. You get detachable speakers, and a 90-degree pivot function.

The PV722E offers top-end performance and extra functionality for both work and



CTX
COMMITTED TO EXCELLENCE

leisure and is designed in a sturdy, yet smart, silver and black frame and stand, making it an ideal choice for the home or office. We have one to give away.



Canon Digital Ixus II >>

Canon's chic, compact Digital Ixus II is the ultimate digital camera if you want to snap shots on the move. It's only slightly larger than a credit card (w x h), its 2x optical zoom lens is supplemented by a 3.2x digital zoom, and it's built around a 3.2megapixel CCD (charge coupled device) sensor for high-quality images. It is compatible with both SD (Secure Digital) and MMC (Multimedia Card) memory cards and weighs just 165g.

Couple the Ixus II with the Canon CP-300 direct print card



you can
Canon

photo printer, and you have a compelling package. The CP-300 produces photo-lab quality colour prints without being connected to a PC. A rechargeable battery pack means you don't even have to be near a power socket to print your snaps. Together, the camera and printer are worth £560 and there's one up for grabs.

Mesh Cubex 3000+ >>

One voter has a chance to win this ultra high-end PC, worth £1,500, and winner of a Highly Commended award in the August issue of PCW. It delivers serious desktop performance in a small, stylish chassis.

Powered by the AMD Athlon XP 3000+, this PC will make light work of any application.

The ATI 9800 Pro All-in-Wonder graphics card provides blistering game action as well as TV/video features. The same goes for the sleek 18in NEC TFT flat-panel monitor.

The system has Dolby Digital 5.1 surround-sound audio capability and your choice of



I-Trigue 3300 or Inspire 5300 speakers. The latest Sony CD/DVD Multiburner is also fitted as standard.

Mesh has been building award-winning PCs since 1987 and has over 100,000 customers a year.

Three Macromedia Studio MX >>

People expect more from the Internet now – richer content and more dynamic applications. You need tools that allow you to streamline your development process and more easily deliver the intuitive, effective experiences your users demand. With Macromedia Studio MX, you can create responsive applications that combine the functionality of traditional client/server solutions with the broad reach and low-cost deployment of web applications.

Macromedia is offering three copies of Studio MX, the market-leading combined suite for



producing rich-media websites that increase effectiveness, appeal and repeat visits.

Worth £679 apiece, Studio MX features Dreamweaver MX, graphics suite Fireworks MX, web-application tool Flash MX, and Freehand MX.

Hi-Grade M6700 >>

We have one of Hi-Grade's good-looking M6700 notebooks to give away. It offers a good graphics chip and a great screen, plus a 1.5GHz Pentium M processor, 512MB of memory, all of which is worth £1,645.

Nvidia's 5200 Go graphics chip lets you run DirectX 9 games without draining the battery too much. There's also a 60GB hard disk and a slot-loading DVD-RW drive.

Watching a film on the 15.4in screen is a pleasure, and it's also good on text and photo editing. The ivory-coloured keyboard is large and well organised, and the



touchpad feels good to use. The chassis comes with three USB ports, a mini Firewire, modem, wired and wireless Ethernet, serial, parallel, infra-red and a PC Card slot.

Two Packard Bell Ixtreme PCs >>



The new Ixtreme PCs from Packard Bell are fully functional multimedia systems, redesigned with a beautiful sleek white finish. We have two Ixtremes, worth £1,250 each, to give away to two lucky entrants.

All new Packard Bell Ixtremes host powerful processors from either Intel or AMD and specifications start from 256MB of memory, 80GB hard drive, DVD and CD-RW drives and excellent graphics cards. The higher range models also come with a DVD-RW drive.

All Packard Bell PCs and notebooks are Internet ready

and easy to set up and use. They come pre-installed with Freeserve and AOL along with an extensive software collection including Microsoft Windows XP Home Edition, Norton Internet Security, Norton Anti-Virus, video, photo and music software and much more.

With versatile hardware and extensive software, the Ixtreme is an ideal family PC that's easy to use and great value for money with prices starting at only £599. Models are available from Dixons, Currys and PC World stores. For more information on these and other systems visit www.packardbell.co.uk.

Packard Bell.

Terms and conditions: All completed entries to the PCW Technology Awards 2003 will be entered automatically into the prize draw for a chance to win one of the listed prizes. The prize draw is only open to UK residents. The winners will be selected by the Editor and notified by post or email. No correspondence will be entered into and his decision will be final. The prize draw is not open to employees of VNU or participating companies. No cash alternative will be offered and submission of entry will be taken as acceptance of the rules. No purchase of the magazine is required to be eligible.



Send your letters to:
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32-34 Broadwick Street, London W1A 2HG



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

Letters

Better late than never >

When I saw in the news section of the August issue of *PCW* the news about a Rom-based XP computer from Wyse, I remembered a letter from a reader who wanted to have a PC that started in just a few seconds like his old Spectrum. After a search through my collection of *PCW*'s I finally found it. It was in the December 1998 issue, the same that talked about the original Colin McRae Rally game. Maybe now, more than four years later, can your reader (John Newbury) see his dream turned reality.

Artur Pires



The Rom-based Winterm 3829TX from Wyse

It's worse than that... >

Following Nik Rawlinson's column on the shortcomings of Internet Explorer (*PCW*, September 2003), things may be even worse than they seem. IE6's support for Cascading Style Sheets is falling behind and Microsoft doesn't seem to want to do anything about it. Support for a lot of typographical stuff, such as being able to select the first paragraph after a heading, is missing.

But the biggest loss is the lack of support for 'fixed' as a positioning parameter, this allows a frames-style left-hand menu without using frames, as the position of an element can be set in relation to the browser window and so stays in view as you scroll down the page.

Both Opera and Mozilla have much more complete support including the wonderful 'fixed' parameter.

I'm not a Microsoft basher by nature, in fact IE used to be my browser of choice when it was a common occurrence to have a dreadfully broken Netscape 4.x, but it makes you weep to see how many things you could do as a web designer if only they all just supported the current standards.

Oh, and you're right about tabs; how do people live without them?

Steve Hardy

Nik Rawlinson replies > The more I use Internet Explorer, the more I feel it is a triumph of marketing over content. It is

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



unfortunate that most designers are producing sites only with IE in mind, as it makes it increasingly difficult for other excellent browsers to gain a foothold. With the even closer integration of Explorer in future Windows releases, I fear that things may only get tougher for Opera, Mozilla and their ilk in years to come.

Charitable offers > Over the years I have upgraded and changed my software right from the various versions of Dos, Microsoft Works, Office, Sage etc and most versions of Microsoft Windows. My shelves are now full of quite legitimate software and manuals that are no longer of use to me. I have approached a couple of charity shops in my area (Newark, Notts) to see if they would accept them but they reply to the effect that they can't sell or part with them either.

Do you have any contacts, or are you aware of any person or organisation that may be interested in receiving them or are they only fit for the waste bin?

Geoff Smith

Nik Rawlinson replies > Unfortunately, the fact that no two software companies seem to use the same End User License Agreement (EULA) complicates matters here. It would take a long time for a charity shop to read through the agreement in every box to ascertain whether they would be breaking any laws by reselling the

Letter of the month

You're a scary looking bunch >

You may be interested to hear that I have just returned to *Personal Computer World* after a 21-year break. The last edition I read was way back in October 1982 and included a set of 3D glasses. On my return to your world in August, I was, at the very least, expecting to be greeted by a friendly face. But yikes! Instead, I found myself being stared at by the scariest bunch of humanoids yet encountered. Your interrogation officer Guy Kewney is clearly suspicious of my intentions, while Gordon Laing is evidently trying to read my mind with his expansive cranium. It is apparent



Nik 'nice guy' Rawlinson

to be Nik Rawlinson, which is slightly ironic given his uncanny resemblance to Montgomery Burns.

that Barry Fox is looking down his nose at me and, as for Ed Henning: well I can't work out whether that's a face of disappointment, pity, or constipation. The only pleasant guy among you appears

Ivor Crayon

software, and even then they would have to rely on your honesty in having uninstalled the copy on your system. Yours is a noble cause, Geoff, but you're fighting an uphill battle.

Wasteful world > In your article on the subject of Microsoft ceasing support for older Windows (News, September 2003), you claim 'Just £500 buys you a fully loaded system', and then go on to recommend scrapping CRT monitors.

Well, some people might not have £500 to buy a new system. Besides, why effectively throw the old one away when it performs the task perfectly well?

This is just another example of our throwaway society. If Microsoft designed its products better so that they didn't need more vast amounts of memory and drive space every time a new version of Windows came out, perhaps there wouldn't

be all this waste. And for the people who couldn't care less and have pots of money to waste constantly upgrading, just wait until there's a landfill site of broken computers near your home, then let's see how you wail.

Andy Davis

Clive Akass replies > There is nothing intrinsically wrong with scrapping things. Nature does it all the time and there is a precise parallel between the evolution of species by natural selection and the evolution of devices under market forces. If nature took your view we would still be unicellular blobs.

The problem lies not in the fact of the waste but in its nature; current scrap is not easily recycled. In the same news section we noted a German system that could force manufacturers to do an ecological audit of any product for its entire lifecycle, an idea that could lead to earth-friendly

manufacturing. It could not, incidentally, be done without advanced computers. You will solve nothing by trying to freeze time at 1992.

A question of size > 'We have tested systems that take up less space than this magazine,' says Emilie Martin in your August 2003 space-saving systems group test. Really?

My base unit sits under my desk so only the monitor, mouse pad and keyboard take up valuable acreage. The keyboard alone uses as much area as your magazine. No-one, no-one in the world, offers small keyboards. And even if they did no-one would ever tell me about them.

Thomas Edward Groves

Emilie Martin replies > We were, of course, referring to the system box when we stated that some of the systems in the group had a smaller footprint than PCW, not the keyboard.

Rest assured, if anyone did make small keyboards, someone would tell you about it — we would.

Aaarrggghhhh! > DEAR sir, I know that this message will come to you as a surprise since we don't know each other before, but for the purpose of introduction, I am MR festus oshodi THE AUDIT DEPT ASSITANT MANAGER OF first bank nigeria plc. There is an account opened in this bank in... [This letter has been edited to fit the available space — Ed.]



Why throw away a perfectly good monitor?

Unless otherwise stated, letters sent to the editor, PCW team or contributors will be considered for publication. Letters may be edited for clarity or length. Views expressed are those of the author and not necessarily those of the editorial team. If you wish your letter to be considered for the monthly prize, please include a full postal address for delivery. An email address alone is not sufficient.

From the PCW forums >

The PCW forums (<http://forums.pcw.co.uk>) are an online community of vibrant debate. Get fixes for your problems, discuss the stories of the day and sound off on the issues that have made you hot under the collar with like-minded individuals. What have our forum members been talking about this month?

Topic: Kazaa users watch your back

Posted by dr.who

If you are using file sharing utilities, watch out. Big Brother is watching. The RIAA is now getting information from your ISPs. That means you can't stop them, and you can't mask the fact that you're doing it. So that means you get fined for every song that you are sharing.

I believe this is completely ridiculous; we live in world of MP3 players, DVD recorders and CD burners. People are going to copy music/movies and whatever they can get their hands on. It started with the recordable eight-track, which allowed users to copy records to listen to them in their cars. Now we can do the same with CDs and DVDs.

The only people this new move benefits is the record labels. Musicians make about £1.50 at the most per CD that they sell. All the rest of that \$18 (£11.14) goes to other people. Most musicians don't care. They want their music to be heard; that is the point of music. To fill each others hearts and souls with their dreams, hopes, fears and stories. I play music not to make a million dollars but to express myself. Out of all my friends who play music not one is in it for the money. So think about it. Who is really the one that will benefit from this? Wake up; we no longer live in a world where musicians control music but where money does. Greed is a horrible thing. Make sure to pass this on and please keep sharing your music by letting your friends borrow you CDs or whatever; just watch your computer next time you want to make a car ride mix CD.

Re: Kazaa users watch your back

Posted by updoc101

Screw the music industry, the same way they have screwed us for years. We can overpower them, download as much music as you can, overwhelm them. It was OK when we had reel to reel, it was OK when we had LPs, it was OK when we had eight-tracks, it was OK when we had cassettes. So screw 'em. Copy your MP3s to cassettes and give them away!

Re: Kazaa users watch your back

Posted by john.broadbent

It may surprise you to know a certain member of the US Senate suggested that people who infringe copyright using computers, (file sharing), should, when the technology allows, have their computers 'fried'. This same gentleman was later found to be using unregistered copyright material (software) on his own website!

In next month's PCW we will be taking an in-depth look at music on the net; how to download it, how to play it and what the artists really think. In the meantime, join the debate at <http://forums.pcw.co.uk>.

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guyk@pcw.co.uk

Crunch time for the Tablet

With disappointing sales since its launch, Guy Kewney considers what the future holds for the Tablet PC

Since its launch a year ago, the Tablet PC has failed to sell 100,000 units, worldwide. Actually, I'm not convinced it's sold even half that number – my own figures suggest actual, real sales of machines to people who said: 'Ah, yes; that's what I want!' would be around the 50,000 mark.

At the end of this first year, what will Microsoft be thinking about the success of Windows XP Tablet Edition?

There will be people saying that the experiment is a dud, and I'm positive that they're wrong. It's going to take another year before we have that data.

What has definitely happened is that HP has led the way with its Compaq Tablet PC, and has probably shipped 10,000-odd samples into Europe. A trivial number compared with the number of notebooks HP sold in the same 12 months, but nonetheless, it's more than anybody else. Toshiba probably sold half that (most, I suspect, to Microsoft, which standardised on that model), and all the rest put together about enough to reach 30,000 units.

'What you can be sure of, is that HP's sales aren't real business; they've basically let every one of their corporate customers have two – at a huge discount – for evaluation,' said one of the company's smaller rivals. 'And HP already knows that it has to re-think.'

It does indeed. All the tablet makers have been brought up short in battery life. That one problem has dissuaded more buyers from digging into their remaining budgets than anything else.

The problem is that, unlike any other PC so far, the tablet is designed to be used standing up. You have to have it propped on your arm. The choice is between giving the user a big, heavy battery or a light battery and short battery life.

There are of course other snags, the biggest being that the tablet software isn't standard PC software, and conversely, that standard PC software isn't ideal for the tablet. There are data types on the tablet – ink – which can't be manipulated on a standard Windows desktop; but it goes the other way too, since there are applications written for standard Windows machines which have not yet been ink-enabled and won't work on the tablet.

That is changing. Software publishers haven't given up on the tablet yet, and are busily enhancing their existing products to work in a tablet-like manner – I'm expecting a host of such announcements come 2004 and onwards. But all that effort will be like bailing the Titanic with a teaspoon if the fundamental design problems aren't sorted first.

HP's big gamble was to bet that battery life was the single most important feature, and to go for a Crusoe

processor from Transmeta. The experiment proves that battery life is important, but not at the expense of performance. The Crusoe chip they chose simply isn't up to the job of processing handwriting.

If you write on the HP Tablet, you'll find the delay between the movement of the pen and the appearance of the black ink on screen is unacceptable. You'll also discover that HP has had to disable one of the best features of the tablet – pressure sensitivity – which gives you not only the ability to get thick and thin lines, but also improves the accuracy of handwriting recognition. As a result, HP is going for the Intel Centrino design in its next machine.

Strangely, only two tablets (of the pure slate form factor, that is) have tried this. One is Research Machines, which isn't a mainstream business PC supplier; and the other is Motion Computing.

And now it's time for me to eat some words: the Centrino design has been far more successful than I dared to believe.

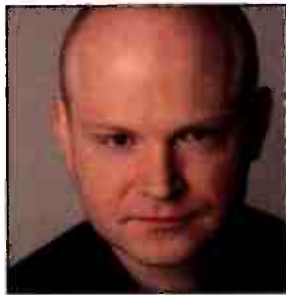
Let's say at once that the figures claimed for Centrino battery life are, as usual, twaddle. Battery benchmarks are not completely valueless because they do at least provide a level playing field, but when a manufacturer says: 'This gives four hours battery life' that's four Batterymark hours, not ordinary, real-world, 60-minute hours of real work. It's assuming you go into standby a lot of the time.

But have a look at IBM's X31 Centrino notebook. You can plug an extra battery onto the bottom of it, charge it up overnight, and then quite literally get eight hours of continuous hard work out of the machine. The fact that the benchmark figures show something like 13 hours is irritating, but irrelevant. What matters is that we do, finally, have a day-long portable computer, which an ordinary person can be expected to carry about. And you can keep your Instant Messenger going continually while the day scrolls past, too.

What we don't have, unfortunately, is a tablet with the same performance. Even with a Motion Computing Tablet, which is indeed light enough to hold over your arm for extended periods – just – you will get no more than three hours of continuous use, and probably slightly less. And if you beefed up the battery to give six hours, your arm would break.

The crunch is not here yet. The tablet has at least another 12 months to stabilise its design, attract specialist software, switch from Pentium III to Centrino and, maybe, to sort out a proper keyboard alternative. But if sales don't start climbing steeply this time next year, it may turn out to be yet another pen-based computer idea which over-anticipated the technology needed to make it sensible.

'HP's big gamble was to bet that battery life was the single most important feature'



gordonl@pcw.co.uk

Reflections on a glaring problem

These days the mobile dream is very nearly a reality, but Gordon Laing is struggling with one fatal flaw

As the 16:34 to Penzance pulled out of London Paddington, virtually everyone in my carriage produced notebooks and started tapping away. I was off for a long weekend, but clearly others had serious work to do. While the sound of typing could prove irritating for other passengers, these people seemed happily installed in their seats and oblivious to their environs. So guilt-free, and with an impending deadline of my own to meet, I joined in and powered up my notebook.

With more people feverishly working in a confined space than I've seen in many offices, it was a sight to bring a tear to the eye of any mobile product manager. Except for one thing: rather than efficiently finishing reports, most people were struggling to view their screens in the presence of even modest sunlight.

With my own notebook also suffering, I decided to read a book instead until the inconsiderate sun had either tucked itself behind clouds or dipped below the horizon altogether. It got me wondering, though, whether I had ever comfortably used a notebook in reasonably bright surroundings.

I certainly recall being out of luck when sat beside any kind of window, whether in a plane, train or back of an automobile – the moral perhaps being to enjoy the view outside instead. I also remember a friend asking if his wireless network would allow him to browse by the barbie on sunny days, only to discover the limiting factor wasn't Wifi's range but outdoor screen visibility.

These experiences seem to go against recent advertising images of people working not just by windows, but actually exposed to the great outdoors. Sure, today's notebooks offer great performance, decent battery life and easy wireless connectivity, while mobile data services like GPRS allow you to browse, email or use instant messaging services from remote locations or during transit. Indeed when you consider all aspects of mobility today, we're actually in pretty good shape. It seems to me the only thing that's really letting it all down are the screens, many of which just don't cut the mustard in bright surroundings.

Walk up a typical high street, though, and you'll see plenty of notebooks in shop-fronts looking fine in bright sunlight. But, and here's the rub, these are normally being demonstrated under mains power with high brightness. You could select the same brightness under battery power, but not if you want a reasonable battery lifespan.

Power-saving technologies typically dim notebook screens under battery power to a level that, while

acceptable indoors, will often see the image virtually disappear outside. Unable to compete with high ambient light levels, the desktop image under battery power can become washed-out, and many screens also suffer from annoying reflections. Of course you can normally still work, but it's far from the greatest experience.

Admittedly there are some exceptions. Sony's recent Onyx Black screens on notebooks like the ultra-portable Vaio TR1MP are certainly some of the best around, but not totally immune to the sun's rays. Probably the best screen I've seen in terms of great indoor and outdoor visibility is on the Palm Tungsten-C.

It's secret is a transfective screen, which combines transmissive technology where light is shone from behind the panel, with reflective technology where ambient light is bounced off the panel for illumination. Transfective technology isn't new – it's currently employed on most PDAs – but the Tungsten-C is one of the best implementations yet. Larger, higher resolution transfective screens are also available, but tend to be

used on specialist devices for vertical applications like marine, police, traffic or wearable computing environments.

I don't know if transfective or another display technology such as Organic Light Emitting Diodes (Oleds) will provide the answer to decent outdoor screen performance, but one thing's certain: once you've used a product like the Tungsten-C, you'll know you want similar performance on all your mobile devices.

Notebook screens will hopefully improve to the point where we won't have to think twice about where we use them. But for now, many notebook users will find it difficult to work in environments they assumed would simply be part of living the mobile dream.

If you're the kind of person who only carries their notebook between meeting rooms or uses it as a desktop replacement, then you'll have nothing to worry about. But there are many who quite fancy taking their notebook out into the garden while remaining connected to their wireless network. Or perhaps would care to take the café seat in the outdoor section as they put the finishing touches to a presentation. Certainly these are the environments we're being encouraged to explore, yet they are the ones most likely to cause frustration.

I'd certainly advise anyone considering working outdoors to check a notebook's screen on battery power and outside the shop before buying – at least then you'll know what to expect. As for me, if I know I've got to work outdoors or near bright windows, I now leave the laptop at home and take a PDA with a foldaway keyboard instead.

'Most people were struggling to view their screens in the presence of even modest sunlight'

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Releasing the Internet bottleneck

As Internet usage increases at an incredible pace, Barry Fox looks at speeding up its performance

Performance, speed – whatever you want to call it, it has always been one of the biggest driving factors of the IT industry. It's also been one of the biggest sticks to beat it with. Nothing could be big or fast enough.

Today's digital cameras have more megapixels than we can afford to store in a memory card. Printer resolution is so fine we need a bank loan for the ink. The PC processor speed race has burned itself out. And now even Internet access, which is never fast enough, is on the firing line.

Today's performance bottlenecks are on Internet connections, not hardware. Mobile GPRS may deliver around 40Kbps, but only if there are not too many people making phone calls or sending data in the same area at the same time. 3G should deliver 384Kbps, but only when the mobile is stationary, reception is strong and congestion low. Something over 100Kbps is usually good going.

Once you have used ADSL broadband, a 56Kbps modem can induce screen-smashing frustration. Compared to Wifi speeds of many Mbps, even ADSL broadband is slow.

The upstream speed of 288Kbps, often less, can reduce the downstream speed of 576Kbps as data packet acknowledgments are slowed.

Telewest has already started an Internet speed war, by taunting BT with comparisons between consumer ADSL and cable modems. BT's next move will surely be to offer faster DSL connections. So it's useful to recall how DSL began.

Ten years ago BT's research labs at Martlesham, near Ipswich, were planning a video entertainment by phone service. They rigged up an experimental ADSL system that could send a 1MHz analogue signal down 5km of ordinary twisted pair copper wires. The analogue signal was a cluster of 256 sub-carriers sharing between one and two megabits per second of digital video. The system delivered VHS quality pictures and was doomed to failure, not because it didn't work, but because UK law at the time stopped BT from broadcasting. So BT had to store movies on a server and send them direct to anyone who asked for them, immediately when they asked for them. Compared to renting tapes from a video store, the cost of Video on Demand (VOD) was prohibitive.

The failure of VOD gave us ADSL broadband Internet access. The technology can deliver higher speeds than are currently on offer; 3Mbps or 4Mbps over 3km or 4km runs from the nearest exchange and 1Mbps to most homes, except those in deep country. The current 576Mbps rate is a safe option. If you pay a lot for a business connection (or are lucky enough to work for BT) you can already get 2Mbps. BT's next move will surely be to offer 1Mbps.

We may also see Symmetric, instead of Asymmetric, DSL. For SDSL, the analogue speech channel quaintly known as Pots (plain old telephone speech) is scrapped and digitally compressed speech sent as data at 32Kbps. The frequency band can then be equally split to give 2Mbps each way at the same time.

But if this puts my phone at the mercy of Windows, then thanks but no thanks.

As more connections offer higher speed, the bottlenecks move down the line. There are plans to build a new generation Internet, called Internet2, with higher quality lines to link universities and companies. But what we really need is a way of making existing Internet connections carry data more efficiently, thus faster.

The breakthrough could come from work being done at the Networking Lab in Caltech, the California Institute of Technology. FAST TCP (Fast Active queue management Scaleable Transmission Control Protocol) updates the Internet Transmission Control Protocol that was developed in the 1980s to carry text files and is now creaking under

the strain of music and movie downloads.

TCP breaks down large files into small packets of data. The computer sending the data seeks acknowledgements of safe receipt and re-sends packets that are lost because the routers have not been able to get them down the right lines. When too many packets are lost, the transmission rate is effectively halved for a while. Making the packets larger can increase speed, but many of the routers round the world would need replacing.

Caltech's Fast TCP uses conventional packet size (so existing routers can still be used) but continually measures the time it takes for the packets to arrive, and the acknowledgements to come back. This tells the round trip delays on the line, which gives early warning of losses. Intelligent software at the sending end then predicts the highest data rate that the connection can support.

A 10,000km test between California and Geneva clocked an average speed of 925Mbps, compared to 266Mbps from ordinary TCP along the same route.

For most readers, this is academic – getting a broadband connection is what matters. If your area is not cabled, BT is the only answer, except for an expensive two-way satellite link. All BT's exchanges are now digital and upgradeable to broadband, but only around a quarter have been converted. Take a tip from the 14-year-old who wanted to play broadband games. He knocked on every door in his town, asking if anyone used a PC and would like something faster, and telling them how to register ADSL interest on BT's website. Now, as a result, they can all have ADSL. ■

'Once you've used ADSL broadband, a 56Kbps modem can induce screen-smashing frustration'

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P4I865PEA

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 FSB: 800/533/400MHz
 Memory: Dual Channel DDR400/333/266
 Form Factor: ATX/5PCI/1AGP SX
 Onboard: 5.1 Channel Audio (6CH, Bracket Cable optional)
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P4I865GA

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 Memory: Dual Channel DDR400/333/266
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 USB/1394: 8xUSB2.0 (4x onboard, 4x optional), 2x1394a (optional)
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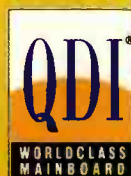
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Blog your way to world domination

Nik Rawlinson discovers that the Internet is changing society, but not in the way we expected

The Internet will bring about the end of society as we know it. That's what people used to say. They predicted we would spend all of our days alone, in our homes, communicating with the outside world through a keyboard and a screen. They also predicted that the birth of the weblog was the death of the printed periodical. I predicted they would be proved wrong.

But perhaps they won't.

You see, it's happening already. Gone are the days when playing games with a friend meant at least sitting in the same room; when grocery shopping involved aisles and a trolley; when to see Madonna live in concert you had to stand for an hour in the rain queuing for tickets, and then two rainy hours more watching the show.

That's all old hat now. And so, it seems, are book tours.

The book tour used to be the staple of a publisher's promotion of new novels. Beyond the billboard ads and magazine inserts, many considered getting the author onto the high street shaking hands and signing copies to be a cost-effective way of drumming up new trade. But as bookshops close in the face of competition from the likes of Amazon, the publishers are changing tack. The book tours are going online.

In a simple idea founded by Kevin Smokler (www.wherethersmoke.net), large publishing houses – self-publishers are excluded – may propose whichever of their authors they don't have the budget to market on a grand scale for their very own tour. The Virtual Book Tour organisers put them in touch with 10 'cutting-edge' weblogs which they supply with a copy of the book and, sometimes, a recording of the author reading an excerpt.

A month later, the tour begins. Each blogger gives some space to the author to talk about the book, post anecdotes, or just chat online. It's pretty much exactly what would happen in a real-world book tour, but it costs far less, can be done from home and requires only that the author has Internet access, not an unlimited budget for airline tickets. All that's missing is a virtual pen to virtually sign the books.

It's a clever idea, and at heart it's subliminal advertising, but it makes you wonder whether this is how we'll find out about all new products in the future. Blogs cost next to nothing to run so don't need to support themselves with paid-for advertising. The currency of blogdom is the reader. Every blogger wants more visitors and guest entries from a well-known author could provide just that.

Association with the blogger is good for the author, too. Bloggers build an affinity with their audiences, and so a guest appearance is akin to a personal recommendation.

Some online are already talking about expanding this idea. If bloggers are trusted by those who read them, what's to stop manufacturers giving them products to mention on their sites? Macromedia could give Jason Kottke (www.kottke.org) copies of Dreamweaver and Flash, safe in the knowledge that he is read by designers, and a few good comments here and there could do no end of good for the profile of the software.

And if the blogger could be in-house, and able to leak authorised information onto the site... well, Phil Wolff (<http://dijest.com/aka>) sees it as a reason for picking one job applicant over another: 'Companies have always hired people who are prominent in their profession and visible in their communities. Blogging is fundamentally no different than appearing on local news television, writing for trade publications, or joining industry organisations. Some firms even pay bonuses for positive publicity.'

So were the doom-mongers right? Is the Internet going to change society as we know it, and am I picking up on the vibe 10 years too late? Will we be buying products

simply because virtual friends 5,000 miles away said they liked them, regardless of the fact we have no idea what these friends look or sound like? And will the number of people you attract to your site do more to determine your job suitability than your past experience?

Sebastien Paquet (<http://radio.weblogs.com/0110772/2003/06/09.html>)

believes it helped him: 'I wouldn't go so far as stating that my blogging activity got me a job, but I'm pretty sure that it

was a significant factor in the decisions to invite me for an interview and subsequently to hire me. Who is it that said that blogging doesn't pay?'

And why not? It works the other way round. Rather than paying several thousand dollars to place an ad in a paper, Quovix CEO Martin Morrow posted his most recent vacancy on his blog (<http://radio.weblogs.com/0113399/2003/07/01.html>) and prefaced it with his reasons: 'I'm tired of paying Monster and Flipdog to post job openings and then sorting through 400 resumes to find two or three folks to interview. The best people are ones we know or know people who know them. So, why not use blogging to find the right person?'

It's all marketing at the end of the day. How much of an impact can you give a company's products, and how large an audience can you deliver? So, if you really want that new job, perhaps it's time you paid attention to what those digital prophets predicted. The web is changing society, perhaps for the better, but probably not in the ways they'd expected.

'Will we be buying products simply because virtual friends 5,000 miles away said they liked them?'

Reviews

EDITED BY MARK WALSH

EXCELLENT ★★★★★ VERY GOOD ★★★★ GOOD ★★★ BELOW AVERAGE ★★ POOR ★

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Innovation in web design



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Dell's Inspiron 8600 Centrino notebook performs well and produces great graphics



PAGE 57

Toshiba's Centrino Portégé R100 is stylish, compact, with an excellent battery life



PAGE 76

Adobe's Premiere Pro is the best-equipped video-editing program around for under £500

As promised last month, page 48 has an in-depth look at the long-awaited first 64bit desktop processor, which, surprisingly, comes from Apple in the form of the magnificent (if incredibly pricey) G5. The next few months will see the arrival of the second 64bit mainstream chip, this one coming from AMD, and rather unimaginatively called Athlon64.

Another technology revolution featured in this issue is the Archos AV320, reviewed opposite. It's the first portable device of its kind to play back music, pictures and video, and do it well. We'll see more compact multimedia playback devices, including those that use Microsoft's CE .Net platform, in the coming months.

As the longest-running PC magazine in the country, we are for the advancement, procurement and enjoyment of technology, so we can't help but feel that such a long wait for a device like this seems excessive, and potentially fabricated.

Admittedly it's our impatient, irrational, tech-hungry side talking, but technology such as this could have been released years ago. Instead, manufacturers have held off from developing and releasing it until they exploited existing technologies and made the maximum profit from them. This tends to be done by regularly releasing minor incremental improvements to old technologies and marketing them as a significant leap, hoping that enough buyers will be duped into taking them and the companies will make a bit of money on each release.

Of course, this is the way of the world. It's certainly not restricted to the PC arena, and there is some justification in the fact that you can't afford to invest in the research and development of new technologies if you don't make enough on the previous incarnation.

However, while the average PC buyer has got used to the fact that what they buy this week will be out of date next week, this has hardly encouraged sales. For example, large companies have mostly held off upgrading their PCs for three years or more purely because they know they should wait for something more revolutionary than a clock speed hike to come along. So manufacturers have to wait even longer to afford to invest in new products, and we techies have to wait even longer to have a new toy to play with. It's just not on, is it?

Mark Walsh





Acer C111TC1

A compact, value-for-money Tablet PC, see page 57



Apple's G5

Stunning design, good specs, see page 48



MULTIMEDIA PLAYBACK DEVICE

Archos AV320

Watch movies, listen to music and look at pictures on the move with this fun piece of kit



Those of us who have tried to watch a film on a notebook during a long train journey know that it's a rather bulky way of doing things. However, with no other option available, we stubbornly carried on. Archos' AV320 may be the answer to this problem though, as it's barely larger than an old-school iPod, but carries a 3.8in screen for video and picture playback, as well as being a perfectly competent music player.

The first thing you notice about the AV320 when you pick it up is that it's rather heavy: it's definitely not something you'd carry around in your pocket. However, it does come with a 20GB hard disk (a 40GB version, the AV340, is available too), and you can feel the hard disk making a satisfying whirr on startup – a handy indication of what's happening. Archos

claims you could fit up to 50 movies on this disk. That's pretty generous; either that or they're very short films. However, there's no reason you could not store 20 reasonably good quality flicks on it.

The device is robust, and the rubberised edges will hopefully protect it from accidental damage. It's also a lot better looking than most of Archos' previous attempts at multimedia playback. Connections include S/PDIF and USB2, as well as analogue video in and out.

Pre-existing tracks, clips and pics are uploaded using the USB2 connection. However, the file formats for all three are rather restricted. Only jpeg and bitmap files are supported: while these are the most obvious two formats to go for, we would have liked to have seen a tiff option.

Mpeg4 and avi movie files are supported too, though it's unlikely you'd want to store too much avi here because files are so big. Finally, the AV320 works with MP3 (up to 320Kbits/sec and with variable bit rate support) and wma files. You can, however, also store unrecognisable files on the player, as it can act as an external hard disk, albeit an expensive one.

The AV320 comes with Archos' DVR100, which is a deceptively useful adaptor that lets you record direct from your telly or DVD player onto the player. Other add-ons that are not included are memory card readers and a small digital camera, the AVCam 300, that produces VGA images.

In use, it's pretty simple, using an interface that has a Palm-esque quality, though obviously there is no touchscreen facility as that would lead to screen damage far too quickly. The layout of controls is very simple, but as none of the controls are labelled, operation is a bit hit and miss for a while before you get the hang of what does what. The most confusing part was that the power button was also the select button, so if you held it down for too long, the device turned off. The small joystick on the right-hand side is a bit small; we found it hard to press inwards to get it to perform the desired function, so it took longer than we'd like, mainly when creating playlists.

One vital aspect is screen quality, but luckily, this is pretty good here. However, we weren't totally impressed by the viewing angle, which deteriorated if you were in any

position other than directly in front of it, and it was rather poor in sunlight.

Our main fear about the AV320 was its battery life. However, we were quite impressed as it lasted for just under three hours of solid video playback. But it's a shame there wasn't an extra power pack included so you could watch those last few minutes of *The Lord of the Rings*. However, you do get far longer if you are just playing back MP3s with the screen switched off.

While this is an expensive device, it's worth the price, even with its few niggles. However, this is just the first in a long line of similar devices, so it may be worth holding off making a decision to buy one until a few more appear.

Mark Walsh

DETAILS

RRP £549 (€467.23 ex VAT) with digital video recorder expansion box
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PRODUCT INFORMATION

Archos www.archos.com
SPECIFICATIONS

20GB hard disk • MP3, wma, mpeg4, avi, jpeg and bmp support • Digital video recorder adaptor • Outer ear headphones • Scart adaptor • Infra-red remote • USB2 connection • 112 x 82 x 31mm (w x d x h) • 350g

PROS Screen size; simplicity

CONS Price; viewing angle

VERDICT

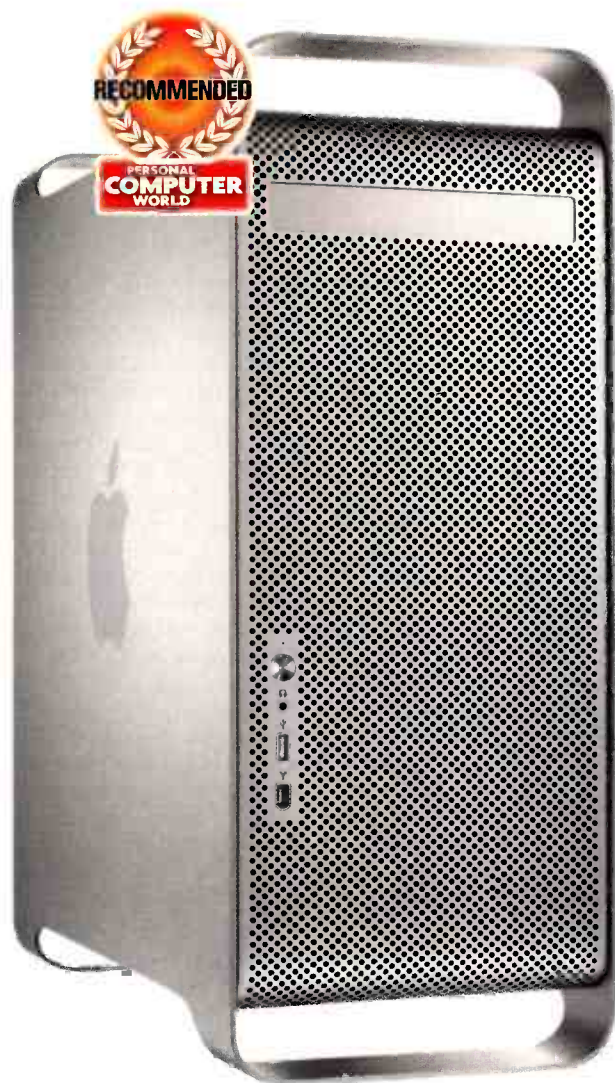
Quite heavy and initially confusing to use, the Archos isn't perfect, but is a lot of fun

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

64BIT DESKTOP

Apple Power Mac G5

The next-generation computer that Mac fans have been waiting for



The front and back of the G5 are almost entirely perforated

the cross-platform GCC compiler. It has been argued that the Intel-based machines would have achieved better results using an Intel-optimised compiler, while the Mac received an unfair boost since the Mac architecture is optimised for GCC. On the other hand, the Intel systems' performance was optimised by running Linux rather than Windows, and configuring a host of additional settings in their favour.

There are plenty of other more technical arguments on both sides of the fence, and neither point of view is without merit. But the bottom line is that the performance of the Power Mac G5 is certainly in the same ballpark as high-end Intel workstations, something which certainly couldn't be said about its predecessor, the Power Mac G4. It's interesting to note that Apple hasn't published any performance comparisons with AMD Opteron-based systems, which are generally recognised to be faster than the competition. As our benchmarking software runs on Windows only, we can't weigh in on this debate. The true test will come from real world performance, and whether Power Macs will save professional users' time compared to Intel and AMD systems. Suffice to say that in the time we spent with the dual 2GHz G5, it was blisteringly fast.

An important point to note about Apple's claim is that the Power Mac G5 is a personal computer, with the performance of a high-end workstation. Apple is keen to point out that what drives its new machine is the world's first 64bit 'desktop processor' – another controversial claim, which really comes down to pricing. The Power Mac range starts at £1,549 for a single processor

1.6GHz PC, and goes up to a whopping £2,299 for the superfast dual 2GHz model, hardly the same price bracket as your typical desktop PC, particularly when you remember that Power Macs are sold without monitors. These are also not the kinds of prices you'd expect to pay for a powerful workstation.

Processor

The reference to a 64bit 'desktop' processor also refers to the fact that the G5's processor, which is actually called the PowerPC 970 and is manufactured by IBM, uses a superset of the technology used in previous generation PowerPC processors. The PowerPC instruction set was always designed to be stepped up to 64bit when the processor technology allowed it, whereas Opteron and Itanium processors have had to effectively 'bolt on' 64bit instructions on top of the original 32bit x86 instruction set. This means that the PowerPC 970 benefits from all 64bit processing's advantages, such as the ability to address vast amounts of memory and perform extremely advanced floating point calculations, with the bonus of being able to run both 64bit and 32bit code natively without any need to recompile. In other words, Mac OS X and all its currently compatible applications will run straight away on the PowerPC 970.

Software will not need to be rewritten to take advantage of its 64bit processing. Instead developers can rewrite only those specific tasks that will benefit from the added processing power. As yet neither Mac OS X nor any Mac-compatible applications are optimised for the PowerPC 970, although the G5 does come with an updated version of OS X, version 10.2.7, which allows the system to address more than 4GB of memory and has enhanced maths and vector libraries.

In response to the mounting pressure placed upon it by the ever widening megahertz gap, Apple has been hard at work behind the scenes for the past few years on its next generation of professional desktop Macs. The result is the Power Mac G5, which Apple has gleefully heralded as the world's fastest personal computer.

As with all such claims, particularly when they're made by Apple, this has sparked a huge amount of controversy in the computer industry. At the launch of the G5, Apple

published a set of benchmark test results which showed the top-end model of the new Power Mac range, which has dual 2GHz processors, to be up to 42 per cent faster than a similarly specified dual 3.06GHz Intel Xeon-based workstation.

The controversy surrounds exactly how these benchmark tests were performed and whether they were biased towards the Apple hardware. For example, the tests used the industry standard SPEC CPU 2000 benchmark suite to negate any bias, but the suite ran atop



Its construction from anodised aluminium contributes to the G5's stunning design and appearance

Incidentally, the PowerPC 970 is not the fruit of the 10-year-old alliance between Apple, IBM and Motorola, which was responsible for the original development of the PowerPC chip, but which has also been responsible for the Mac falling so far behind in the megahertz wars in recent years, thanks to Motorola's financial woes forcing it to deprioritise processor development. Rather it's the result of a new partnership which has seen IBM invest hugely in new production and manufacturing processes, which the companies claim will see the PowerPC 970 ramp up to 3GHz in as little as a year.

Having these advanced processors alone would make precious little difference if the rest of the computer's architecture hadn't also taken a similar technological leap. And this is where there's no debate about the excellence of the

Power Mac G5. It's the first computer to feature a 1GHz Front Side Bus (FSB); Intel will only make this leap come the end of the year. The dual processor models (the mid-range £1,849 machine has dual 1.8GHz processors) have a separate FSB per processor, which means a massive 16Gbps (gigabits per second) of data throughput.

Expansion

To minimise the chance of any data bottlenecks, the G5 uses 400MHz, 128bit DDR memory. It's supplied with 512MB of Ram, and its eight slots can accommodate up to 8GB. The G5 features the industry's first PCI-X expansion slots, one of which runs at 133MHz, the other two at 100MHz. This provides a bandwidth of up to 2Gbps. AMD's Hypertransport technology is used to ensure maximum throughput between the PCI-X controller and the main I/O controller.

The graphics card is an ATI Radeon 9600 Pro, with a 9800 Pro available as a £230 optional extra. Apple answers those critics who say that these graphics cards are not up to

workstation demands, by arguing that it's not the inherent technology that differs between consumer and workstation graphics cards, but the drivers, which unlock varying amounts of the cards' capabilities. Since Apple writes all its graphics card drivers itself, no features in the cards are left unavailable.

In typical Apple style, the new Power Mac has been designed with the utmost attention to detail, with the technology working hand-in-hand with the physical design of the machine to create the finished product. The biggest challenge of a computer with these kinds of specifications is the amount of heat all its components generate. So the G5 was designed to stay as cool as possible while remaining as quiet as possible. The trick was to separate the unit into four distinct thermal zones. Each zone is cooled separately by an ingenious combination of nine fans, so, for example, if your processors are working overtime but the hard drive isn't being heavily used, the fans in the processor zone will spin fast while the storage zone fans will spin very slowly, hence almost silently.

Airflow

To enable all this airflow, both the front and back of the unit are almost entirely perforated, except for the optical drive door, ports and expansion slots. This makes for an unusual appearance, with the front looking more like some sort of high-tech speaker. The entire unit is constructed from anodised aluminium, which helps heat conductivity, but is used primarily to make the Power Mac look good. The right-hand panel clips off to reveal the neat and well-organised innards of the machine with not a connector or cable in sight. Access to the memory and PCI-X slots as well as drive bays is incredibly simple, and a great deal of thought has been put into this design. As with the previous models, there are two handles on the top of the unit

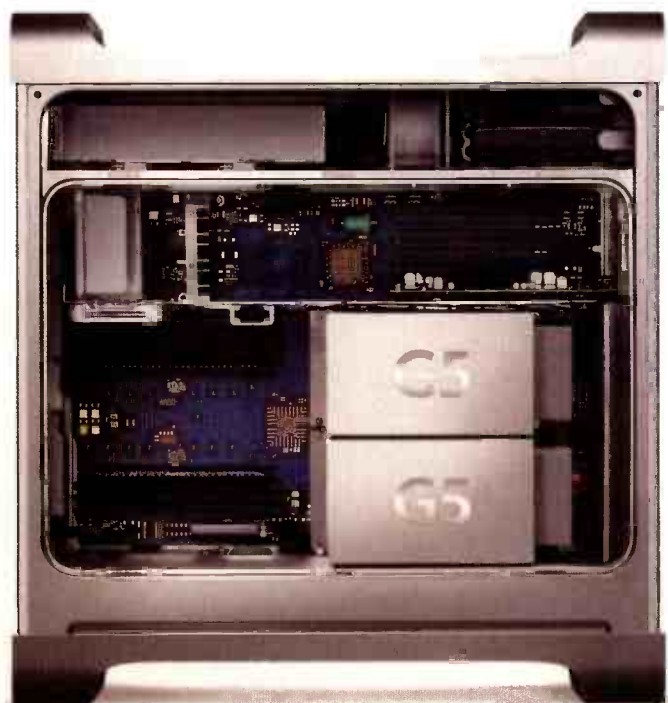
so it can be easily transported, and there's a clever locking mechanism that prevents the side from being removed, protecting you from opportunistic thieves.

The Power Mac G5 comes with the standard Apple features, such as a Superdrive DVD-R/CD-RW drive and Firewire ports, including one of the new, faster, Firewire 800 ports. Apple has also caved in and included three USB2 ports, and there are also slots on the motherboard for attaching an Airport wireless networking card and a Bluetooth module. Audio professionals will welcome the digital optical audio-in and -out ports, with support for Dolby Digital 5.1 surround sound, in addition to the standard analogue audio connectors.

Mac users have been waiting many years for Apple to come out with a professional system it can be truly proud of.

We're sure the debate about performance comparisons with Intel and AMD-based workstations will run and run, but there's no doubt that with the G5, Apple has finally produced a Power Mac for the 21st century.

Mark Heaton



The inside of the G5 is extremely well-organised, and a clever locking mechanism prevents opportunistic component thieves from removing the side of the machine

DETAILS

RRP £2,299 (£1,956.57 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Apple 0800 039 1010

www.apple.com/uk

SPECIFICATIONS

Mac OS X 10.2.7 • 2x 2GHz IBM PowerPC 970 processors • 512MB PC3200 DDR memory • 160GB Serial ATA hard disk • Superdrive (4x DVD-R, 16x CD-RW) • ATI Radeon 9600 Pro graphics card with 64MB DDR SD-Ram and AGP 8X Pro support • 3x PCI-X slots • 1x Firewire 800 port, 2x Firewire 400 ports, 3x USB2 ports • iLife suite, Appleworks 6, World Book 2003 • One year RTB warranty

PROS

Stunning design; good specifications

CONS

No 64bit native software yet; expensive

VERDICT

This is the next-generation computer Mac fans have been waiting for. Performance is hard to measure as there is no native software

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

COMPACT PC

Armari ZPC Iwill

A petite PC for a bijou home office



At just 157 x 250 x 44mm (w x d x h) lying vertically, the ZPC Iwill gives new meaning to the term small form factor. It comes with a 2.4GHz Pentium 4 processor at its core, coupled with 512MB of DDR memory and a 40GB hard disk.

A slim CD-RW/DVD drive opens out of the front of the silver system chassis, which is sandwiched between two sheets of plastic. At the front you'll also find power and reset buttons, microphone and line-out mini jack sockets, two USB2 ports and two Firewire ports. There are two further USB2 ports at the rear, along with a modem socket, serial and VGA connectors and two PS/2 sockets.

The upper surface of the case features a large circular vent with a fan mounted just inside that pumps hot air out of the system to help cool down the internal components.

A Sysmark 2002 score of 192 is not what you'd expect from a machine built around a Pentium 4 running at 2.4GHz. Being

reliant on an integrated Intel Extreme Graphics chipset for graphics processing, the ZPC is not really suitable for gaming, with a 3Dmark 2001 score of 1,474 and a total score of 8.62fps in Unreal Tournament.

The Samsung SM152T LCD flat panel is tiltable and height-adjustable with integrated stereo speakers and support for analogue and digital input. A Logitech cordless keyboard and dockable cordless optical scroll mouse are also included.

Emilie Martin

DETAILS

RRP £1,049 (£892.77 ex VAT)

BEST PRICE & PRODUCT INFORMATION

Armari 020 8993 4111

www.armari.com

SPECIFICATIONS

2.4GHz Pentium 4 • 512MB DDR SD-Ram • 40GB hard disk • Windows XP Home • Liteon CD-RW/DVD combo drive • Intel onboard graphics • 15in Samsung SM152T LCD flat panel • 1yr onsite hardware maintenance

PROS Tiny footprint;

good connectivity

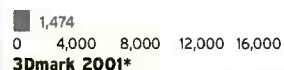
CONS Performance

VERDICT

You'll be trading performance for size but it's worth considering as a second home system

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

PERFORMANCE



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

DESKTOP PC

Pelham Sloane PS1500

A business PC inside a TFT display



Measuring only 7cm thick, the PS1500 is aimed at space-conscious users, and will be available with a screen that can be raised and tilted back 90 degrees for access to the ports. The screen has a slight pinkish tinge, but the picture is sharp. Viewing angles in the horizontal plane were adequate, but the illumination drops after about 40 degrees in the vertical plane.

Since the PS1500 is a 'sealed unit', upgrades must be carried out by the company. Inside our pre-production model, there's a mini-Flex ATX motherboard based on Intel's 845GV chipset. This has a 2.4GHz Pentium 4 processor and a 256MB stick of DDR memory. An overall Sysmark 2002 score of 183 bodes well for office applications, and a 3Dmark score of 1,503 is pretty poor, but good enough for a PC that's not for hardcore gaming.

The price includes a DVD drive, a 40GB hard drive, two USB2 ports and one Firewire port. In later versions, two further USB ports will be added to the right.

There's no infra-red as standard or a dial-up modem, but you do get a 10/100 Ethernet port, plus serial, parallel, TV-out ports, line-in and -out mini jacks and a PS/2 wheel mouse and keyboard.

Pelham Sloane will also be offering 1.8GHz Celeron and Via C3 933 processor versions and, at varying costs, will tailor options to suit most users' needs.

The price is reasonable and its compact size fits its intended niche well. In the end though, it comes down to a choice between this and a notebook.

Jalal Werfalli

DETAILS

RRP £1,162.08 (£989 ex VAT)

BEST PRICE & PRODUCT INFORMATION

Pelham Sloane

020 7349 2090

www.pelhamsloane.com

SPECIFICATIONS

Windows XP Pro • Intel Pentium 4 2.4GHz • 256MB of memory • 40GB hard disk • Eight-speed DVD drive • Intel Extreme Graphics chip • 15in TFT LCD monitor • AC97 5.1 audio chip • Integrated stereo speakers • 8.6kg

PROS Very compact; price

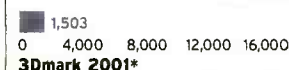
CONS No modem; average display

VERDICT

A PC inside a TFT display is a novel idea, but some may be better off with a notebook

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

PERFORMANCE



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

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Soltek "M.O.M." Hardware Monitor (Motherboard Operation Monitor Program)

Soltek M.O.M (Mainboard Operation Monitor) Program monitors CPU voltage, CPU (internal & external) / system temperature and on-board Fan speeds. Its warning LED is an intimate guardian and links user closely to the whole operating condition. With MOM Program, user will have nothing to worry about the running system.



FSB 1200
Capable



Socket 478

SL-865PE-L

Intel® 865PE+ICH5

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- > Dual Channel DDR 400/333 SDRAM
- > Supports AGP8X
- > UATA-100 & Serial ATA
- > Integrated LAN function
- > Integrated 6-Channel AC'97 Audio
- > 8 x USB2.0
- > BIOS Vcore Setting & FSB Setting
- > BIOS AGP & DIMM Voltage Setting
- > Hyper Threading Technology
- > Soltek UV Technology
- > *Soltek MBA Technology
- > Soltek MOM Hardware Monitor

*Please visit Soltek website for detailed information

King



Socket A

SL-75FRN2-RL

NVIDIA® nForce2 Ultra 400 + MCP

- > FSB 400/333MHz
- > Dual Channel DDR 400/333 SDRAM
- > Supports AGP8X
- > UATA-133 & Serial ATA RAID
- > Integrated LAN function
- > Integrated 6-Channel AC'97 Audio
- > 6 x USB2.0
- > ABSII CPU Protection Function
- > BIOS Vcore Setting & FSB Setting
- > BIOS AGP & DIMM Voltage Setting
- > ABSII CPU Protection Function
- > Soltek MOM Hardware Monitor

Socket A



Socket A

SL-KT600-RL

VIA® KT600 + VT8237

- > FSB 400 / 333 MHz
- > Supports DDR 400/333 SDRAM
- > Supports AGP8X
- > Supports UATA-133 & Serial ATA RAID
- > Integrated LAN function
- > Integrated 6-Channel AC'97 Audio
- > 8 x USB2.0
- > BIOS Vcore Setting & FSB Setting
- > BIOS AGP & DIMM Voltage Setting
- > ABSII CPU Protection Function
- > Soltek MOM Hardware Monitor

VGA CARDS

GeForce™ FX5900
SL-5900-FD

- CineFX™ 2.0 Engine
- AGP8X
- DirectX9
- OpenGL 1.4
- Dual-Fan
- DVI+TV-OUT
- 128MB Memory



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DESKTOP REPLACEMENT

Dell Inspiron 8600

You'll get great performance and battery life from this Centrino notebook



We first saw this latest chassis from Dell's desktop replacement range four months ago. It has now been updated from its previous Pentium 4 2.4GHz core to a Centrino chip, running at 1.7GHz. Surprisingly, the case does not use Dell's traditional black finish, instead opting for a blue/grey colour that neither excites nor sets it apart from the crowd. However, it has all you'd require from a multimedia-ready notebook aimed at replacing a traditional desktop PC. What it lacks in portability, it more than makes up for in power, which is just as well given its bulky frame.

The 8600 is thin but, as it uses a 15.4in wide aspect ratio screen, it's an effort to carry it around for too long. However, the super-crisp WUXGA panel offers a resolution of 1,920 x 1,200, with a very wide viewing angle, which is perfect for working with multiple documents simultaneously and watching DVDs.

This is well supported by the inclusion of an Nvidia GeForce FX Go5650 with 128MB of its own memory. Curiously, this chip does not officially exist; only the Go5600 is officially supported. However, both the graphics processing unit and memory clock speeds are the same here as on a 5600, and the driver was the most recent from Nvidia's site at time of testing. Scores in our graphics tests place this chip at the top of the 3D pile, yet even given this high score. The Inspiron 8600's battery life was the best we have seen from a desktop replacement, at more than three and a half hours.

The 8600 also came with a DVD writer combo drive, which is what we would expect for the asking price. It uses the Plus format, which Dell believes will be the victor in the never-ending DVD writer format war.

Notable external features include dual pointer control and custom power cable, which is likely to mean extra expense if

you need to replace it. The 8600 has the usual array of ports: two USB2s, a mini Firewire, two PC Card slots and a 56K modem. The 8500 incorporates Ethernet and wireless networking options. Unlike some of its other models, Dell has chosen to go for the full Centrino branding here, and has included a Callexico wireless card inside – a requirement for any notebook that has the Centrino sticker on its chassis. It obviously also follows Intel's requirements by using the 855 chipset with its Pentium M processor. The 8600 also includes 512MB of memory as well as a decent sized 80GB hard disk.

As is customary with Dell notebooks, the keyboard is excellent to type on, and has all the buttons in the right place. However, unlike all previous Dells, while it may have both a touchpad and trackpoint, the buttons on both are appalling. Those on the trackpoint in particular are set far too deep

into the chassis to be practical, while the touchpad buttons are uncomfortable to use.

In keeping with previous Inspirons the design incorporates 'Quicksnap' covers, allowing for a spot of mobile phone fascia-style customisation to suit your mood. Quite what mood you'd have to be in to like the Venice Blue option is unclear, but four other options are available.

Good value, but not necessarily that well designed, the Inspiron 8600 has all the accoutrements any self-respecting worker on the move would need. We can't help but wish, though, that Dell had stuck with its original chassis as it was much more of a pleasure to use.

Mark Walsh

DETAILS

RRP £1,878.83 (£1,599 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Dell www.dell.com/uk

SPECIFICATIONS

Intel Pentium M 1.7GHz • 512MB 266MHz DDR-Ram • 80GB hard disk • DVD writer • Intel 855 chipset • Nvidia GeForce4 5650 • 15.4in widescreen WUXGA TFT display 1,920 x 1,600 pixels • Windows XP Home, Microsoft Works 7 • Integrated Ethernet, Intel 802.11b/g wireless networking (TrueMobile 1180) • 2.99kg • 361 x 276 x 38.6mm (w x d x h)

PROS Fast; battery; good graphics

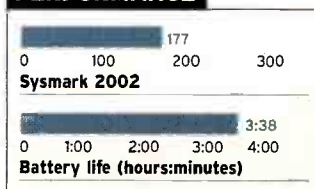
CONS Portability

VERDICT

Powerful comfortable to use and, with the best battery life to come from a Centrino notebook so far, the Inspiron is a true desktop replacement

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

PERFORMANCE



PENTIUM 4 NOTEBOOK**AJP D410**

Fast and well featured, but the fan is noisy



Weighing a hefty 3.6kg, the AJP D410 is one notebook you'll want to keep on your desk, while the cooling fan for the 2.8GHz Pentium 4 certainly catches your attention: this is one loud laptop.

Backing up the processor is 512MB of DDR memory, fast becoming the standard for notebooks of this size, so it has enough performance to handle today's business applications.

What is really impressive about the D410 is the graphics performance, which comes as no surprise as it uses ATI's 64MB Mobility Radeon 9000. It scores 6,667 in 3Dmark 2001, and the Sysmark score of 214 proves it is no performance slouch.

The D410 is strangely one-sided when it comes to what's built into the chassis. The right-hand side is empty save for the Kensington Lock slot, with the optical drive, floppy drive, single Type II PC Card slot and a USB port all built into the left side. The front edge houses the two speakers and the three audio ports, as well as the on-off switch for Bluetooth. The rear

panel contains the usual ports; single PS/2, S-Video, Lan, modem, serial and parallel along with two USB ports.

For storage the D410 has a Fujitsu 60GB hard drive, while the optical drive is a Teac DVD/CD-RW combo drive.

The 15.1in TFT screen is crisp and clear, with a native resolution of 1,400 x 1,050. The model we saw also came with a video camera embedded in the top of the screen lid. The keyboard is well built, firm and positioned far enough up the chassis to make typing easy and comfortable. The trackpad works well, as do the two mouse buttons and the scroll pad.

Simon Crisp

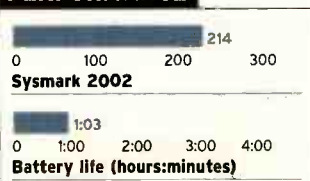
DETAILS

RRP £1,174 (£999 ex VAT)
BEST PRICE & PRODUCT INFORMATION AJP www.ajp.co.uk
SPECIFICATIONS
 2.8GHz P4 • 512MB of DDR memory • 60GB hard disk • DVD/CD-RW • Modem • 10/100 Ethernet • ATI Mobility Radeon 9000 • 15.1in TFT • Bluetooth • 329 x 275 x 36.5mm (w x d x h)
PROS Fast; well featured
CONS Loud fan

VERDICT

With performance to match many desktops, it's a shame the cooling fan is so loud

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

PERFORMANCE**CENTRINO NOTEBOOK****Maxdata NB Pro 7000X**

Lots of connectivity options at a good price



The 7000X is Maxdata's first Centrino notebook, combining a 1.6GHz Pentium M processor with 256MB of memory and a 40GB hard drive. It combines good performance with an adequate battery life, but is quite chunky at 2.8kg.

Finished in silver and black, its twin-spindle design is stylish. Centrino technology and a small processor ensure this notebook won't burn your lap.

The keyboard is well placed and laid out, with responsive keys, but the build quality isn't that good as the keyboard flexes when you type. However, the mouse buttons and touchpad work well.

Although the screen is commendably thin, it doesn't flex much and has a native resolution of 1,024 x 768. You won't be playing anything approaching a decent game with this, as it only has integrated Intel graphics.

The 7000X has plenty of ports to connect to the outside world as, apart from the integrated wireless networking of Centrino,

there is also 10/100 Ethernet, a V.92 modem and infra-red. Also provided are three USB2 ports and a single Firewire port.

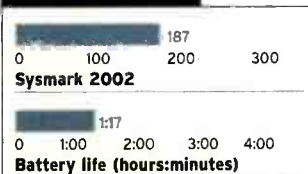
Apart from the hard drive for storage, the 7000X has a single Type II PC Card slot and a Memory Stick, Secure Digital (SD) and Multimedia Card (MMC) slot, enabling a wide range of external cards to be used. The CD player can be used without booting up the notebook.

The graphics may be a bit of a letdown, but the 7000X is good value, and is one of the cheapest Centrino notebooks we've seen.

Simon Crisp

DETAILS

RRP £1,390.03 (£1,183 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
 Maxdata www.maxdata.co.uk
SPECIFICATIONS
 1.6GHz Pentium M • 256MB of DDR memory • 40GB hard disk • Windows XP Pro • Integrated Intel graphics • 15in XGA TFT screen • 2.8kg • 327 x 270 x 29.8mm (w x d x h)
PROS Well featured; battery life
CONS Keyboard; graphics
VERDICT
 Apart from its graphics performance, the 7000X is well-featured with plenty of options for the mobile user

PERFORMANCE

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

MULTIMEDIA PC

Mesh Matrix 3000+

A fast system with 7.1 audio support



The Matrix 3000+ Immerse is the first system we have seen that includes both 7.1 capable speakers and sound card.

Housed in Mesh's new style black case, with black fronted optical drives and a black Creative Audigy 2 ZS unit, the Matrix 3000+ has an Athlon 3000XP+ processor sitting in an Nforce2 motherboard.

There are two 256MB sticks of DDR400 memory and an ATI Radeon 9800 Pro graphics card. The Sysmark score was 209, and 3D performance was as expected: 13,927 in 3Dmark 2001 and 58fps in Unreal Tournament.

For backing up data or burning files, the Matrix 3000+ has a DVD writer and CD-RW drive.

The height adjustable NEC Multisync LCD1860ONX TFT screen has a native resolution of 1,280 x 1,024 pixels at 60Hz.

The hard drive is 120GB with an 8MB cache. The drive is fitted in the side-mounted drive cage.

A 56K PCI modem comes with two integrated Ethernet ports, six

USB ports (two in the front bezel, four in the rear), a parallel and a serial port and two Firewire ports.

The motherboard fully supports 5.1 audio through the onboard Realtek chip. Games, joysticks and a wireless keyboard and mouse go with the Audigy card and a set of Creative Inspire T7700 7.1 speakers.

Mesh's Matrix 3000+ is well specified enough to be a high end games system or a fast performing desktop.

Simon Crisp

DETAILS

RRP £1,643.82 (£1,399 ex VAT)

BEST PRICE & PRODUCT INFORMATION

Mesh 0870 046 4747

www.meshcomputers.com

SPECIFICATIONS

Windows XP Home • 3000XP+ AMD Athlon processor • 512MB memory • 120GB hard drive • DVD writer • DVD/CD-RW combo • ATI Radeon 128MB 9800 graphics • NEC Multisync LCD1860ONX TFT • Creative Audigy 2 ZS sound card • Creative Inspire T7700 7.1 speakers • Pinnacle Studio 8 • MS Worksuite 2003

PROS 7.1 audio support

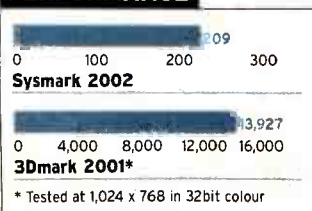
CONS Price

VERDICT

Fast and well featured system, but you pay a lot extra for surround sound

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

PERFORMANCE



ATHLON XP 3000+ PC

Systemax Inspire 3167

An expensive PC that's worth the high price



At over £1,500, this may be an expensive PC, but very little of it leaves you wanting. Based around an Athlon 3000+ processor and 1GB of DDR memory, it achieved an impressive Sysmark score of 256.

A 160GB hard disk is as big a capacity as you can get in a single drive, and Systemax has also supplied a dual format DVD writer from Sony and a bog standard CD-Rom drive. We would have preferred a CD-RW here, as they tend to have higher write speeds than DVD writers.

Systemax has used an Nforce2 motherboard, which is not only one of the fastest chipsets for AMD chips, but also has a superb quality onboard sound chip. This means that a separate sound card is not necessary, bringing down the overall cost. Videologic's ZXR-750 7.1 speakers are also supplied – these can upmix the Nforce2 board's 5.1 output to 7.1.

There are four USB2 ports on the back, as well as Firewire and the usual modem, Ethernet and serial and parallel ports. The Inspire 3167 is the first PC we've

seen to adopt ATI's Radeon 9800SE graphics card.

Confusingly, the 'SE' means this is an All-in-Wonder card, not a downgraded card as the term normally implies. It performs as well as a normal 9800 card but has a TV tuner, analogue video-in and ATI's Remote Wonder remote control. CTX's 19in TFT monitor accompanies it very well.

Our only other possible gripe is the use of Ability Office rather than a superior Microsoft product, but otherwise this is an excellent value system.

Mark Walsh

DETAILS

RRP £1,526.33 (£1,299 ex VAT)

BEST PRICE & PRODUCT INFORMATION

Systemax

www.systemax.com

SPECIFICATIONS

Windows XP Home • AMD Athlon XP 3000+ processor • 1GB memory • 160GB hard disk • Sony DVD-RW drive • Samsung CD-Rom • ATI Radeon 9800SE graphics card • CTX P922E 19in TFT • Onboard Nvidia sound • Videologic ZXR-750 speakers • Ability Office • 3yr on site warranty

PROS Fast, graphics card

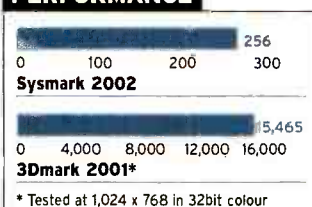
CONS No CD-RW drive

VERDICT

Expensive, but worth pretty much every penny

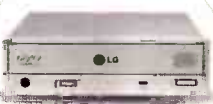
PERFORMANCE ★★★★★
FEATURES ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★

PERFORMANCE

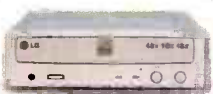




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32 x Combi Drive
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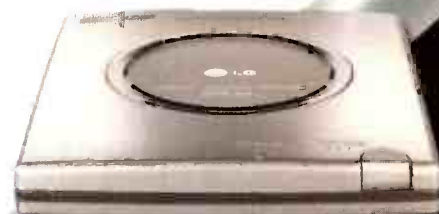
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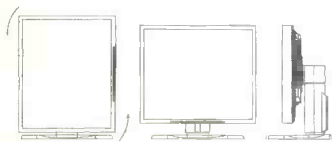
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CELEBRATING 10 YEARS

CENTRINO NOTEBOOK**Toshiba Portégé R100**

Stylish design with excellent battery life



Weighing just over a kilo, the R100 represents just what a Centrino notebook should be: light, stylish and with a long enough battery to be truly portable. Using a 900MHz Pentium M processor and 256MB of memory, the R100 earned just 104 in Sysmark, but it is more than capable of office and web functions.

As it's only 18mm thick without its extra battery pack, Toshiba has not fitted an optical drive, but there are two USB2 ports that could accommodate an external drive. Toshiba has managed to fit a 40GB hard disk in the diminutive chassis.

There aren't many ports on the sides. Apart from the USB2s, there is a PC Card slot, headphone and mic mini jack sockets, as well as an SD slot, which have been creeping into many notebooks recently. There is also a modem and an Ethernet port, and an on/off switch for the 802.11b Callexico wireless card on the right-hand side.

As with the majority of Toshiba notebooks, the keyboard

really lets it down. Granted there is very little space to play with, but Toshiba keyboards tend to only have one Control key and move the Windows key to the opposite corner than normal.

Back on the positive side, the touchpad is a decent size, and while the screen and graphics chip aren't exactly games-worthy, it still produces an excellent image. Finally, battery life is excellent, lasting for just under an hour and a half without the extra battery pack, and a huge four hours, 20 minutes with it.

Mark Walsh

DETAILS

RRP £1,643.83 (£1,399 ex VAT)

BEST PRICEwww.pcw.co.uk/bestprices**PRODUCT INFORMATION**

Toshiba 0870 444 8944

www.toshiba.co.uk**SPECIFICATIONS**

Windows XP • Intel Pentium M 900MHz processor • 256MB memory • 40GB hard disk • Trident XP graphics chip • 12.1in TFT • 286 x 229 x 14.9/19.8mm (w x d x h) • 1.09kg

PROS Size; weight; battery life**CONS** Keyboard**VERDICT**

Not cheap, but a brilliantly compact and well-designed Centrino model that easily earns a recommendation

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

PERFORMANCE**CENTRINO TABLET PC****Acer C111TCI**

Compact and good value for money



Acer's C111TCI is one of the best and smallest tablets around, and uses a traditional notebook style. The 10in screen folds around on a centralised hinge in the centre so that it can be used as a normal notebook, or carried around like a tablet. This kind of flexibility is welcome, although even at just 1.45kg, it does make it feel rather heavy.

The C111TCI is the second Centrino-based tablet to appear on these shores. It uses a 1GHz Pentium M chip, so it's not particularly fast, but the lack of power means it can last for over four hours without needing a plug. It comes with 512MB memory and a 40GB hard disk, though our review model came with only 15GB's worth. It also uses Intel's 855 chipset and the Pro 802.11b wireless card that makes up the rest of the Centrino branding.

Included in the box is a Firewire DVD/CD-RW combo drive and a USB floppy, as the tablet is too small to accommodate either drive.

The keyboard is obviously quite tiny, but makes full use of the available space. Buttons such as Shift and Enter are a little small for our liking, but on the whole it's comfortable to use. Touchpad and buttons have a similar size problem, but are responsive. The stylus was quite a disappointment though,

as it is barely larger than that on a PDA – a larger one could easily have been slotted into the chassis.

There are plenty of ports on the C111TCI, from infra-red to USB2 and Firewire. All are neatly concealed under rubber flaps, and there is a PC Card slot as well as headphone and mic sockets. The main disappointment with the C111TCI is the screen, as it has a very weak viewing angle: it had to be head on for you to be able to read text.

Mark Walsh

DETAILS

RRP £1,408.03 (£1,199 ex VAT)

BEST PRICEwww.pcw.co.uk/bestprices**PRODUCT INFORMATION**Acer www.acer.co.uk**SPECIFICATIONS**

Intel Pentium M 1GHz processor • 512MB memory • 40GB hard disk • 10.4in TFT • External CD-RW/DVD and floppy drives • 257 x 216 x 29.7mm (w x d x h) • 1.45kg

PROS Price; features; external drives are included in the price

CONS Keyboard is quite fiddly**VERDICT**

Very good value and compact, but its size does make the keyboard fiddly to operate

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

PENTIUM 4 NOTEBOOK

Toshiba Satellite P20

Good performance if you have the space

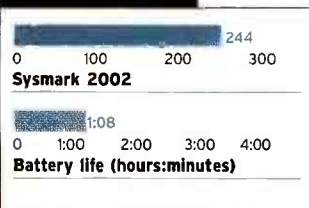


The Satellite P20 is massive – a true notebook behemoth. The red outer casing may not appeal to all, but the insides have a more attractive metal and black combination.

Running on a 3GHz Pentium 4 and 512MB memory, the Sysmark score was impressive, reaching 244 overall. The P20 also uses Nvidia's GeForce FX Go5200 graphics chip. Battery life was poor, lasting just over an hour, but at 4.3kg it's unlikely you'd be lugging this around much.

Toshiba makes little use of the notebook's sides. With this much space, we expected a floppy drive, multimedia card readers and more USB ports. Sadly, the first two are missing and there are only four USB2 ports on the sides and back, and a single non-powered Firewire port on the right-hand side. But there is a DVD writer, two PC Card slots and an SD slot, as well as Ethernet, modem and audio mini jack ports. The optical drive has been placed on the front which makes it easier to use, and sits it next to the player controls.

PERFORMANCE



It's a real shame Toshiba could not have used a bigger keyboard, given the amount of space available. But it is comfortable to type on, even if some keys are in an awkward position. The Harmon Kardon speakers are also excellent quality, something Toshiba has gained a positive reputation for.

Despite our reservations about the case, this is a very good notebook for those with the space and inclination towards a widescreen display. However, the screen quality was slightly grainy – we certainly expected better.

Mark Walsh

DETAILS

RRP £2,199 (£1,871.49 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices
PRODUCT INFORMATION

Toshiba

www.toshiba.co.uk

SPECIFICATIONS

Intel Pentium 4 M 3GHz processor
• 512MB memory • 40GB hard disk
• Nvidia GeForce FX Go5200 • 17in TFT • 419 x 293 x 47mm (w x h x d)
• 4.3kg

PROS Performance, DVD writer

CONS Looks, screen quality

VERDICT

A good desktop replacement let down by its screen quality and the small keyboard

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

CELERON NOTEBOOK

Hi-Grade Notino 3600

A basic machine at an extremely low price



This is one of the cheapest notebooks we've ever reviewed, at just over £700 including VAT.

It's built around a 2GHz Intel Mobile Celeron processor with 128MB of DDR SD-Ram system memory, of which about 16MB will be used up by onboard graphics and a 30GB hard disk.

3Dmark wouldn't run on this machine, and it scored just 11.2fps in Unreal Tournament, but its Sysmark score was pretty respectable with 134 overall.

The black and silver case has a responsive touchpad, right and left mouse buttons and a button that lets you scroll in four directions, just under the keyboard. The keys are large and set out in their normal positions with volume and screen brightness on the function keys.

Two built-in speakers sit between the keyboard and the 14in LCD screen – one in each of the corners nearest the screen on the bottom half of the unit. These give a tinny sound, but at this price you couldn't expect brilliant quality. The LCD panel has a maximum resolution of

1,024 x 768 and gives a bright, clear picture, although viewing angles are fairly narrow.

A slot-load CD-RW/DVD combo drive sits on the right-hand side of the unit with a total of four USB1 ports and the power socket. On the right-hand side, a Type 2 PC Card slot sits next to a VGA port, an S-Video socket and sockets for a Lan and modem connection. There's also a heat vent towards the rear and line-in, line-out and microphone mini jack sockets mounted on the front edge of the notebook.

Emilie Martin

DETAILS

RRP £703.83 (£599 ex VAT)

BEST PRICE & PRODUCT

INFORMATION Hi Grade
020 8532 6100 www.higrade.com

SPECIFICATIONS

Windows XP Home • Intel Mobile Celeron 2GHz • 128MB DDR SD-Ram • 30GB Hitachi hard disk • 24x10x24x CD-RW • 8x DVD-Rom • onboard graphics • 14in LCD • 1,024 x 768 native resolution • 3kg • 310 x 277 x 33mm • Microsoft Works 7 • 2yrs C&R inc accidental damage

PROS Price; accidental damage warranty

CONS Graphics; weight

VERDICT

An incredibly good value basic notebook

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

PERFORMANCE



SOUND CARD AND SPEAKER SET

Creative Audigy 2ZS & Inspire T7700

The best surround-sound speakers and a great card create a winning combination



For a company that prides itself in being at the forefront of audio technology, it seems a little late for Creative to be releasing a 7.1 sound card and speaker set. It's especially surprising to find that it is just a spruced-up version of its previous card, the Audigy 2; we expected a complete revamp in order to encourage users to upgrade. However, given that the Audigy 2 was, and still is, the best all-round sound card, especially when it comes to an overall experience, the Audigy 2ZS was well worth the wait.

We saw a Platinum version of the 2ZS, though there is a standard version that retails for £99, but lacks the breakout box. At first look, the only real difference between the Audigy 2 and the Audigy 2ZS is the extra minijack output, which makes us wonder why it was not put on there originally. Also, in keeping with the Audigy 2, it's even got the Firewire port on both the card and breakout box.

It has a 24bit, 96KHz signal output and input path, which is up there with Terratec and Midiman's top-end 7.1 cards as the highest currently on the market. The card is Dolby Digital EX compatible, and can support DVD-Audio at its advanced resolution. It also comes with a THX certification. However, as we said with the previous

Audigy 2, we are unsure of the real benefit of having speakers in your living room that comply with a standard that is meant for mammoth cinema halls, as the acoustics are vastly different.

In an improvement to the Audigy 2, the 2ZS is compatible with ASIO 2 drivers, offering advanced support for high-end audio devices. This may not be in keeping with the gaming focus of the card, but prevents audiophiles from turning up their noses immediately. Another improvement is with the signal-to-noise ratio (SNR), which is now 120dB and superior to any other consumer card. However, it is quite a small improvement so we barely noticed any difference between the two.

On the plus side though, the software bundle is pretty much the same as before, though the Mediasource application has been upgraded, and the graphics equaliser now has seven bands.

The 2ZS is compatible with DTS ES decoding, which is the enhanced version of DTS that handles eight-channel audio

output. The obvious problem that arises here is the availability of true 7.1 soundtracks. Granted, you can upmix the six-channel audio of an average DVD to eight, but it's not making full use of the setup. Investing in this set will at least prepare you for when it does come along, but perhaps waiting for more media to use this technology with (and the price of 7.1 cards to fall) would be more prudent.

There's a new set of speakers to go with this new card. They use metal stands and are much larger, giving a far more professional feel than the previous models.

As you can see from the specs, the T7700s are much louder than their predecessors, whacking out a huge 125w overall, and the centre satellite makes 20w of that. The overall effect is very good, though, high-end frequencies deteriorate as the volume increases.

SNR is OK at 80dB. However, a lot of noise is produced when you have eight speakers, so we would have preferred a higher SNR to reduce some of this hiss.

Setup is simple, using RCA and bare wires to connect satellites to the sub-woofer. The wired remote is a little too chunky, but does have a bass level adjustment as well as overall volume. Most interestingly, there is also an M-Port, which is a USB port so you can plug in your Creative Muvo MP3 player.

The real problem is that the speakers are expensive at £130, and Videologic's ZXR-750s are capable of everything these are, including the 5.1 to 7.1 upmix. However, these do look far better, and so may be worth the extra cash.

Mark Walsh

DETAILS**INSPIRE T7700 SPEAKERS**

RRP £129.99 (£110.63 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Creative

<http://uk.europe.creative.com>

SPECIFICATIONS

125w total output: 8w satellites, 20w centre, 25w sub-woofer • 80dB SNR • Wired remote with headphone jack and line in

PROS Sound quality

CONS Price

VERDICT

The best surround-sound set around, but quite pricey

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

DETAILS**AUDIGY 2ZS PLATINUM PRO**

RRP £199.99 (£170.20 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Creative

<http://uk.europe.creative.com>

SPECIFICATIONS

Audigy 2ZS sound chip • 7.1 output • 24bit/96KHz sound & recording quality • 120dB SNR • Dolby Digital EX and DTS ES decoding • ASIO 2 compatible drivers • THX certified • Firewire port

PROS Sound quality

CONS 7.1 still has a limited use

VERDICT

A great card, but without enough media to take advantage of it, it seems a bit of a waste

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

INKJET PRINTER

Epson Stylus Photo 935

A serious printer for serious photographers



The boxy 935 has a couple of rather neat tricks up its sleeve. For one thing, it has slots for all media cards (besides XD), and it will print to rolls of photo paper for seam-free panoramas. But the real innovation comes in the ability to connect an external CD-Rom or Zip drive to the integrated USB port and burn photos directly. It has Bluetooth for wireless printing and will connect by cable to a host of cameras from the likes of Nikon, Minolta, Casio and Pentax.

A dot-matrix screen allows for direct photo printing and duplicates most maintenance tasks of the Windows driver. Through this you can perform basic photo enhancements, such as sharpening or adjusting colour saturation. Combined, these features make the printer suited to ambitious home photographers.

Under the hood, the print head holds two cartridges – one black and one CMY plus photo inks – and when used with Epson photo paper their output should resist fading for 25 years. The driver is both comprehensive and easy to understand, and keeps watch over remaining ink levels. The bundled software, meanwhile, is geared towards enhancing and automating your photo printing.

The 935 is not particularly fast. It pushed out 10 A4 pages

of text at the default quality setting in just under six minutes, and the same number of pdf pages in a fraction more than five. However, the more demanding A4 test photo was ready for framing just one minute and seven seconds after we pressed the print button, and that was at highest quality on glossy paper. This proves once and for all that the Epson Stylus Photo 935 is a printer for the serious photographer, not the spreadsheet jockey.

Nik Rawlinson

DETAILS

RRP £229 (£194.89 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Epson 0800 220 546

www.epson.co.uk

SPECIFICATIONS

Piezo inkjet • 100-page feeder •

8.5ppm colour and mono quoted

print speed • 5,760dpi • Two

cartridges • 32KB memory • USB

1.1/Bluetooth • 6.4kg, 492 x 290 x

228mm • 2.5in LCD • Cost per page

4.2p black, 8.2p colour

PROS Photo quality; media slots;

roll paper compatibility; connectivity

CONS Slow on text printing

VERDICT

Great photo prints from a versatile printer

PERFORMANCE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

PORTABLE INKJET PRINTER

HP Deskjet 3650

Ideal for notebook or hot-desking users



First impressions can be misleading. Despite the tiny size and low price, the HP Deskjet 3650 is one of the best personal printers we've seen, combining quality desktop output with lightweight portability. Notebook users might want to take notice.

When not in use, the two-tone grey unit occupies a minimal footprint. Lifting up the carriage hood reveals a pair of hinged flaps which fold down and telescope out towards you to form the paper trays. Close the hood, put up to 100 sheets of A4 office paper into the lower tray and, assuming you've installed the ink cartridges, you're ready. Printouts emerge face-up in the tray above.

Real-life print speed is nowhere near the official rating, which is based on draft mode. In practice, black-only text documents printed in normal mode will output at around four pages per minute (ppm), while colour documents such as web pages may only achieve 2-3ppm. Print quality is as good as any HP Deskjet, achieving excellent 600dpi plain paper results and striking 4,800 x 1,200dpi photo output on glossy paper. The Deskjet 3650 produces cleaner office documents than we've seen from many laser printers – a lot more quietly too – yet it can equally print borderless

6 x 4in photocards. You can fold back the trays underneath the carriage hood and pick up the 2.3kg unit in one hand.

If you don't mind replugging the mains and USB cables each time, this printer can be moved from one PC to another with ease or carried around with you for ad hoc desk use with a notebook. Just remember to carry some spare ink cartridges with you, as they're small and don't last very long.

Alistair Dabbs

DETAILS

RRP £59 (£50.21 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP 08705 474 747 www.hp.co.uk

SPECIFICATIONS

Thermal inkjet printing • 100-sheet

input tray, 50-sheet output tray (face-

up) • 17ppm black only, 12ppm colour •

1,200 x 1,200dpi (4,800 x 1,200dpi on

glossy paper) • Two cartridges • Four

colours (optional six) • USB2 • 2.36kg

• 429 x 206.2 x 143.4 mm (w x d x h)

PROS Portable; high-quality output

CONS Not a fast printer; ink

cartridges empty quickly

VERDICT

A semi-portable printer that still achieves class 4ppm office document performance, plus genuine photo printing

PERFORMANCE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

WORKGROUP PRINTER

Samsung ML-2152W

The price includes wireless and other extras



Cheap printers often turn expensive when you add in the upgrade options to make them workgroup-worthy. But here's a product that comes with everything included in its basic price, from duplexer to wireless networking port.

The ML-2152W is well featured for paper handling. A 500-sheet input cassette, complete with paper-level indicator, slots in flush with the front of the unit. A multipurpose tray above this supports another 100 sheets. Printouts can be delivered face-down to the top output tray, or face-up to a hinged-panel output tray at the back. This can also act as a straight-path tray in conjunction with the multipurpose feeder.

The full list of ports includes USB2, parallel and 10/100BaseTX Ethernet, while the wireless antenna receives print jobs from any computer with an 802.11b adaptor, both directly or via a wireless hub. This works well, although setup seems drawn-out because of the need to install several software utilities one by one. The printer can be configured remotely from a web browser, or at the device itself using its navigation buttons and two-line backlit LCD status window. You can even toggle duplexing on and off with a single global override button on top of the machine.

Print quality is best at 600dpi, despite the availability of 1,200dpi which makes greys look grainy or murky. Print speed is best when using the USB2, wireless or Ethernet interfaces, achieving around 17ppm real-world performance for plain text output, compared with the official engine speed of 20ppm. Printing with the Postscript 3 emulation driver supplied is a bit slower. Given all the extras you get within the base price, the ML-2152W is great value.

Graham McLeod

DETAILS

RRP £703.83 (£599 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Samsung

www.samsungprinting.com

SPECIFICATIONS

500-sheet input cassette, 100-sheet multipurpose tray, built-in duplexer • 20ppm • 1,200 x 1,200dpi • 16MB • USB2, parallel, 10/100 Ethernet, 802.11b • 13.5kg • 386 x 436 x 326mm (w x d x h) • Toner cartridge £104.58

PROS Everything included; wireless connectivity as standard

CONS Fiddly software installation

VERDICT

A small workgroup printer that includes everything in the price

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

WORKGROUP PRINTER

Lexmark T634N

Fast, simple to use, with good text quality



EXCLUSIVE

The fastest of Lexmark's small workgroup printers, and the most expensive, the T634N is a reasonably flexible mono laser. It uses a speedy 500MHz processor and has 64MB of memory.

So it's not exactly slow, and its quoted 43 A4 pages per minute (ppm) is not that far off the mark. The T634 managed to churn out 42ppm on average for text, pdf and mixed Word documents. That's impressive for something of this size, though we wouldn't expect anything less for nearly £1,300. Text quality was good, if not stunning, and images did suffer quite a bit.

The T634's rather tidy and compact outfit won't turn any heads, but is small enough to just about fit under a desk without encroaching on too much leg room. The base unit comes with a 500-sheet input tray and a 100-sheet multipurpose feeder. Among the various expansion options are a 500-sheet duplex unit and secondary drawer options with capacities up to 2,000 pages.

Besides the ubiquitous USB, the T634N has a 10/100Base/TX Ethernet port, and carries two extra internal card slots for extra expansion. The cartridge is a high-capacity number that doesn't exactly glide into its slot, but its capacity is a real bonus. Be aware, though, that replacing it isn't cheap.

The LCD menu is well laid out, and Lexmark has kept the number of buttons to five: just enough to make it simple to use and avoid the complexity of having one button that performs multiple functions and will confuse users.

Besides the drivers, there are various handy utilities including Markvision, Lexmark's web-based print management tool. It's very simple to use and, together with the blistering speed, makes this printer an excellent buy.

Mark Walsh

DETAILS

RRP £1,291 (£1,099 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Lexmark www.lexmark.co.uk

SPECIFICATIONS

500-sheet input tray, 100-sheet multipurpose feeder, 500-sheet output tray • 43 pages per minute quoted speed • 1,200 x 1,200dpi • Single cartridge • 64MB of memory (expandable to 320MB) • USB1.1, 10/100 Base/TX Ethernet • 436 x 513 x 406mm (w x d x h) • 19kg

PROS Very fast; expandable

CONS Image quality

VERDICT

Superb speed and text quality make this an excellent value buy

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

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MINI ROUND-UP

CD-RW drives

They may have similar technology, but performance can vary. We test seven CD writers



In the last 20 years, manufacturers have sold so many CDs and CD drives that they are now more commonplace than floppy drives in PCs, and you're likely to find a number of drives in a typical house and car. When the CD writer (CD-R) was introduced in 1988 as an extension to CD-Rom, it cost a fortune, ran very slowly and produced more faulty CDs than usable ones. As time passed, the drives got faster and better, and then the whole process kicked off again in 1997 with the CD-RW, which allows you to use the same piece of media many times. Initially, CD-RW speeds were very slow and you could choose whether you bought a drive that was only capable of CD-R and CD-Rom, or could handle CD-R, CD-RW and CD-Rom. As the technology improved, pure CD-R drives vanished, and these days any CD writer can handle both CD-R and CD-RW.

The major advance in recent years has been in the speed of the drives and the reduction in costs, which is the usual case with any mature technology. We still relate the speed of a CD drive to the speed of an original audio CD-Rom, which reads data in real time at a rate of

150Kbytes/sec. This means a 52-speed drive reads and writes data at 7.8Mbytes/sec.

We hit a ceiling with the CD-R part of the drive when speeds reached 52-speed, as the 120mm diameter CD has to rotate so fast (approximately 10,000rpm) that there is a severe danger of the CD breaking in use. In addition, the benefits of increasing speed suffer from the law of diminishing returns, so an increase to, say, 60-speed would only take around 20 seconds off the time to burn a complete CD-R. While this would be welcome, it wouldn't change our lives significantly.

Instead, the manufacturers have been concentrating on boosting CD-RW speeds from the previous upper limit of 24-speed to a new industry standard of 32-speed. This is a significant increase, but there are a number of provisos.

CDs are written to an international standard, ISO9660, to ensure that any CD will play back in any optical drive. This means CD writing software will default to a slower writing speed if it detects a problem, to ensure data integrity.

This is a sensible and necessary approach, but it also means that CD writing software will slow down the drive if it doesn't

The Cyberdrive is ideal for anyone using CD-R media over CD-RW

recognise the specification of the drive correctly, or if it has doubts about the integrity of the media.

Every drive in this round-up ships with a copy of either Nero Burning Rom or Nero Express (the two are very similar), as well as Nero Toolkit, to detect the speeds of the drive installed in your PC. However, despite using these utilities we had some surprising variances in our test results.

We suspect this is due to the nature of the new Ultra Speed media that we used. We have seen these issues time and again over the past few years. When a new generation of drives is released, some can be very picky about the media with which they will work successfully. Then the media manufacturers will change their technology slightly, the CD drive manufacturer will release some updated firmware, and the CD writing software will be patched, after which all will be well.

Our second area of concern relates to CD-RW writing. A CD-RW is completely different to a CD-R, which has a layer of ink that is permanently changed by the laser in the drive. The CD-RW has a surface that changes its state when the laser passes over it. This is called phase change, but the process can be reversed by formatting the CD. This is similar to wiping a spatula over the surface of an iced cake to smooth it out. The problem is that formatting can take a long time and is often wasteful, as the entire CD will be formatted yet you may only be writing to a tiny portion of it.

This is where the Mount Rainier standard comes in. A special interest group that includes HP, Microsoft, Philips and Sony (www.mt-rainier.org) is moving to include CD-RW packet writing as a native part of the operating system. At

present, you have to use a third-party application such as InCD. With Mount Rainier-enabled drives and operating systems there will be no need to format the CD-RW in advance, but instead the drive formats and writes simultaneously, much like using a hard disk.

All the CD writers in this round-up are Mount Rainier enabled, but it seems to us that this has had a major impact on the way that the drives work with the supplied packet writing software. We'll cover this in more detail when we discuss the results of our tests.

While all the drives here are meant to operate at practically the same speeds, we ran four tests on each drive: testing, reading, writing, packet writing and formatting. In each case, we used the software that was supplied by the manufacturer.

First we tested the CD-Rom capability of each drive by copying a 597MB PCW cover CD to the hard disk. Then we wrote that image to a CD-R. After that we fully formatted a CD-RW, and finally we used packet writing to drop a 494MB version of our cover CD on to the CD-RW. We timed each test – the shorter the time the better. We used Fujifilm 700MB multispeed 52-speed CD-R media and Verbatim 650MB Datalife Plus Ultra speed 24-speed CD-RW media.

Asus CRW-5224A

The Asus CRW-5224A is rated at 52-speed CD-R, 24-speed CD-RW and 52-speed CD-Rom, which, while fast, makes it marginally slower than the newest drives. It was the slowest drive in our CD-R test, with a speed that equates to a 14-speed drive. We suspect this is an issue with media incompatibility but, whatever the reason, it's very disappointing. Asus did much better in our CD-RW test, with a fast format time of 38 seconds and a respectable packet writing time of 328 seconds, which

The Asus CRW-5224A is great value for money but has slow CD-R times

equates to a 10-speed drive. Just to confuse the issue, this was the fastest drive in our CD-Rom test, so it earns its three marks out of five for performance.

All the drives in this round-up have some form of buffer under-run protection, and in the case of the Asus the technology is called Flexlink.

The package contains an IDE cable, fixing screws, an audio cable and an emergency eject pin, so we have no complaints there. The price is amazingly low at £34.08, making the Asus superb value for money. However, we were still very disappointed with the slow CD-R times.

Cyberdrive C099D

The Cyberdrive C099D is rated at the same 52-speed, 24-speed and 52-speed as the Asus, yet it performs in a completely different manner. The C099D was the fastest drive in our CD-R test, just ahead of the Plextor, and scorched to the top of our CD-RW writing test, but there's a fly in the ointment. The Cyberdrive took over seven minutes to format a CD-RW, which is an awfully long time and has a major impact if you need to format media before you write to it. In our CD-Rom test this drive also impressed.



With a price just under £40, the Cyberdrive is very good value, although the package doesn't include an IDE cable. If you mainly use CD-R media, rather than CD-RW, the Cyberdrive is unbeatable.

LG GCE-8520B

Our third drive is also rated at 52x 24x 52x, and it has a lot in common with the Cyberdrive. Unfortunately, it is significantly slower at writing to CD-R and CD-RW than the Cyberdrive, and manages to be the slowest drive of all at formatting a CD-RW.

This is bad news, although the LG partially redeems itself as it is a decent CD-Rom. The real problem is that LG charges £49.99 for the GCE-8520B, although you can find it online for closer to £40. That means there is little reason to choose the LG over the Cyberdrive, unless you want to use Nero Express software supplied by LG, rather than the included Nero Burning Rom.



Mitsumi CR485F TE

Mitsumi's latest drive is one of the first to be rated at 54x 32x 54x, so the key point of interest with the Mitsumi CR485F is how it compares in our CD-RW tests. In an ideal world it would match the first three drives in every respect and then humble them at CD-RW writing, but in fact the reverse is true.

In our CD-R and CD-Rom tests, the Mitsumi runs as fast as a 23-speed drive which puts it low down our charts. Although it is fast at formatting a CD-RW, it is slow when it comes to packet writing. In fact, it is so slow – equivalent to a five-speed rating – that it is clearly suffering from a problem, and the likeliest snag is media compatibility. Overall, you can't separate the LG and the Mitsumi on performance, and they happen to be the same price, too.



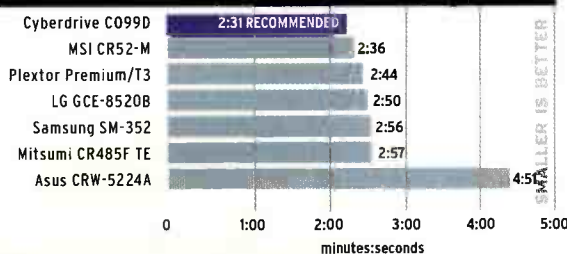
The Mitsumi CR485F seems to have media compatibility problems

MSI CR52-M

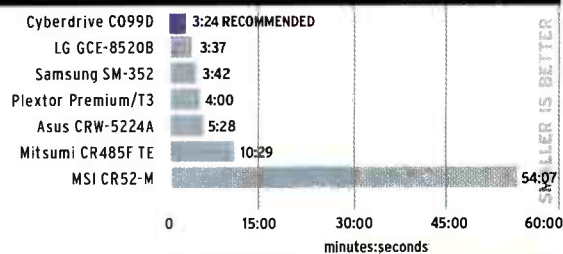
We've had plenty of success with previous MSI CD-RW drives, so the MSI CR52-M had a lot to live up to. It is also rated at 52x 32x 52x and managed to swing from one extreme to another. Performance in our CD-R and CD-Rom tests was good, and it only took 44 seconds to format a CD-RW, but that was offset by a CD-RW write time of just under one hour. This equates to single-speed, which is the clearest sign yet that this drive simply wasn't happy with the media we used, even though it is correctly rated.

The drive itself boasts a couple of unusual features, in the form of a pair of large LEDs that inform you when it has a CD inserted and when it is writing. In addition, the drive is only 175.8mm deep, compared to the other drives that are 200mm or so deep. That makes the MSI very

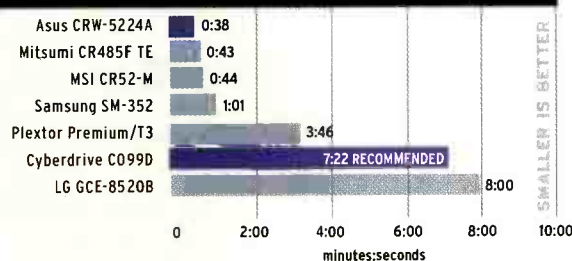
CD-R write speeds



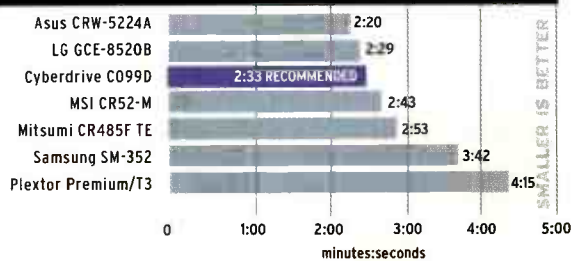
CD-RW write speeds



CD-RW format speeds



CD-Rom read speeds



The slim MSI CR52-M will be useful for small form factor PCs

useful if you have a small form factor PC, and the price is very good at £35. However, we simply can't ignore that CD-RW write time and have to hope that compatible media is available soon.



Plextor Premium/T3

The Plextor Premium certainly lives up to its name, with a list price of over £90. Plextor includes its own Plectools utilities with its CD-RW drives, and the Premium gets some extra software in the shape of Plectools Professional. This software has a number

of useful functions, such as measuring the quality of media before and after it is written, as well as sending feedback to the Plextor hardware team, but we remain unconvinced. In addition, this is the only pure CD-RW to have an 8MB buffer, rather than the more usual 2MB.

The real issue, however, is how the drive performs, and in this round-up it is plumb in the middle of the field.

That means the Premium/T3 is a high-quality drive, but the high price is unjustified, so we can't recommend the Plextor Premium.

Plextor's Premium/T3 is a high-quality drive but steeply priced



Samsung SM-352

Our final drive is also the only combo in this round-up. Samsung expects that the combo drive market will replace the CD-RW drive market over the next few years, with sales climbing from 1.5 million drives in 2003 to four million in 2004.

Despite the fact that you get the added function of a DVD-Rom, at £59.99 (£51.06 ex VAT) the SM-352 costs little more than the LG and Mitsumi CD-RW drives, and is cheaper than the Plextor.

In principle, we feel it is better to have two separate optical drives so you can copy CDs on the fly, but this combo drive

As the only combo drive tested, the Samsung SM-352 performed well

could be ideal if you have a small case that only has room for a single drive.

Despite its extra features and on-paper low speed rating, the SM-352 came through our tests very well, and gave us a pleasant surprise.

Variety

The big news at present is the new 32-speed CD-RW speed rating, but the problem is that at the moment, 32-speed drives are far slower than 24-speed drives. We are quite sure that this is due to the lack of media compatibility.

Cyberdrive's offering can burn 600MB of data to CD-R in two and half minutes and wins a Recommended award. We look forward to using Mount Rainier on a fast CD-RW with quick write times and no format time at all.

In the meantime, you need to choose your new CD-RW drive very carefully as some are good at CD-R and not so good at CD-RW, and with others the situation is reversed. It amazes us that there is still wide variance in CD-Rom speeds, and that should be a consideration too.

Leo Waldoock



Table of features



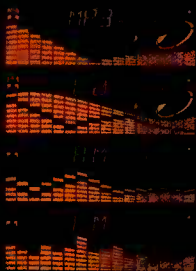
For the best CD-RW prices try www.pcw.co.uk/bestprices

MANUFACTURER	ASUS	CYBERDRIVE	LG	MITSUMI	MSI	PLEXTOR	SAMSUNG
MODEL NAME	CRW-5224A	C099D	GCE-8520B	CR485F TE	CR52-M	PREMIUM/T3	SM-352
Price inc VAT (ex VAT)	£34.08 (£29)	£39.99 (£34.03)	£49.99 (£42.54)	£49 (£41.70)	£35.25 (£30)	£93.99 (£79.99)	£59.99 (£51.06)
Product information	www.asus.com	www.cyberdrive.de	www.lge.com	www.mitsumi.de	www.msi.com.tw	www.plextor.de	www.samsungoms-europe.com
CD-R speed	52x	52x	52x	54x	52x	52x	52x
CD-RW speed	24x	24x	24x	32x	32x	32x	24x
CD-Rom speed	52x	52x	52x	54x	52x	52x	52x
DVD-Rom speed	N/A	N/A	N/A	N/A	N/A	N/A	16x
CAV or CLV?	CAV	CLV	CAV	CAV	CAV	CAV	CAV
Mount Rainier support?	✓	✓	✓	✓	✓	✓	✓
Buffer under run protection	Flexlink	Superlink	Superlink	Exactlink	Supertlink	Burnproof	Superlink
Data buffer	2MB	2MB	2MB	2MB	2MB	8MB	8MB
Software	Nero 5.5	Nero 5.5	Nero Express 5.5	Nero Express 5.5	Nero 5.5	Nero 5.5, Plectools Pro	Nero 5.5, PowerDVD
SCORE							
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall score	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

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The MEGA PC is available as a barebone or a pre-built system. Components such as the optical drive, hard drive, CPU, TV tuner, and memory are not included in the barebone package. To get complete system functionality, including, but not limited to PC functions, burning and playing CDs/DVDs/MP3 music, and watching TV you need to add the relevant components.

FLATBED CCD SCANNER

HP Scanjet 3970

A cut above the average sub-£100 flatbed



With nearly a dozen Scanjets on the market, HP leaves few flatbed scanning gaps unfilled. The Scanjet 3970 sits at the top end of the home user category, but could easily fit in with a small office setup when quality matters more than sheer throughput.

Looking brighter than the usual dull grey HP slabs, this scanner features 2400dpi optical sampling with the help of HP's dual-sensor CCD system. This uses a pair of staggered CCD arrays to achieve true 2,400dpi capture in one pass without the need for expensive, high-density optical hardware. Lab tests reveal good resolution and accuracy results, comparable with pricier scanners.

Four quick-task buttons are provided at the front. These are icon-labelled for scan, scan to printer, scan to web and memories disc (scan to CD archive), but can be customised. The latest version of HP's scanning driver and imaging software, which includes image correction, file management and album printing, is friendly and easy to use. The automatic enhancement feature doesn't always produce good results, so we tended to leave it switched off.

A small transparency lamp is built into the lid complete with a slot for sliding in a strip of 35mm negatives, of which it can scan two at a time. This is so

much simpler than using the various lamp contraptions offered with some other Scanjet models that we wish they all did this. There isn't even any transparency holder to lose.

Image scanning, especially for 35mm negatives, produces excellent results, while the inclusion of Readiris Pro 8 turns the Scanjet 3970 into a surprisingly powerful OCR solution. As long as you don't expect scanning to be fast, the Scanjet 3970 deserves to be a real crowd pleaser.

Alistair Dabbs

DETAILS

RRP £99.99 (£84.25 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP 08705 474747 www.hp.co.uk

SPECIFICATIONS

2,400dpi (dual sensor) max resolution
• 48bit • 37sec quoted single A4 scan time • Readiris Pro 8 (OCR) • 3.29kg • 472 x 298 x 90mm (w x d x h) • USB2

PROS Very easy to use; built-in 35mm transparency adaptor

CONS Slow hi-res scans; auto enhancement unreliable

VERDICT

Will equally suit quality-conscious office workers, home users and even serious amateur 35mm photographers

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

LASER PRINTER

Panasonic KX-CL500

A well-specified, network-ready product



Despite the current push for sub-£1,000 A4 colour laser printers, these products tend to cut too many corners in the specification. Panasonic's KX-CL500 provides a more realistic starting point with plenty of memory, decent paper capacity and a network interface at an equally realistic price.

The basic unit appears to be a plain cube with a 530-sheet paper input cassette at the bottom. The front panel of this cassette hinges open and telescopes out to form a multipurpose tray. It's a bit fiddly and flimsy but it works, and is big enough to hold up to 250 sheets.

Toners and drums are separate replaceable items. The imaging drums (one for black and a special triple-drum unit for colour) are installed with some effort on the right-hand side of the printer. In sharp contrast, the toner cartridges are easily slotted in under a flap on top of the unit – anyone could do it. The cartridges are big for such a small A4 printer, keeping running costs down to around 5p per sheet.

Print speed is impressive at around 15 pages per minute (ppm) for black and 13.6ppm for colour. This doesn't come close to the official rating, but is good. Sheets are printed in one pass, hence the fast colour output performance. Output quality is good and comparable with other colour lasers, but the printing process itself is much quieter.

A 10/100 Base Tx network interface comes as standard and network functions are well implemented via an embedded web server, so you can manage the printer remotely using a web browser, and using the on-printer menus was just as easy.

The best part of this purchase is that you get two years' worth of black toner for free. Obviously, we would have preferred colour cartridges, but this still represents a huge saving.

Alistair Dabbs

DETAILS

RRP £1,761.33 (£1,499 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Panasonic 08700 100 464

www.panasonic.co.uk

SPECIFICATIONS

Colour laser • 530-sheet input tray, 100-sheet multipurpose tray, 250-sheet output • 20ppm black, 16ppm colour • 1,200 x 1,200dpi • 64MB memory • USB1.1, parallel, 10/100 Base Tx Ethernet • 419 x 536 x 395mm (w x d x h) • 30kg • Black cartridge £34.83, CMY £81.08

PROS Speed; toner replacement

CONS Price

VERDICT

Well-specified, upgradable and network-ready, with two years of unlimited free toner

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

>>> Acer TravelMate C110 Tablet PC

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>>> Acer n20w

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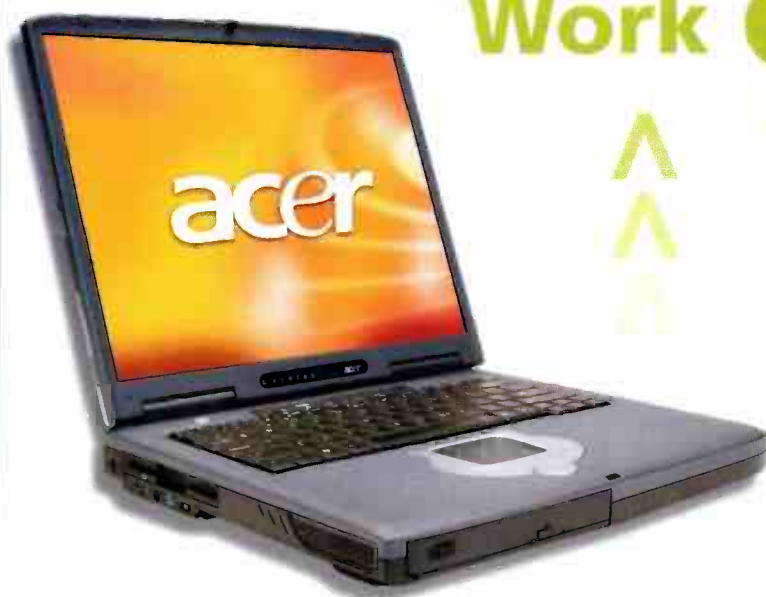
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Standard specifications include:

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- Microsoft® Windows® XP Home Edition
- 56kb/s V.90 modem
- Built-in 10/100 ethernet LAN or Wired & wireless LAN.*
- 17" SXGA Display
- 512MB DDR RAM (upgradeable to 1GB)
- 80GB or 120GB Ultra ATA-100 Hard Disk drive
- Integrated 1.44MB, 3.5" Floppy Disk drive,
- 8/24/10/24x DVD/CD-RW Combo Drive or 8x DVD-RW*
- Li-Ion battery with average 2 hours battery life
- 2 years limited warranty,
1 year International Travellers Warranty

Acer recommends Microsoft® Windows® XP.



Acer Aspire 1703SC

£1056 INC VAT

£899 EX VAT

Intel® Pentium® 4 Processor at 2.66GHz CPU, 512MB DDR, 80GB,
CD-RW+DVD Combo, 17" SXGA, Modem/LAN,
Microsoft® Windows® XP Home Edition

Acer Aspire 1705SMi

£1526 INC VAT

£1299 EX VAT

Intel® Pentium® 4 Processor 3.06GHz CPU, 512MB DDR, 120GB,
DVD-RW, 17" SXGA, 128MB nVidia GeForce FX Go5600,
Modem, Wired & wireless LAN,
Microsoft® Windows® XP Home Edition

>> Acer Projectors The Future of Digital

PD 310



Acer PD310

£1268 INC VAT

£1079 EX VAT

DLP, SVGA (800*600) resolution, 1100 Ansi lumen, 500:1
contrast, 35db noise, 1.5Kg, 2000 hrs lamp life, Keystone
correction

Imaging

PD 520



Acer PD520

£1898 INC VAT

£1615 EX VAT

DLP, XGA (1024*768) resolution, 1500 Ansi lumen, 1800:1
contrast, 32db noise, 1.7Kg, 2000 hrs lamp life, Keystone
correction

For further information:
www.acer.co.uk

Pricing Effective From 5th September, 2003 till 6th October, 2003.

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A3
Empowering People

>> Acer Aspire 8200 Entering the World of PCs

Thanks to its innovative design and advanced features, the Aspire 8200 combines ease of use with power and simplicity, to give each member of the family the chance to get into the digital age. Its operating system, Windows® XP, comes with a series of utilities that provides for a wide range of needs. These include the powerful anti-virus software PC-cillin 2K, Acrobat Reader, and Magic Keyboard. The Aspire 8200, which comes with an AMD Athlon™ processor and a 3 in 1 smart reader.

Has Never Been Easier

Standard specifications include:

- AMD Athlon™ XP Processor 2200+
- Microsoft® Windows® XP Home
- 256MB DDR SDRAM
- 40GB ATA-100 HDD
- ATI 9000 64MB VGA
- Integrated 10/100 ethernet
- CD-ROM
- 56K Modem
- Audio O/B
- 2 years warranty



Acer Aspire 8100

£388

INC VAT

£330 EX VAT

AMD Athlon™ XP Processor 2000+, 40GB, 256MB, CD-RW+DVD, 32MB VGA/LAN On-Board, Modem, Speakers, Microsoft® Works 7.0, Microsoft® Windows® XP Home

Acer recommends Microsoft® Windows® XP.

>> Acer Monitors

AL1931 - 19" Multimedia LCD, TCO '99 A Larger Picture for the Digital Age

- Resolution 1280 x 1024
- Brightness 250 cd/m²
- Contrast Ratio 700:1
- Viewing Angle 170°
- Response time 25ms
- Digital and Analogue
- S Video
- Silver metallic Sleek design
- Warranty 3 years
- ISO 13406-2 certified

£546 INC VAT
£465 EX VAT

AL1731 - 17" Multimedia LCD, TCO '99 A True Reflection of Image

- Resolution 1280 x 768
- Brightness 250 cd/m²
- Contrast Ratio 430:1
- Viewing angle 160°
- Response time 20ms
- Digital and Analogue
- Multimedia Speaker 1W x2
- Silver metallic Sleek design
- S Video
- Super Slim Format
- VESA Wall Mounting Supported
- Warranty 3 years
- ISO 13406-2 certified



£388 INC VAT
£330 EX VAT

AL1531 - 15" Multimedia LCD, TCO '99 Executive Class

- Resolution 1024 x 768
- Brightness 250 cd/m²
- Contrast Ratio 500:1
- Viewing angle 130°
- Response time 16ms
- Digital and Analogue
- Multimedia Speaker 1W x2
- Silver metallic Sleek design
- Super Slim Format
- Warranty 3 years
- ISO 13406-2 certified

£253 INC VAT
£215 EX VAT

Pricing Effective From 5th September, 2003 till 6th October, 2003.



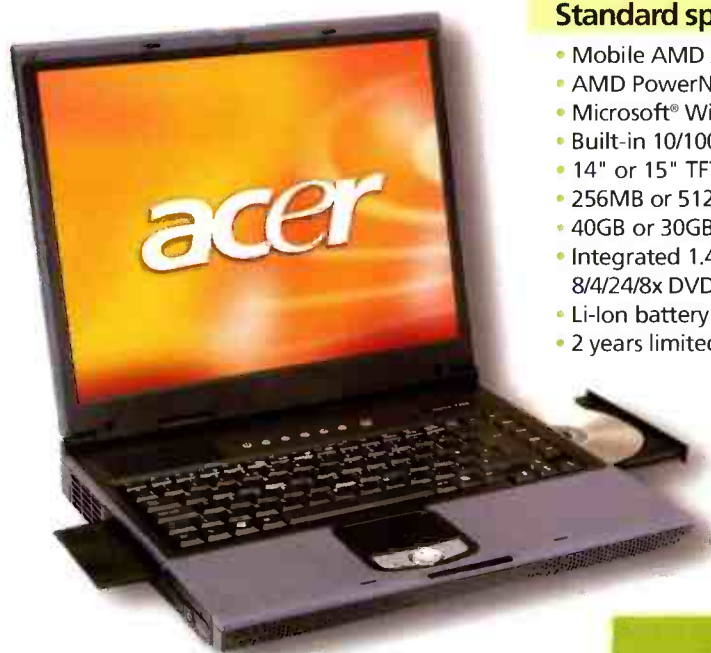
>>> Acer Aspire 1350

>>> Your Business Enhancer

The Aspire 1350 has been designed specifically to meet the needs of small business and SOHO professionals looking for a fully functional work device that offers solid reliability and stable performance in a small yet durable package. Perfect for space-conscious users, the easily transportable Aspire 1350 also provides relief for today's business-intensive professionals with impressive home entertainment capabilities.

www.pleasin

Pricing Effective From 5th September, 2003 till 6th October, 2003.



Standard specifications include:

- Mobile AMD Athlon™ XP processor up to 2600+
- AMD PowerNow!™ technology
- Microsoft® Windows® XP Home Edition
- Built-in 10/100 ethernet and 56kb/s V.90 modem
- 14" or 15" TFT Display Options
- 256MB or 512MB RAM (upgradeable to 1GB)*
- 40GB or 30GB Ultra DMA-100 Hard Disk Drive*
- Integrated 1.44MB, 3.5" Floppy Disk drive, 8/4/24/8x DVD-ROM/CD-RW Combo drive or 2x DVD-RW*
- Li-Ion battery with average 2.5 hours battery life
- 2 years limited warranty, 1 year International Travellers Warranty

Acer Aspire 1356LM

£CALL INC VAT

£CALL EX VAT

Mobile AMD Athlon™ XP Processor at 2800+, 512MB DDR, 40GB, DVD-RW, Modem/LAN, 15" TFT, Li-Ion, Microsoft® Windows® XP Home Edition

Acer Aspire 1352XC

£CALL INC VAT

£CALL EX VAT

Mobile AMD Athlon™ XP Processor at 2200+, 256MB DDR, 20GB, DVD/CD-RW Combo, Modem/LAN, 14" TFT, Li-Ion, Microsoft® Windows® XP Home Edition

Acer recommends Microsoft® Windows® XP.



For further information:
www.acer.co.uk

Acer Aspire G505

Experience Digital Pleasure

Standard specifications include:

- AMD Athlon™ XP Processor 2600+
- Microsoft® Windows® XP Home
- 512MB DDR SDRAM
- 80GB ATA-100 HDD
- Nvidia NForce2 GeForce MX Graphics
- Integrated 10/100 ethernet
- DVD-RW + DVD
- Works 7
- 56K Modem
- Audio O/B
- 2 years warranty



Acer Aspire G505

£599 INC VAT

£510 EX VAT

AMD Athlon™ XP Processor 2600+, 80GB, 512MB DDR-RAM, DVD & CD-RW, Audio O/B, ATI7500LE 64MB VGA, Modem/LAN, WXP-Home, Worksuite 2003, Speakers & Sub Woofer. Microsoft® Windows® XP Home

*Monitor, wireless keyboard and mouse are not included

Acer Monitors



AL506 - Sound and Vision

- Resolution 1024 x 768
- Brightness 350 cd/m²
- Contrast Ratio 450:1
- Viewing Angle 120°
- Response rate 23ms
- Video signal Analogue (D-sub)
- Acer White
- 3 year warranty

£206 INC VAT
£175 EX VAT

AL707 - A Vision for Performance

- Resolution 1280 x 1024
- Brightness 250 cd/m²
- Contrast Ratio 500:1
- Viewing Angle 150°
- Response rate 20ms
- Video signal Analogue (D-sub)
- VESA arm support
- ISO 13406-2 compliant
- 3 year warranty

£300 INC VAT
£255 EX VAT



AC711 - Reliably Ergonomic

- Resolution 1280x1024 @ 60Hz
- Resolution 1024x768 @ 85Hz
- Horizontal frequency 30-70 KHz
- Vertical frequency 50-160 KHz

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Channel Islands: Fotosound (Jersey) Ltd Jersey 01534 758718 lindsay@fotosound.co.uk • HTL Computers 2 Branches in St Helier - Jersey 01534 878788 ht@localdial.com

* Denotes dependant upon configuration

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Pricing Effective From 5th September, 2003 till 6th October, 2003.

For further information:
www.acer.co.uk

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Empowering People

DIGITAL VIDEO CAMCORDER**Canon MV6i MC**

Catch the action with this compact camera



The MV6i is built around a 0.8megapixel CCD sensor. The lens offers 10x optical zoom capability and a massive 400x digital zoom, which seems excessive when you consider that even a 5x digital zoom severely impacts on image quality.

The 2in LCD screen folds out of the left of the unit and can be rotated through 270 degrees. It gives a clear image and copes fairly well with movement. You can shoot up to 10 seconds of footage at 320 x 240 resolution, or a 30-second movie clip at 160 x 120 and there's a choice of two image resolution settings for still images, 1,024 x 768 or 640 x 480 using the supplied 8MB SD card. No tape is provided. On test, image quality was fair, but the MV6i coped much better with subjects at close range.

The unit itself is very compact, with dimensions of 49 x 89 x 106mm and a weight of 380g. Using the adjustable hand strap on the right-hand side of the unit, the photo capture and zoom controls sit just under your fingertips. Meanwhile, the project switch sits under your palm. This lets you choose to save your video clips and photos to the card or tape.

Just under the viewfinder at the back of the unit, the mode dial gives access to movie and still image capture and playback

modes and sits within easy reach of your thumb with a menu button, slideshow button and focus/datacode buttons below. If you've got larger hands, you may find that your fingers inadvertently cover the light sensor under the lens and the microphone, which is mounted at the top of the unit rather than at the front where it would be directed towards your subject.

The menus are not intuitive though, so newcomers to digital camcorders may struggle here.

Emilie Martin

DETAILS

RRP £649.99 (£553.19 ex VAT)

BEST PRICEwww.pcw.co.uk/bestprices**PRODUCT INFORMATION**

Canon 0870 514 3723

www.canon.co.uk**SPECIFICATIONS**

0.8megapixel CCD • 1,024 x 768 max resolution still capture/320 x 240 max resolution video capture • 10x optical/400x digital zoom • 2in LCD screen • Micro DV tape/SD card formats • 380g • 49 x 89 x 106mm (w x d x h)

PROS Portable; 8MB SD card**CONS** Menus are not intuitive**VERDICT**

A highly portable unit suited to spontaneous shots, but doesn't offer the greatest picture quality

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

MULTIMEDIA DECODER**Adaptec Videoh Media Centre**

Add home entertainment to your PC



With Microsoft's release of its Windows XP Media Centre Edition, it seems that everyone wants to get in on the multimedia act at the moment. Adaptec is no exception, and its Videoh DVD Media Centre product promises to add home entertainment to your PC, letting you watch and record live TV via a regular analogue TV antenna socket, and hook up analogue video sources, such as a video camera.

The product itself is a slate grey and silver box little bigger than a CD case and is about 2cm thick, plugging into your PC via a USB2 port. There is a small stand included in the box if you want to stand the unit next to your PC tower or on your desktop. On one side of the box is a socket for analogue TV antenna input, along with a USB2 socket and power socket. You'll find sockets for analogue audio and video input on the opposite side of the unit, as well as an S-Video input socket. Adaptec has included the USB cable you'll need to connect the box to your computer, as well as an S-Video cable in the box, which is a bonus. There's also a remote control with basic preset channel, channel surfing and volume and video controls.

Installation is a simple matter of inserting the accompanying CD into the optical drive on your PC and following the instructions. The interface is

clear and easy to navigate, with a virtual control panel appearing on your screen that has been designed to look like the control panel on a regular video player. For an external TV device, performance was pretty good, but the picture and sound of live broadcasts was sometimes jittery.

While you might be able to get hold of an internal TV tuner card that would offer the same functions for less money, you also get a copy of Sonic MyDVD thrown in so you can burn your own CDs and DVDs. A copy of Arcsoft's Showbiz video-editing package is also bundled.

Emilie Martin

DETAILS

RRP £179 (£152.34 ex VAT)

BEST PRICEwww.pcw.co.uk/bestprices**PRODUCT INFORMATION**Adaptec www.adaptec.com**SPECIFICATIONS**

S-Video, analogue audio and video input • USB2 cable and S-Video cable bundled • Remote control unit • Mpeg1 and mpeg2 encoding

PROS Bundled software**CONS** Price; occasionally jittery TV playback**VERDICT**

May be more expensive than a PCI card but the bundled software is an added bonus

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

17IN TFT

Viewsonic VP181B

A great buy for the business user



The first thing that strikes you about the VP181B is the very thin bezel. It is only 17mm wide, making it ideal for placing several displays side by side for a multi-panel setup.

If that's not your thing, then you'll find the VP181B sits quite happily on its own, thanks to the two splaying feet on the base. These provide stability, especially when the screen is effortlessly raised through 11.5cm by virtue of its spring-dampened neck. Furthermore you can swivel the display from side to side and pivot the screen through 90 degrees to portrait orientation, which can aid text-editing work.

The VP181B has an integrated power unit so no chunky power adaptor is needed here. It also has a 4-port USB2 hub and both a D-Sub and DVI socket, the latter of which can accept either an analogue or digital signal. A DVI cable is also supplied.

Below the display is a row of five discrete buttons, including the power button, up and down scroll buttons and a main menu button. The remaining button accesses the OSM's variable controls and doubles up as a signal select switch. The intuitive OSM has all the usual settings including auto image adjustment, contrast, brightness, picture position and colour temperature, plus you

can rotate the OSM for use in portrait mode.

Overall image quality was good, but under tests using the DVI interface we did notice a very slight pinkish tone to some greys, particularly towards the dark end of our greyscales. Primary and secondary colours, however, are punchy even when viewed at wide viewing angles. Contrast remained high at these angles too, and the VP181B coped well with distinguishing colours in our 64-intensity scale.

Jalal Werfalli

DETAILS

RRP £480.58 (£409 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Viewsonic 01293 643 900

www.viewsoniceurope.com/uk

SPECIFICATIONS

18.1in diagonal • 1,280 x 1,024 resolution • DVI-A/D, D-Sub, 4-port USB2 hub • 8kg • 410 x 250 x 344mm (w x d x h) • 250cd/m2 • 350:1 contrast ratio • 160 degree horizontal and vertical viewing angles

PROS Thin bezel; pivotable; analogue/digital inputs, USB2 hub
CONS Pinkish tinge in greyscale

VERDICT

Reasonably priced, easy to use and well-suited to business users

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

17IN MONITOR

Cornea CT1704

A well laid-out newcomer to the LCD market



Cornea is a newcomer to the UK LCD market, and arrives here with a range of LCDs, including this competitively priced 17in model built around a Samsung flat panel.

The tilt-only CT1704 looks the part, with a brushed aluminium effect and a pleasing outward curve to the lower part of the bezel. Here you will find five control buttons arranged in what could only be described as a wonky fashion, with unequal spaces between each button. That aside, these consist of a menu button, select button, left and right cursors, and an auto button that will automatically adjust the picture to the optimum position.

The options in the OSM (on-screen menu) are laid out well and cover most needs, including phase and clock adjustments for syncing the screen with the graphics card.

Disappointingly, the CT1704 only has a D-Sub port, which means you are limited to an analogue input. A USB hub is absent, but you do get a pair of small speakers intriguingly built into the rear of the chassis. The sound quality is typically weak, and the plug on the D-Sub cable shrouds half of the left speaker.

As far as image quality is concerned, the factory-preset picture was a tad on the cool side, but is improved by fine-tuning

the individual RGB signals. Our colour scales revealed evidence of compression in the highlight ends of the range, yet greyscale graduations were rendered more smoothly. In our DVD test, motion blur is lessened thanks to the decent 20ms response time, whereas the high contrast ratio helped with detail resolution in static images. The CT1704's viewing angles in the horizontal plane are good, but raise your head past 50 degrees and you notice the rapid deterioration in illumination and colour.

Jalal Werfalli

DETAILS

RRP £329 (£280 ex VAT)

BEST PRICE &

PRODUCT INFORMATION

Anders Electronics Plc

020 7380 8181

www.anders.co.uk

SPECIFICATIONS

17in diagonal • 1,280 x 1,024 resolution • LCD-TFT • D-Sub, stereo audio in/out, cables • 5kg • 403 x 181 x 420mm (w x d x h) • 270cd/m2 (max) • 500:1 contrast ratio • 160 degree horizontal, 50 degree up/70 degree down viewing angles

PROS Price; response time; contrast

CONS Analogue only; no USB

VERDICT

Affordable, but the build quality and no digital input niggles

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

MULTIFUNCTION DEVICE

HP Officejet 4110

Not the quickest, but it's cheap and versatile



Leaving no stone unturned in its quest to dominate the multifunction device market, HP is now treading on Lexmark's toes with an ultra-low-cost product for the home user. The Officejet 4110 combines print, scan and copy functions, as well as fully built-in fax operation.

The case is designed to take up as little space as possible, with its input and output trays folding inwards flush with the unit when not in use. The input feeder at the front holds just 100 sheets and printouts are dropped on top of it. In addition, there is a sheet feeder tray on the top of the case for fax and scan functions, delivering originals onto a dedicated wire catch tray at the front. Obviously, since the scanner is sheet-fed, you can only scan and fax loose documents, which turns out to be a limitation more often than you might expect.

Printouts and copies are produced by quality inkjet printheads which achieve high-quality text worthy of an office printer, and impressive colour photo output on both plain and glossy papers, which will go down well at home. Speed performance is another matter, though. Our tests suggested a real-world speed of 3ppm (pages per minute) for plain black text documents, which doesn't compare well with the official

7.8ppm rating; note that HP's 10ppm rating in its brochure only relates to draft mode.

Fax and copy control buttons are arranged on a front panel along with a two-line LCD status display, and everything has been designed to be very easy to use. The unit can also store up to 65 pages of incoming faxes pending printing. If you can live with an all-in-one that takes its time, the Officejet 4110 is a budget bargain.

Alistair Dabbs

DETAILS

RRP £149 (£126.81 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP 08705 474 747

www.hp.co.uk

SPECIFICATIONS

600 x 600dpi print, 600 x 1,200dpi scan resolution • Thermal inkjet • 7.8ppm (black), 3.6ppm (colour) • CCD scanning, 36bit • 33Kbits/sec fax • 3.4kg • 425.8 x 209.6 x 182.4mm (w x d x h) • USB2 • Black cartridge: £19.32, Tri-colour: £28.40

PROS Price; fax function

CONS Slow; sheet feed only

VERDICT

An inexpensive, easy-to-use colour printer-copier-fax for the home, but you'll want a faster machine in the office

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

MONO LASER PRINTER

Xerox Phaser 3130

Impressive specs makes it worth the money



The Phaser 3130 may seem expensive, but Xerox has gambled by providing a better specification and paper handling than many of its competitors at this price. It seems this gamble has paid off.

The Phaser 3130 looks like many other personal lasers on the market, although the curvy case design prevents it from being just another white slab. Paper is fed from an internal 250-sheet cassette which closes flush with the rest of the case, with a mechanical paper-level indicator at the front. Printouts are delivered face-down on top of the unit in conventional manner, while a basic flap at the back opens up to act as a functional alternative face-up tray. There's a single-sheet manual feed slot just above the main cassette at the front which, when used in conjunction with the face-up exit at the back, provides a useful straight path for printing onto thick card without the risk of jams.

Our test unit was provided with a solitary parallel port, but we are assured the shipping product will also feature a USB2 port. Testing with a slow parallel connection may have contributed to the slow results we achieved for data-intensive graphics printing, despite the 32MB of memory – a very generous amount by personal laser standards. Throughput

tests for plain text documents suggested a real-world performance of over 14ppm (pages per minute), which is not far off the official engine rating of 16ppm.

Print quality is good, if not outstanding. Text begins to break up below 6pt and halftone greys seem a little streaky, but it's still well above average compared with other personal lasers. This sums up the Phaser 3130: you pay a little more, but you definitely get your money's worth.

Alistair Dabbs

DETAILS

RRP £284.35 (£242 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Xerox 0870 541 3245

www.xerox.com/officeprinting

SPECIFICATIONS

Mono laser • 250-sheet input cassette • 16ppm • 1,200dpi image quality • 32MB of memory • USB2, parallel • 348 x 355 x 193mm (w x d x h) • Toner cartridge: £64.63 • Cartridge life: 3,000 sheets at five per cent coverage

PROS Well specified; straight path printing for thick media

CONS Price; slow for graphics

VERDICT

Small, quiet, good-looking and a solid performer

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

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incl. Del. & VAT

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E-VALUE Code: i03

Recommended Upgrade Offer

- Upgrade to 8xDVD/24xCD-Rewriter Drive **£50 excl. VAT**
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£996.40

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E-VALUE Code: i09

Recommended Upgrade Offer

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E-VALUE Code: i06

Recommended Upgrade Offer

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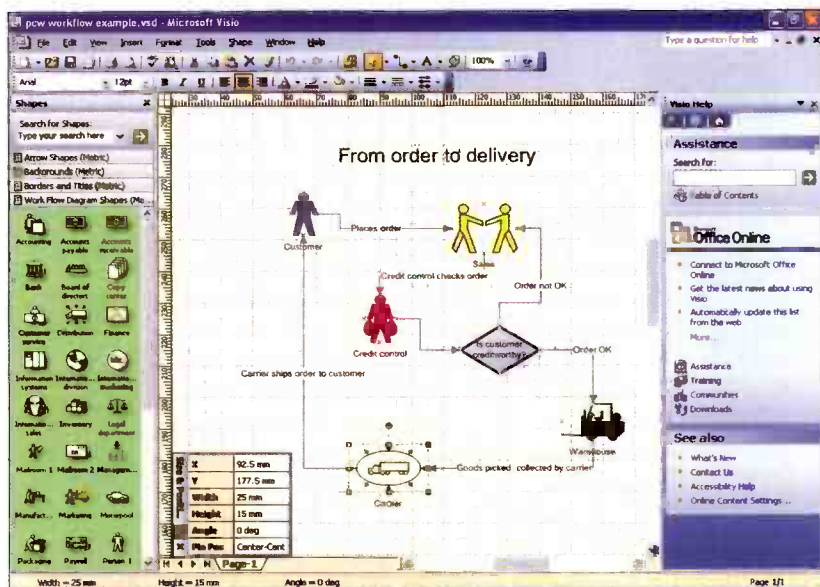
0870 152 4611

DIAGRAMMING TOOL

BETA

Microsoft Visio 2003

Microsoft's planning and charting tool gets the Office System treatment



Microsoft's all-purpose diagramming tool has improved ease of use and stronger developer features in this new release. Visio is part of what Microsoft now calls the Office System. Standard word processing and spreadsheet applications have become commodity items, so Microsoft's rebranding puts the emphasis on other aspects such as team features, programmability and interoperability through XML. Visio is no exception. Having said that, a lot of effort has gone into enhancing the user interface in small but helpful ways, making it a worthwhile upgrade for any Visio user.

A Visio document mainly consists of shapes and connectors. Shapes are typically dragged from a palette called the Shapes Window, labelled, positioned and resized as required, and then connected to other shapes to show their relationships or their part in a flow of actions. A Visio shape is more than just a drawing object. Well-designed shapes are intelligent, and can only be modified in ways that make sense for what they represent.

Shapes can have custom properties and custom actions. For example, a Staircase shape in a building plan has a Number of Treads property and a Hide Handrails action.

In Visio 2003, shapes are easier to manipulate. As an illustration, in previous versions you rotated a shape by selecting a shape, then a rotation tool, and finally rotating the shape with the mouse. Shapes in Visio 2003 have a rotation handle, so you can select and rotate in one quick operation. Other enhancements include support for digital ink on a Tablet PC and revamped online help integrated with the Task Pane. Team support is much improved in this version. A new review mode lets team members annotate diagrams and propose changes. You can also use a Sharepoint server to store drawings for team availability with features such as change notification.

Shapes are complex, and the usefulness of Visio depends largely on the supplied templates. Each template comes with its own set of shapes and documentation on how to use them. The templates range from simple flow charts to more

New business process and workflow diagrams make Visio more appealing to business users

specialised options like electrical diagrams, engineering drawings and network diagrams. Visio is a mature product, and there are hundreds of templates available. Most are familiar from previous versions, although

many have new and enhanced shapes. If you do need to create shapes, the Visio SDK includes a new Shape Studio tool, although we haven't seen this yet.

This time round, Microsoft has tried to give Visio a greater appeal to business rather than technical users, so there are new business process templates for diagramming things like workflow, audits, SAP systems and fault-finding processes. There's also a new geographical mapping template, which lets you put together good-looking maps and routes. Web developers will be interested in the website template, which lets you generate a website map automatically simply by specifying a URL. In the beta under test, we found the results awkward to use and over-pessimistic with regard to broken links, but nevertheless the range of website shapes are valuable for designing a site outline, or for creating simplified diagrams that communicate a design to others.

One of the most interesting uses of Visio is as a component in a custom solution. Several

new features make it more attractive to developers. For a start, there is now a macro recorder. This is doubly useful, first for recording macros, and second as a way of generating code that shows how to program Visio's elaborate object model. The macro recorder does Visual Basic for Applications, but as with other Office System applications you can also write code in the .Net languages. Next, there is a new Visio ActiveX control that lets you embed and control Visio drawings within other applications, such as those created in Visual Basic or C#. Thirdly, database integration lets you hook up diagrams to dynamic data, or extract data from a Visio diagram. Finally, XML support lets you analyse Visio diagrams with XML tools, or hook into XML web services for dynamic drawings. Visio XML is unfortunately rather complex, but still easier to work with than a binary format.

Tim Anderson

DETAILS

RRP Prices not yet available

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Microsoft

www.microsoft.com/office/visio

SYSTEM REQUIREMENTS

Windows 2000 or XP • Pentium III or higher • 64MB of Ram • 245MB of free hard disk space

PROS

Powerful, easy-to-use diagramming with an excellent range of shapes and templates

CONS Does not run on Windows 98; XML export creates large, complex documents

VERDICT

A great tool and a worthwhile upgrade, but the quality and scope of the templates vary, so check it out carefully if you have a specific purpose in mind

EASE OF USE

★★★★★

FEATURES

★★★★★

VALUE FOR MONEY

★★★★★

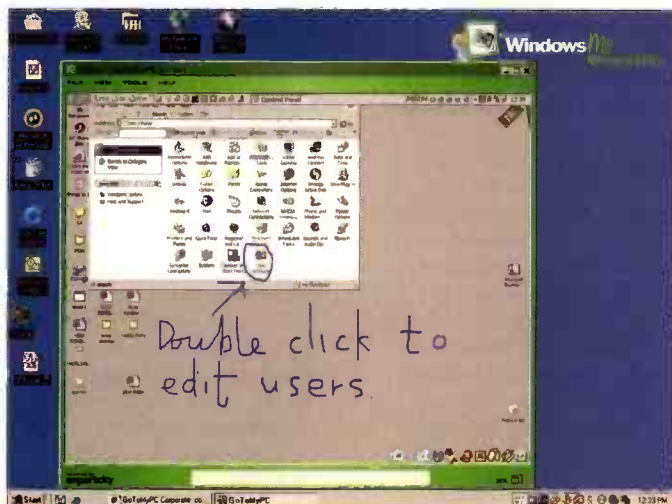
OVERALL

★★★★★

REMOTE ACCESS

Go To My PC 4 Pro

A powerful remote access service



Go To My PC's Pen mode lets the user write on the screen they are accessing, which is handy for meetings and demonstrations

Go To My PC 4 Pro is a web-based remote access service, which avoids complications with virtual private networks and firewalls as it runs through an HTML interface that the majority of firewalls do not monitor or block.

Online registration is quick and easy, and the software itself is just 1.4MB. Once installed and running, an icon sits in the System Tray.

Access to the host PC is gained by going to the Go To My PC website, logging on and selecting the PC you wish to access. There is a Java-based universal viewer as well as a native viewer for Windows. One of the best features is the pen mode, where any 'guest' can draw on the screen of the host PC. Files can also be transferred and the screen is scaled to fit.

Security is very important, so access is controlled by several layers of passwords. Each account has a password and it is also possible to assign a local password to a host PC. All of the information transferred is compressed and encrypted and there is a visible warning when another PC logs onto the host.

Version 4 has included several new features that make Go To My PC even more attractive. It

is now possible to access host PCs from a PocketPC, with an update for Palm users scheduled for this year. The Administration Centre generates reports on how users have been accessing their PCs.

This is a powerful product for allowing remote access to PCs. There are alternatives, such as One Red Square, but it lacks the same freedom for guest access.

Tim Smith

DETAILS

RRP £41 per month for four-PC plan (additional PCs, £9 per month)
BEST PRICE

www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Expert City 0870 345 1096
www.gotomypc.com

SYSTEM REQUIREMENTS

For host PC: Windows 95/NT4/CE • Internet Explorer • 3MB of hard disk space • Always-on stable Internet connection • For the client computer: Windows 95/NT4/CE or any OS such as Macintosh or Unix that has a Java-enabled browser

PROS Ease of use; full control
CONS Host PC Windows only

VERDICT

A simple-to-use and reasonably-priced application

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

DIAGRAMMING SOFTWARE

Allclear 6.1

Quick and simple-to-use diagramming tool

The Allclear package is a diagramming tool that understands two types of diagram: organisation trees and flow charts. As you can guess from its version number, it has a long history going back to Dos.

Allclear is simple compared to the likes of Visio, but it has a couple of special features. One is that all diagrams have a text representation, and you can create or modify diagrams by typing script as an alternative to drag and drop. There is no xml, just a small, easily-to-learn script language. This means you can type a business process or tree hierarchy in something not too far from plain English, and Allclear will draw it as a diagram.

You can also generate an Allclear script from some other source, such as a database. A certain amount of formatting information can be included in the script, but you will probably want to do the final layout using the visual editor.

The other strong feature of Allclear comes only in the high-end Analyzer version. This is for process modelling, and lets you analyse existing processes and construct what-if scenarios. For example, in a product order process you could enter different

values for the probability of an item being out of stock, and see what impact that has on costs. You can also distribute a free Allclear viewer.

There is also support for inserted images and hyperlinks, HTML, OLE automation from languages like Visual Basic, and, in the Analyzer version, you can link directly to external databases. For organisation charts and process modelling Allclear is a quick, simple route to the results you need.

Tim Anderson

DETAILS

RRP Allclear Orgcharter 6.1 £77.55 (£66 ex VAT); Analyzer 6.1 £390.10 (£332 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Deans Hill Systems Ltd
01795 479 001 **www.proquis.com**

SYSTEM REQUIREMENTS

Windows 95 or higher • Pentium 90 or higher • 16MB of Ram

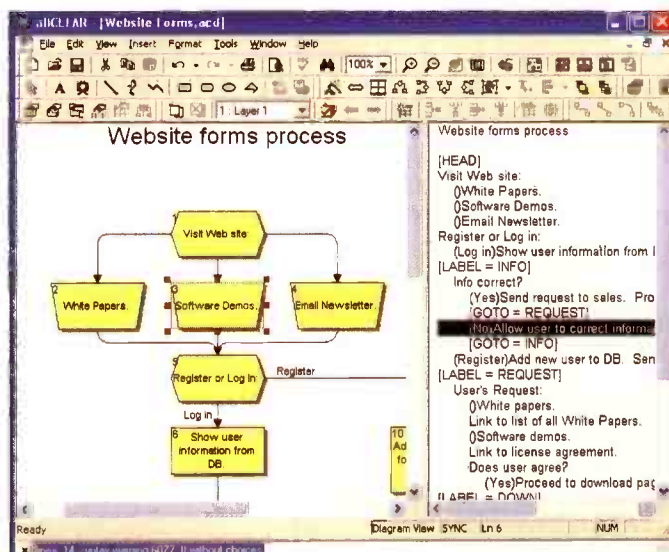
PROS Simple scripting; free viewer

CONS Lacks power and polish

VERDICT

Very useful within its scope

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



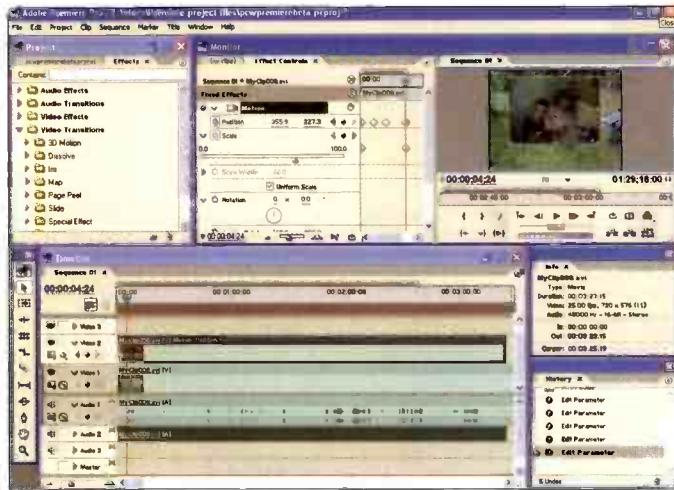
A diagramming tool with an unique text view

VIDEO EDITING

Adobe Premiere Pro

BETA

This radical makeover has new features and greater performance



Adobe recently announced that it would cease development of Premiere for the Mac. Depending on your view, this was either tacit acknowledgement of Final Cut Pro's superiority, or a sound business decision to concentrate on the PC market. Whatever the reason, Mac Premiere users have every reason to be disappointed. Having tested the latest beta of Premiere Pro we can reveal it's the most radical Premiere upgrade yet. There's a slick new interface, a raft of new features and productivity improvements, performance optimised for fast Pentium and multi-processor hardware, and improved integration with After Effects (see review, page 82) and Adobe's new DVD authoring application, Encore DVD (see review, page 80).

Premiere Pro bears only a passing visual resemblance to its predecessor, but fundamentally things work in much the same way and Premiere 6.5 users will quickly find their way around. The existing containers – the project, timeline, monitor and source windows – are still there, but their functions have expanded hugely.

Getting radical

Probably the most radical change is the introduction of multiple timelines or

sequences, each occupying a separate tab in the timeline window. The revised project window's storyboard and list modes have been revamped to provide more information and better organisation. The monitor and source windows have taken on a wider range of functions, including tabbed display of multiple timelines and a docked effect controls window, with the ability to apply keyframeable motion control by direct manipulation of the frame in the monitor window.

There are new colour correction and audio controls, better support for offline editing, support for a wider range of file formats (including mpeg2 import) new DV capture and scene detection features. Direct DVD export is also included, and performance enhancement to realtime editing with native support for YUV colour processing provides improved colour accuracy and a performance boost.

When you're used to working with one timeline, having any number at your disposal is a little disconcerting at first, but the benefits of multiple timelines quickly become

Multiple nested timelines display as corresponding tabbed panels in the timeline and program monitor windows

New controls allow direct manipulation of motion paths from within the program monitor or the new Effect controls panel

apparent. They can be used to organise a project into segments, or to apply different processes to a segment. For example, you can quickly duplicate a timeline and apply a video effect, or change the default transitions then make comparisons between several versions.

Multiple timelines are displayed as tabbed panels, both in the timeline and program view of the monitor window, and selecting a tab in either window switches to the corresponding view in the other. Timelines can be nested, or combined by dragging their sequence icon from the project window into a video track within another timeline. This provides a convenient method for assembling complicated multi-part projects into a single timeline. Timelines nested in this way are live updated, in other words, if you go back and edit the original timeline, the nested version is updated with the changes.

The project window features a number of enhancements, mostly designed to provide more information on clips and

other media. There are now just two view options – list and icon. The number of fields available in the list view has more than doubled to include columns for in and out points, offline properties, scene, client, compressor and many more. You can turn any of these off, use them as the basis for sorting and even add your own custom fields.

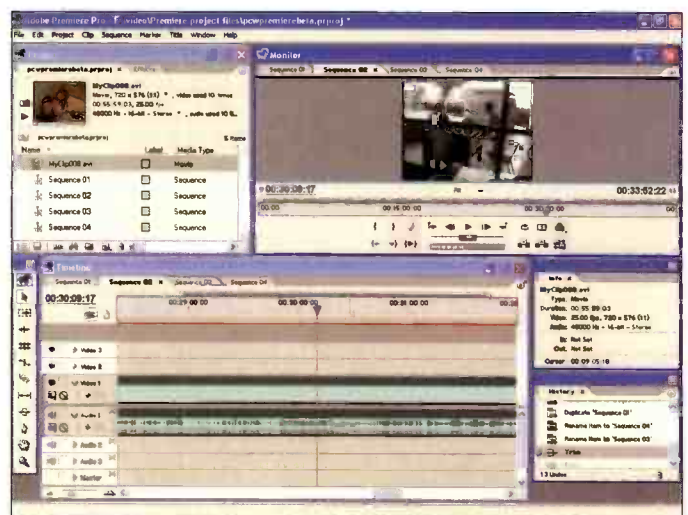
The preview area of the Project window also displays much more information, including the number of times a clip is used (including a navigable pull-down list of the locations within the project), the description, shot date and tape name.

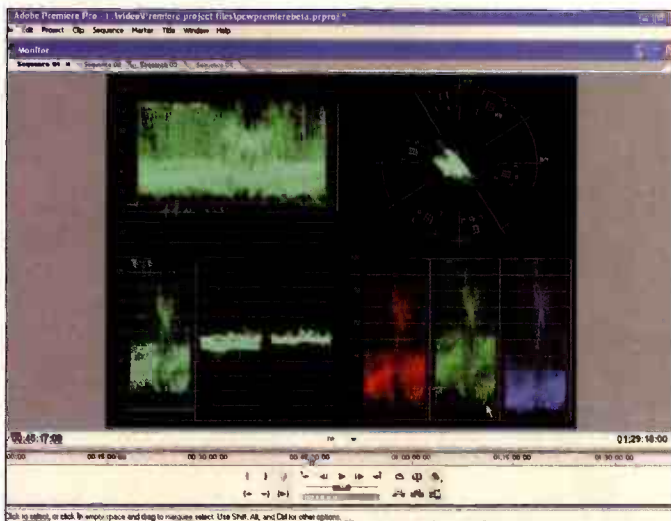
The icon, or storyboard mode now provides a grid structure in which clips can be placed in any, non-contiguous order and automatically inserted on a timeline (they go to the currently active sequence). There are several new options, including placement at unnumbered markers, insert or overlay editing, clip overlap and default video and audio transitions.

The source and program views of the monitor window have grown a multitude of new buttons and sliders providing easier access to editing and navigation controls.

A time view bar can be used to quickly zoom in on a specific section of the clip and, below this, VCR-style control buttons are supplemented by jog and shuttle controls. Arrayed on either side are two button panels.

In and out point and unnumbered marker set and navigations controls are





New colour analysis tools include waveform, vectorscope, YCBCR parade and RGB parade

arranged on the left. On the right are new lift and extract buttons, a safe action, title area marker toggle and a button to access the new trim window. Like just about every other Premiere window, the trim window has been vamped up, and provides considerably more precise control over ripple, rolling slip and slide edits.

In Premiere 6.5 the program view of the monitor window displayed the contents of the composited timeline at the playhead position. In Premiere Pro, its function has expanded not only to the display of multiple timelines, but also to provide output for the new three-point colour correction tools. These closely resemble those introduced in Apple's Final Cut Pro 2 and more recently in Vegas 4.

The Vectorscope, waveform, YCBCR parade and RGB parade readouts can be displayed individually, or four-up, though the latter is only really of any practical use if the window is maximised to full screen size. Essentially, they all show the same thing in different ways – the distribution of chrominance (hue and saturation) and luminance (image intensity from black to white) throughout a given frame.

The trick with these displays is knowing how to read them. With practice they can be useful, both in aiding your eyes when colour matching clips from different sources, as well as providing assurance that colour values fall within broadcast

legal limits. The new three-point colour filter provides fully keyframeable control of more colour parameters than the average user is likely to know what to do with, including hue, saturation, brightness, contrast, pedestal and chroma max and min.

Workspace presets available in the beta version include a colour correction option, which provides a dual-monitor layout showing the effect preview in one window and the vector scopes in another, with the colour controls available from the effect controls tab in the project window. The Effect controls panel allows After Effects-style scrubbing of numerical input fields, so you can either input precise values or click the numeric field and drag left or right while viewing changes in the monitor windows.

Improvements to the effect controls panel go beyond colour correction and are most evident when applying transformations and motion paths to video clips. Gone is the clunky motion settings dialogue box,

The Effect Controls panel showing a few of the controls in the new colour corrector filter

while position, scale and rotation parameters can be controlled either from within the effects control panel itself, or by directly positioning the clip within the program view of the monitor window.

The position, scale and rotation effect controls are nested within the overall motion control grouping on the left side of the panel, and the right side is devoted to keyframe positioning and control. As with other timeline-related functions, a time view bar allows you to zoom in on a portion of the clip for more accurate placing of keyframes.

Just for effect

Using After-Effects-style controls, positioning keyframes and making precise size, position and rotational adjustments is simply a question of click and drag and this is pretty much the case for all effects. An alternative, and more hands-on approach, is to make these adjustments directly by manipulating the clip preview in the program monitor.

Right-clicking keyframe markers displays a contextual menu with a variety of keyframe interpolation options. The default setting interpolates effect properties evenly over time, but effects can be made to accelerate or decelerate towards or away from keyframes.

The many other improvements and additions include an improved DV capture module with built-in scene detection, capture direct to

specific project bins and the ability to capture low-resolution clips for offline editing with subsequent batch capture of full resolution versions. File support has been extended to include import and export of mpeg2, Windows Media 9 Series files and it's now also possible to burn a project to DVD direct from the timeline.

The recommended system requirements for this new release are more demanding and if you want to see the benefit of the real time features you'll need a processor that runs in excess of 3GHz. A more economical and effective option, would be to wait for the Premiere Pro edition of the Matrox RT.X10 Xtra real time card (or the more powerful RT.X100 Xtreme) The RT.X10 currently ships with a full version of Premiere 6.5 for around the same price as the software only, and the Premiere Pro version should be similarly priced.

At less than £500 excluding VAT, Premiere is competitively priced – Vegas 4 and Edition 5 cost about the same, Ulead's Media Studio Pro is considerably cheaper, but Premiere has more to offer than all three. At £665 ex VAT, the Video Collection bundle standard edition, which includes Premiere Pro, After Effects 6 standard edition, Encore DVD and the Audition sound editing application, is great value for money.

Ken McMahon

DETAILS

RRP £586.33 (£499 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Adobe 020 8606 4001

www.adobe.co.uk

SYSTEM REQUIREMENTS

800MHz PIII (3GHz recommended) •

256MB of Ram (1GB recommended) •

600MB of disk space • Windows XP •

1,280 x 1,024 32bit display adapter

PROS Interface design; multiple

timelines; motion paths and effect

controls; colour editing tools

CONS Requires fast hardware for

real-time support

VERDICT

Great new features and a sleek interface establish Premiere Pro as the most accomplished and best-equipped video editing application for under £500

EASE OF USE

★★★★★

FEATURES

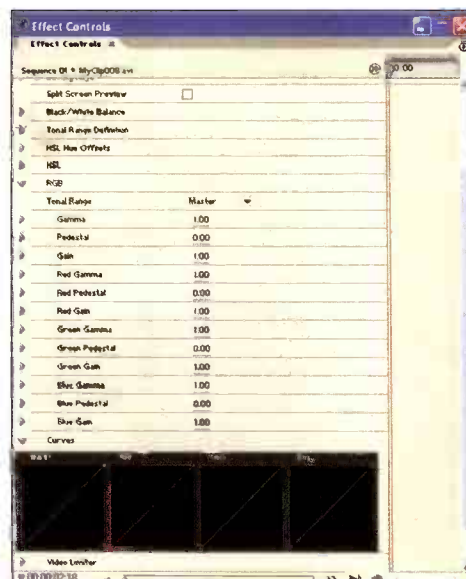
★★★★★

VALUE FOR MONEY

★★★★★

OVERALL

★★★★★





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E-CODE: QU1028-02



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- 17" (16" visible) Phillips 107E FST (CRT) monitor
- CD-RW drive (48x24x48) / 16x DVD-ROM combo drive
- **Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)**
- v92 56k Internet ready modem
- Sound Blaster compatible audio
- Creative Sound Blaster SBS250 speakers
- Mini Tower case (352x180x373)
- 2x USB ports
- Microsoft® Windows® XP Home
- **Olympus C150 digital camera**
- **HP PSC 1110 All-In-One**
- **Ability Office 2002 (OEM)**

£799 inc VAT (£680.00 ex VAT)



Quest II 2400 Total Office includes:
Microsoft® Office® XP SBE (OEM)

£949 inc VAT (£807.66 ex VAT)

Axis 2400+KD

E-CODE: AX1120-02



- **AMD Athlon XP 2400+ processor**
- 512MB DDR RAM (PC2100) (2x256MB)
- 80GB 7200rpm UDMA100 hard drive with 2MB buffer
- 128MB DDR ATI Radeon 9200 graphics with TV-out and DVI
- 17" (16" visible) Evesham EZ Flat (CRT) monitor
- 16x DVD-ROM drive
- CD-RW drive (52x24x52) with BURN-proof technology
- **Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)**
- v92 56k Internet ready modem
- Sound Blaster compatible 6 channel audio
- Creative Inspire 4.1 4400 speakers
- Midi-tower case (420x198x465), 4 x USB ports
- Microsoft® Windows® XP Home

£699 inc VAT (£594.89 ex VAT)



Axis 2400+KD Office includes:
Microsoft® Office® XP SBE (OEM)

£849 inc VAT (£722.55 ex VAT)

Axis 2400+KD with 15" Philips 150S4FG TFT

£809 inc VAT (£688.51 ex VAT)



Axis 2400+KD TFT Office includes:
Microsoft® Office® XP SBE (OEM)

£959 inc VAT (£816.17 ex VAT)



Model shown: Axis 2400+KD with 15" Philips 150S4FG monitor. Was £829 inc VAT.

Features: High specification, fully expandable PC system.

Advantages: Get the best out of today's software applications, as well as the applications of tomorrow

Benefits: Don't get left behind! As your IT needs change simply upgrade this system to meet your future demands.

Evolution 2600KF

E-CODE: EV1077-02



- **Intel Pentium 4 2.66GHz processor with 512KB on die cache and 533MHz FSB**
- Asus P4B533 motherboard with Intel 845 chipset and USB2.0
- 512MB DDR RAM (PC2100) (2x256MB)
- 80GB 5400rpm UDMA100 hard drive with buffer
- Intel Extreme 2D/3D graphics
- 17" (16" visible) Evesham EZ Flat (CRT) monitor
- 16x DVD-ROM drive
- CD-RW drive (52x24x52) with BURN-Proof technology
- **Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)**
- v92 56k Internet ready modem
- Sound Blaster compatible 6 channel audio
- Creative Inspire 5.1 5100 speakers
- Midi Tower case (420x198x465), 6 x USB2.0 ports
- Microsoft® Windows® XP Home

£799 inc VAT (£680.00 ex VAT)



Evolution 2600KF Office includes:
Microsoft® Office® XP SBE (OEM)

£949 inc VAT (£807.66 ex VAT)

Evolution 2600KF with 15" Philips 150S4FG TFT

£909 inc VAT (£773.62 ex VAT)



Evolution 2600KF TFT Office includes:
Microsoft® Office® XP SBE (OEM)

£1059 inc VAT (£901.28 ex VAT)

UPGRADES

Microsoft Works Suite 2003 £47.00 inc VAT
(When purchased with an Evesham PC)

Home Installation £99.99 inc VAT
(Includes delivery & professional installation)

Upgrade to 3 years on-site warranty (Axis and Evolution systems) £34.08 inc VAT

3 YEAR WARRANTY AS STANDARD

Evesham recommends Microsoft® Windows® XP

With all Axis, Evolution, Quest II and e-style systems, we supply a **3 year warranty** as standard. Axis, Evolution and e-style systems have 2 years on-site with a 3rd year return-to-base warranty (parts and labour). Quest II and Voyager notebook systems have a 1 year on-site with 2 years return-to-base warranty (labour only). On top of our standard warranty we provide the following support service:

- Lifetime telephone technical support
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- BigFix software installed



Are those models which we try to keep in stock for immediate despatch

Price does not include delivery which is £34+VAT (£39.95) - UK mainland only. All systems and upgrades are subject to availability. Prices correct at date of publication. Price and specifications subject to change without notice. Finance is subject to status. Evesham's Terms and Conditions apply and are available on request. Actual products may not match photographic representations. Technical Support opening hours are Monday to Saturday 9:00 to 17:20. On-site warranty applies to UK mainland only; monitors are covered directly by the monitor manufacturer. Featured systems are based upon the original award winning specification. Bundled versions of video cards, sound cards and software are not full retail packs, and the software features on-line documentation. Hard disk capacities are quoted in thousands of millions of bytes and are prior to installation of operating systems and other applications. As part of our staff training some telephone calls may be monitored. AMD, AMD Athlon and AMD Duron are trademarks of Advanced Micro Devices. Intel, the Intel Inside logo, Celeron and Pentium 4 are trademarks of the corporation. E&OE.



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...with excellent LCD panel and DVD writer"

Computer Shopper, Sep 2003

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Axis 2600+MKR Office includes:
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£1324 inc VAT (£1126.81 ex VAT)

Axis 2600+ MKR



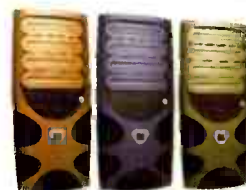
e-CODE: AX1127-02

- **AMD Athlon XP 2600+ processor**
- **NVIDIA nForce2** motherboard with dual channel DDR & USB2.0
- **512MB DDR RAM** (PC2700) (2x256MB)
- **120GB 7200rpm UDMA100** hard drive with 8MB buffer
- **128MB DDR ATI Radeon 9600** graphics with TV-out & DVI
- **17" Philips 170B4BS** Pure Digital DVI TFT monitor
- **SONY latest model DW-U14A Multi Format 4x +R/+RW DVD writer**
- **SONY** CD-RW drive (52x24x52) with BURN-Proof technology
- **Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)**
- **10/100 network connection** (on-board)
- **v92 56k Internet ready modem**
- **NVIDIA SoundStorm™** audio supporting Dolby Digital 5.1 digital surround sound and 6 speaker connectivity (on-board)
- **Creative Inspire 5.1 5300** speakers
- **Microsoft®** cordless keyboard and cordless optical mouse
- **Ability Office 2002 (OEM)**
- **NEW** Ultra stylish tool free case with blue lighting (435x222x495)
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- **Microsoft®** Windows® XP Home



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What Laptop & Handheld PC, Gold Award, May 2003

Voyager 5800 series

- **Intel processor** see table below
- **Memory** up to 1GB
- **64MB VGA NVIDIA GeForce4** graphics
- **12 cell Li-Ion battery** (life up to 3 hrs approx.)
- **v90 56k Internet ready modem**
- **Built-in aerial** for wireless
- **10/100 network card**
- **Built-in smart card reader** (See feature)

- **Built-in audio & speakers**
- **Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)**
- **Ports** - up to 4xUSB2.0, Firewire, VGA, PCMCIA 1xType II
- **Weight** - 3.8kg
- **Dimensions** - 332mmx285mmx30.5mm (39.5mm max)
- **Microsoft®** Windows® XP Home

What Laptop Award Winner

NEW
3 year warranty
as standard



Built-in smart card reader
Supports MMC/SD/SM/MS

	£30 off - was £999 inc VAT	£50 off - was £1249 inc VAT		
	5814+ C2.4	5815+ 2.6	5815+ 2.8	5815+ 3.0
Processor	Intel Celeron 2.4GHz	Intel Pentium 4 2.66GHz	Intel Pentium 4 2.8GHz	Intel Pentium 4 3.06GHz with Hyper-Threading
DDR RAM	256MB	512MB	512MB	512MB
Hard Drive	30GB	40GB	60GB	80GB
Screen Size	14" TFT	15" TFT	15" TFT	15" TFT
Drive	DVD/CD-RW Combo	DVD/CD-RW Combo	DVD/CD-RW Combo	DVD/CD-RW Combo
Price	£969 inc VAT (£824.68 ex VAT)	£1099 inc VAT (£935.32 ex VAT)	£1199 inc VAT (£1020.43 ex VAT)	£1399 inc VAT (£1190.64 ex VAT)
Price with Microsoft® Office® XP SBE (OEM)	£1119 inc VAT (£952.34 ex VAT)	£1249 inc VAT (£1062.98 ex VAT)	£1349 inc VAT (£1148.09 ex VAT)	£1549 inc VAT (£1318.30 ex VAT)

IDEAL UPGRADE: Add an internal wireless LAN Mini PCI 802.11b card **£49.99** inc VAT

MONITOR UPGRADES

Evesham recommends Microsoft® Windows® XP Professional for Mobile Computing

	to:	to:	to:	to:
	19" Mitsubishi Plus 93 SB (CRT)	15" Philips 150S4FG TFT	17" Philips 170B4BS DVI TFT	19" Viewsonic VP191 TFT
from: 17" Philips 107E FST (CRT)	£115.00 inc VAT	£130.00 inc VAT	£270.00 inc VAT	£490.00 inc VAT
from: 17" Evesham EZ Flat (CRT)	£97.00 inc VAT	£110.00 inc VAT	£250.00 inc VAT	£470.00 inc VAT
from: 17" Philips 170B4BS DVI TFT				£240.00 inc VAT

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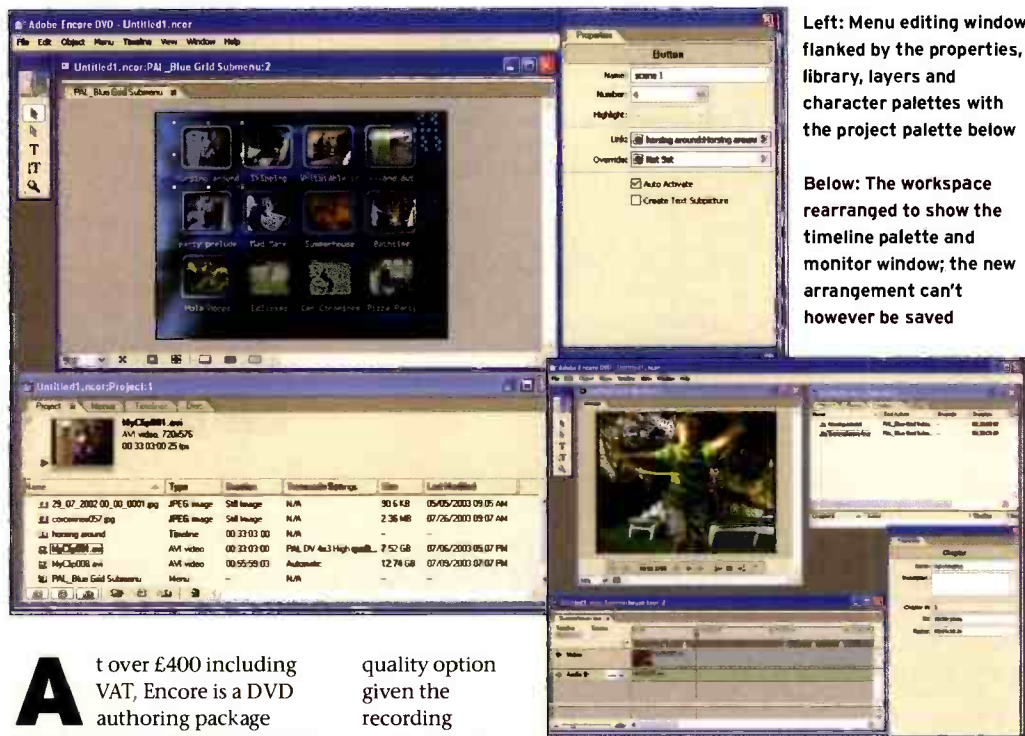
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DVD AUTHORIZING PACKAGE

Adobe Encore DVD

BETA

An excellent debut that will appeal to professional video makers



Left: Menu editing window flanked by the properties, library, layers and character palettes with the project palette below

Below: The workspace rearranged to show the timeline palette and monitor window; the new arrangement can't however be saved

At over £400 including VAT, Encore is a DVD authoring package aimed at the professional market.

DVD authoring involves importing video and other content, designing menus, building navigation structures and burning the project to DVD, and handles all three tasks very well. You can work directly with DVD-compliant mpeg2 files, import and transcode DV avi files, a variety of still image file formats and subtitles from industry-standard Captions, inc and fab files.

A library palette provides a selection of menu templates and buttons which can be quickly customised in the template editor. Encore has few graphics tools but its text editing tools are sophisticated and versatile – adapting templates – by adding and annotating buttons, for example – is a two-minute job.

Navigation is controlled via the Properties palette, which provides options for linking buttons to content and determining what happens when clips finish playing. A range of editable transcoding presets, combined with file size feedback, allows you to choose the best

quality option given the recording media. Studios producing a DLT master for pressing can opt for CSS and Macrovision copy protection.

A key element of any new Adobe product or upgrade is integration, and Encore DVD allows users of existing Adobe products to capitalise on their experience by providing standardised interface elements and swapping layered Photoshop files back and forth. In fact, while Encore provides pretty good tools for creating and editing DVD menus, advanced users will probably do most or all of the legwork in Photoshop before importing the completed menu into Encore to add navigation.

Photoshop psd files come into Encore with layers intact and the compatibility works both ways – you can open a psd menu that has been created or edited by Encore in Photoshop. This round tripping support is essential, as DVD menus with multi-state buttons use a 2bit indexed colour overlay to indicate normal, active and selected states, and Encore builds such menus on the basis of carefully labelled layers.

The Encore workspace, not surprisingly, resembles Premiere. A project window gives access to all the elements within a project, subdivided into four tabbed sections for Project, menus, timelines and disc production.

Each video clip in the project has its own timeline, occupying a tab in the timeline palette. You navigate the timeline by scrubbing a play head, and there's a dedicated button for adding chapter points. In addition to the default video and audio tracks you can add up to eight further audio tracks and up to 32 subtitle tracks. Subtitles can be added at any position on the timeline by keying them into the monitor window; the default duration is two seconds. As the subtitle track is a full screen overlay you can add any kind of animated graphic, though this is limited (by the DVD format, not Encore) to a 2bit indexed colour graphic.

Adding subtitles, as well as other textual information is made easy. The small toolbox contains vertical and horizontal text tools that can be used

directly within the menu editor, and the character palette gives the same kind of advanced formatting options as Photoshop, including anti-alias options.

The beta version we tested has rough edges. You can add drop shadows to menu elements but, other than opening the file in Photoshop, removing them was impossible and the preview didn't work. You can't drag and drop layers in the layers palette to change the stacking order; you must use bring forward/send backward menu commands.

On a more general level, the workspace isn't as organised as the more mature Adobe applications, and the various windows and palettes often seem to be competing for, rather than sharing, the screen space.

For clarity, the screenshots have been produced on a 1,024 x 768 monitor, but even at the minimum recommended 1,280 x 1,024 resolution the workspace can quickly become cluttered. A system of saveable workspace layouts, like Premiere's, would therefore be very welcome.

Ken McMahon

DETAILS

RRP £428.88 (£365 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Adobe 020 8606 4001

www.adobe.co.uk

SYSTEM REQUIREMENTS

800MHz PIII (P4 recommended) • Windows XP • 256MB of Ram • 500MB of disk space • 1,280 x 1,024 display

PROS Powerful, yet easy to use professional DVD authoring

CONS Workspace needs careful and constant organisation

VERDICT

There are some minor blemishes to this release that may have to wait until the next upgrade to be fixed, but this barely tarnishes what is otherwise an excellent DVD authoring package

EASE OF USE

★★★★★

FEATURES

★★★★★

VALUE FOR MONEY

★★★★★

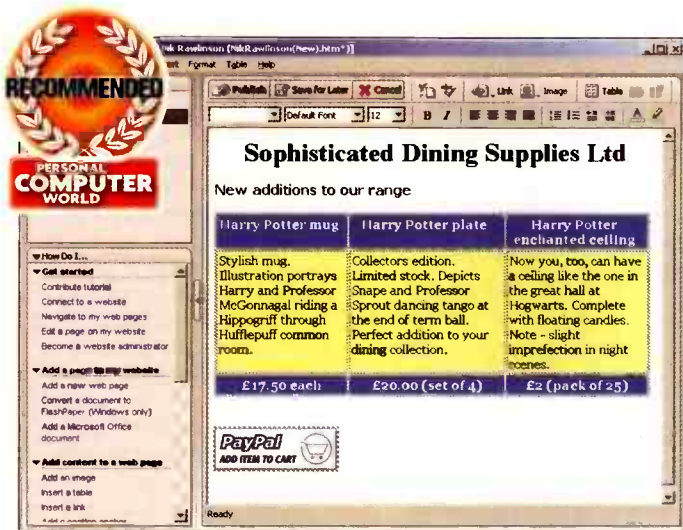
OVERALL

★★★★★

WEB CONTENT CREATION

Macromedia Contribute 2

An easy way for novices to update a site



It's easy for contributors to update an existing website through the word-processor-type interface

Macromedia is savvy enough to know that no company can afford Dreamweaver on every desktop. Half the people who tinker with a website don't need to know what goes on behind the scenes, and most developers would rather keep it that way. Contribute hooks up with Dreamweaver-created templates and provides a word-processor interface through which 'content contributors' can add new content to existing sites.

New in this second release is a beefier SFTP connection for secure uploads, better handling of imported Office documents, and a Paypal wizard that allows non-pros to build shopping carts on a corporate site.

This is the first application in which we have seen Flash Paper, a low-grade alternative to Adobe Acrobat. Flash Paper renders anything 'printed' to its rendering driver, or inserted 'as Flash paper', as a zoomable, scrollable Flash file. It's an easy way to retain formatting in a Word document while shrinking down the file size. However, it can be confused by a Powerpoint presentation with transitions. Files can be printed, but there is no option to search them, and as they can only be created under

Windows 2000 and XP it won't unseat Adobe yet.

Contribute 2 is subject to product activation, but unlike Microsoft, Macromedia allows two simultaneous installs. It also lets you deactivate at any time, install it somewhere else and reactivate on a new machine.

Contribute 2 builds on a competent offering and, at this price, it's worth the upgrade.

Nik Rawlinson

DETAILS

RRP £93.99 (£79.99 ex VAT), upgrade for £34.08 (£29 ex VAT) after 31 August

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Macromedia Store 0800 169 8216

www.macromedia.com/uk

SYSTEM REQUIREMENTS

300MHz processor • Windows 98SE

upwards • 50MB of hard disk space •

64MB of Ram • Internet Explorer 5

PROS Simple to use;

Paypal integration

CONS Flash Paper creation

restricted to Windows 2000 and XP

VERDICT

A good business alternative to multiple copies of Dreamweaver

EASE OF USE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

AUDIO EDITING

Adobe Audition 1

A professional quality sound manipulator

If you recognise that interface you're probably a Cool Edit Pro user. Adobe bought the software from its creators, Syntrillium. Beyond adding the company name to the title bar, there is little new. If you're a Cool Edit Pro 2.x user you're eligible for a free upgrade to Audition. Earlier Pro editions and Cool Edit 2000 entitle you to a subsidised update.

Audition is one of the most accomplished and easy-to-use editing packages around, and is used in many professional sound environments. A comprehensive tools library and the ability to record and mix 32bit files using any sample rate up to 10MHz, which exceeds the quality of your average DVD movie, puts this beyond the average home user app, while retaining a conservative price point. The standard editing window is complemented by a multi-track studio capable of handling up to 128 stereo channels for non-destructive mixing, in which samples can be positioned with an accuracy of one-thousandth of a second.

The tabbed interface keeps everything close at hand, with effects organised in a collapsible tree to maximise the amount of screen space devoted to the editing window. One tabbed

palette is reserved for your favourite settings.

The software falls into Adobe's video product line-up and an 'edit original' command in Premier will open samples or sessions in Audition. We're guessing that by version 1.5 the interface will be more similar to the other products in its range – Premier and After Effects – but for the moment its unattractive layout is at least easy to navigate.

Nik Rawlinson

DETAILS

RRP £233.83 (£199 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Adobe 020 8606 4001

www.adobe.co.uk

SYSTEM REQUIREMENTS

400MHz processor • Windows 98SE

upwards • 64MB of Ram • 55MB of

hard disk space • 800 x 600 colour

display • Stereo sound card • CD-Rom

drive • Speakers or headphones

recommended • Microphone (optional)

PROS Accurate editing; tools

CONS Unattractive interface

VERDICT

If you are serious about audio editing this is excellent choice, but it's expensive for home use

USABILITY ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★



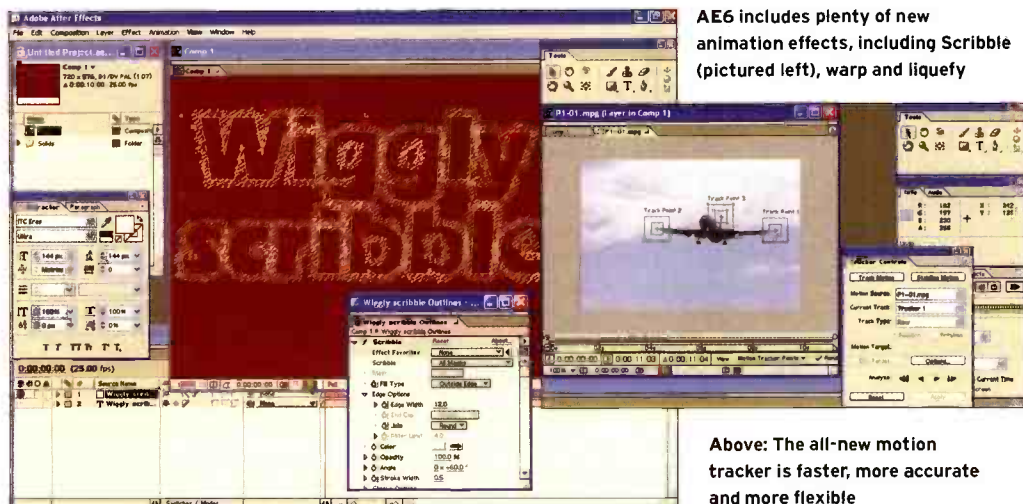
Audition is used in professional sound environments like radio studios

VIDEO EFFECTS APPLICATION

BETA

Adobe After Effects 6 Professional Edition

This upgrade has something for everyone, but at a price



AE6 includes plenty of new animation effects, including Scribble (pictured left), warp and liquefy

Above: The all-new motion tracker is faster, more accurate and more flexible

After Effects, Adobe's video special effects and compositing application, is aimed at video post-production studios. It's not a conventional video editing application – rather a special effects and motion graphics application. How you rank the new features in this version will depend on how you use it, but we'd give the new text engine and the associated text animation features top billing. You can now enter and edit text directly in the composition window. Also, typographic control is on a par with what you'd find in Indesign, Photoshop or Illustrator and uses the same standard character and paragraph palettes.

The text animation features will be of more interest to titling specialists. AE6's new tools help produce sophisticated keyframed effects on individual characters, whole words or an entire layer. Where you would have had to assign each character to a specific layer, now you can control animated properties in a block of text using Range Selectors to define which characters the animation will effect.

But the real fun starts when you animate the Selectors themselves. To use a simple example, you might use a

Range Selector to alter the colour of a line of text and have the effect ripple along the line from beginning to end. Each selector can be used to animate multiple properties, making it possible to create effects that involve changes of both typographic properties, such as baseline shift and tracking, as well as other properties such as rotation, scale or opacity.

The ability to apply random wiggle (selections that vary randomly by a specified amount over time) to animated text properties makes it possible to produce distinctive and original animated text effects in a fraction of the time this sort of thing used to take. The text remains fully editable, so last minute copy changes won't mean having to repeat the entire process to recreate the effect.

Adobe has also introduced a warp effect, with 15 preset styles that can be used on any layer type but are best suited to text distortion. As well as the arc, wave and flag-shaped distortions that will be familiar to users of any budget DTP application, these warps can be customised and keyframe animated.

AE6 has also inherited Photoshop's liquefy tool, or at least something similar. As well as the familiar warp, bloat, pucker and twirl variants, AE6

includes a turbulence tool, and a reflection tool which moves pixels perpendicular to the brush stroke to create water reflection effects. You can use masks to protect areas of the footage. Warps can be keyframe animated, so you can set keyframes for distortion percentage – making eyes bulge cartoon-style from sockets has never been easier.

Graphics tools have not been ignored, and a new vector paint engine provides Photoshop-style brushes which can be used to create fully editable non-destructive brush strokes. One obvious use for these is in creating write-on animation, but they can also be used on masks, and the new Clone Stamp tool can be used to remove unwanted detail across a range of frames.

Amidst the additional effects, one in particular offers titling artists and animators something new. Scribble animates either the stroke or fill of a mask with a series of lines that look like, well, scribble. Again, a high degree of control is provided over scribble parameters so you can create wide variations in effect; with a little effort, you really can make it look quite messy.

Adobe has rebuilt the After Effects motion tracker from the ground up, and the new model

features a motion tracker control panel which allows you to analyse motion forwards or backwards, or to step-through on a frame-by-frame basis using VCR-style controls. Standard one, two and four-point tracking options are built in, or you can specify as many tracking points as you want. You can perform multiple tracks on a single layer and it's no longer necessary to apply the tracking data to a destination layer. The tracking data is visible on the timeline, so you can edit it manually or use it in expressions.

Adobe is marketing a Standard and Professional edition. The Standard edition doesn't include the advanced motion tracking, additional warping tools, the Keylight advanced keying plug-in, 30 special effects, a particle system, additional audio effects and 16bit colour support. Another feature exclusive to the Pro edition is render automation, which provides Javascript control of the After Effects render queue.

Ken McMahon

DETAILS

RRP Standard £628.63 (€535 ex VAT), Pro £1,016.38 (€865 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Adobe 020 8606 4001

www.adobe.co.uk

SYSTEM REQUIREMENTS

PIII • Windows 2000 or XP • 128MB of

Ram • 150MB of free hard disk space

PROS Increased performance, new motion tracker and text animation

CONS Many of the best new features limited to Pro edition

VERDICT

An upgrade that makes complicated jobs simpler, faster and more profitable, with stunning new tools and effects. However, while post production studios won't be too worried about the price tag, the standard edition is pretty expensive

EASE OF USE

★★★★★

FEATURES

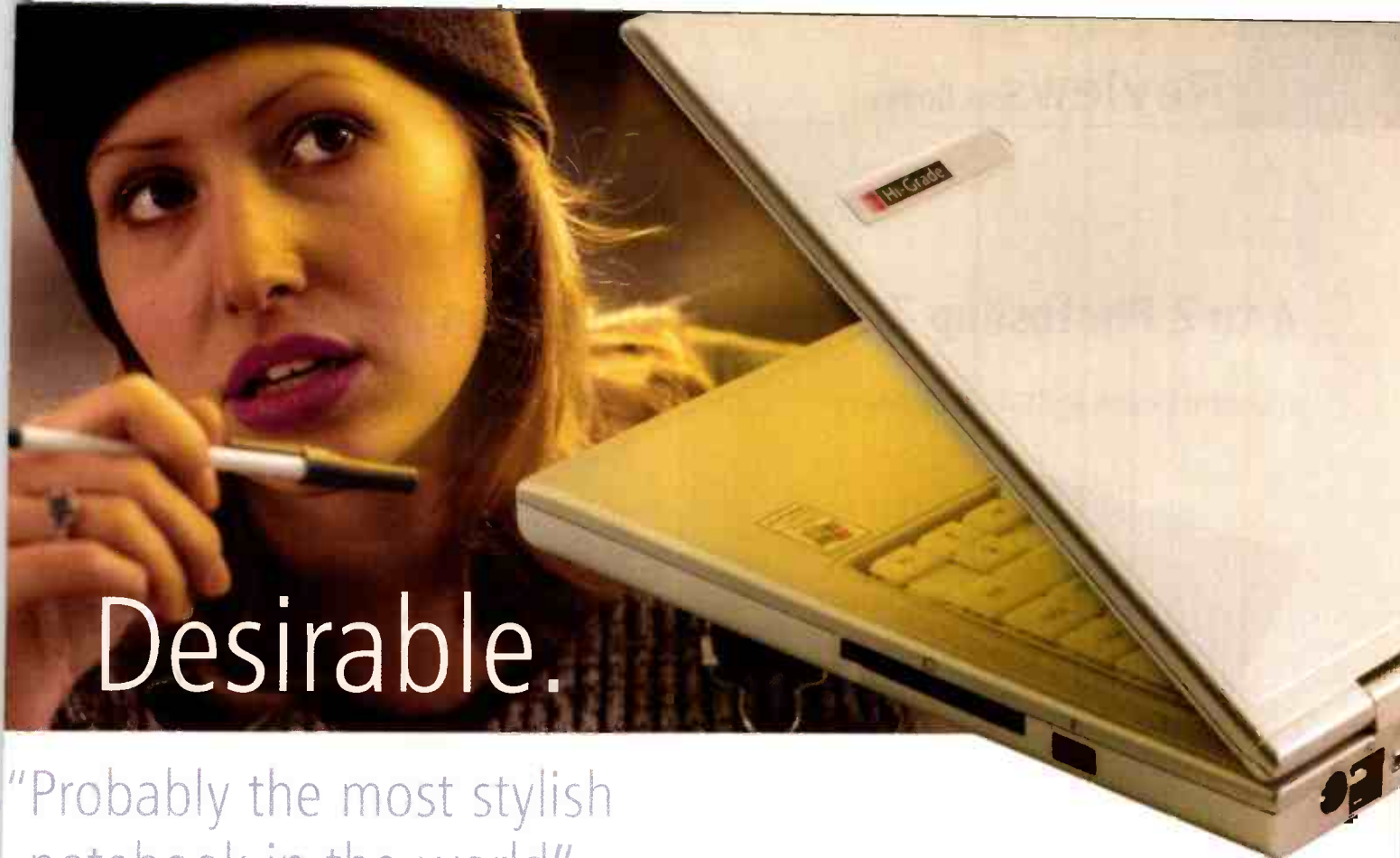
★★★★★

VALUE FOR MONEY

★★★★★

OVERALL

★★★★★



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"Probably the most stylish notebook in the world" PC Pro, April 2003



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STANDARD NOTINO C6700 FEATURES

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Latest Awards

Notino W6700
PC Advisor Gold
April 2003

Notino W6700
Computer Buyer
Recommended
June 2003

Notino C6700
PCW
Recommended
September 2003

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Most Improved Notebook
Brand of the year 2002
PC Advisor

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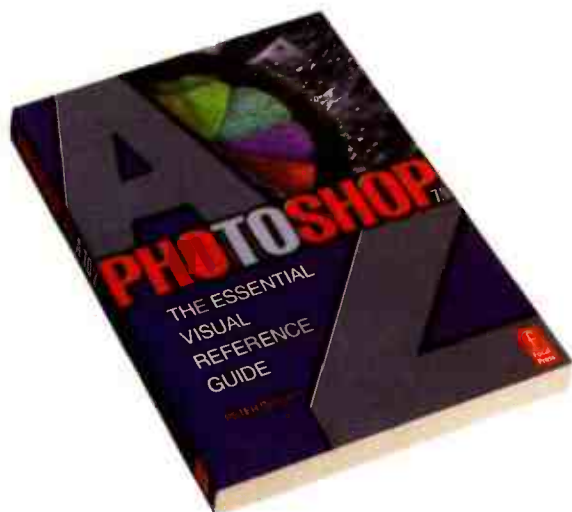


Hi-Grade

Technology with a human face

A to Z Photoshop 7.0

A useful image-editing dictionary



Imagine an illustrated index that runs to almost 200 pages. That's this book.

As the name suggests, its content is arranged in alphabetical order, and each page is a colourful, lavishly-illustrated explanation of what each tool, function, filter or Photoshop plug-in does.

Of course, there are problems inherent in following a book written this way. For a start, you have to know where to look, and few beginners would realise that 'how do I print several pictures on one page' is answered in the section entitled 'picture packager' – the name Adobe gives the function. Likewise, in talking about the 'preserve transparency' feature, the book will happily explain its function, but unless you closely examine the small and poorly-cropped screenshot, in which the relevant palette is squeezed into a corner, you'll never understand how to invoke it.

To get the best from this slim volume, you'll need at least a passing familiarity with Photoshop, and should consider it a dictionary rather than a workbook, which defines tools and options rather than tasks and jobs. As such, it is not as inspirational as many other Photoshop

books, which would show you new methods of working with your images.

Nonetheless, the publisher hasn't skimped on the illustrations and has splashed out on a fair amount of colourful ink. The text on each page is almost squeezed out by the number of pictures surrounding it, and several series of useful examples show the effect of using the full spectrum of each tool. An entire spread is devoted to just the hue slider, showing the difference made in progressing 12 steps from +180 to -180.

In short, if you're already a Photoshop aficionado and need something to grab on the odd occasion when you're trying something new, this book may well come in handy. But for beginners, or if you're teaching yourself Photoshop, there are better options out there that may suit you.

Nik Rawlinson

DETAILS

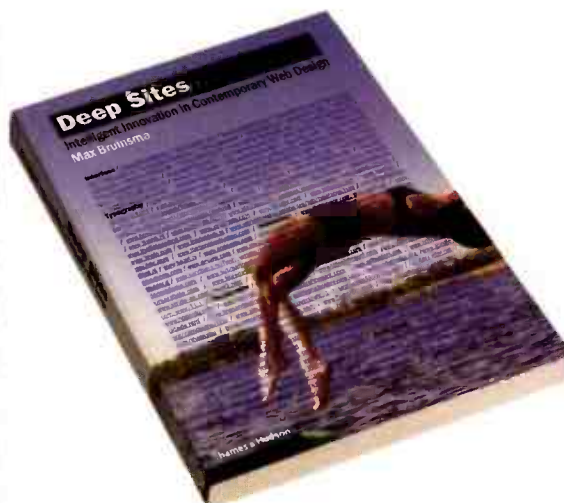
TITLE A to Z Photoshop 7.0: The Essential Visual Reference Guide
PRICE £15.64
AUTHOR Peter Bargh
PUBLISHER Focal Press
ISBN 0-240-51912-4

RATING



Innovation in web design

Discover the Internet's hidden gems



In the earliest stages of the development of what we now term the Internet, few would have guessed the impact this new medium would have on publishing and authoring, graphic design and content distribution.

While early website design may seem primitive by today's standards, recent developments in display technologies, compression techniques and increased bandwidth have opened up the possibilities for more sophisticated and truly innovative graphic design online. In his book, *Deep Sites: Intelligent Innovation in Contemporary Web Design*, Max Bruinsma explores the critical issues surrounding web design today, and sets out to scrutinise some of the areas in which innovation has truly enhanced the user's interaction with the online interface.

To this end, the book is split into five chapters, each of which report on developments in one specific area of website design. The first chapter, *Interface*, considers how we navigate cyberspace, taking into account the fact that web technology is often very much at odds with the ways in which we are used to interacting with text. Each chapter opens with a

critical discussion of its theme, and talks about specific websites that push the boundaries of online design, complete with screenshots and accompanying notes set out in the margin.

The second chapter discusses typography and the departure from static text and typefaces. Meanwhile, subsequent chapters explore the use of animation, building online communities, and the impact the web has had on authoring – blogging being an obvious example of an online genre that has turned our notion of journalism on its head.

For those who enjoy casting a critical eye over their online environment, this is a great book to dip into and provides clearer insight into a medium that most of us use on a daily basis. It is also a great jumping off point that will introduce you to some of the design gems that the web has to offer.

Emilie Martin

DETAILS

TITLE Deep Sites: Intelligent Innovation in Contemporary Web Design
PRICE £18.95
AUTHOR Max Bruinsma
PUBLISHER Thames & Hudson
ISBN 0-500283-84-2

RATING





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Computer Shopper, May 2003



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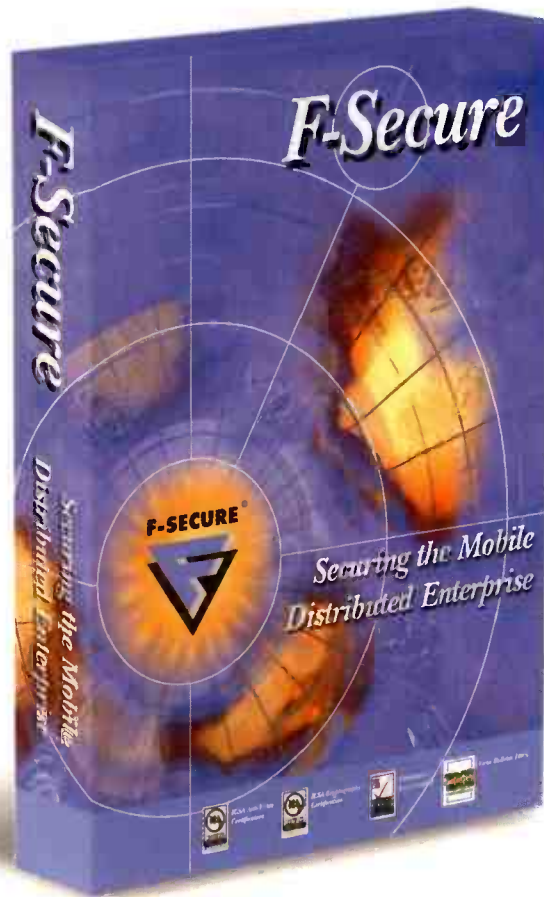
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ENTRY-LEVEL PC

Systemax Inspire 3127

REVIEW June 2003, p51 RRP £821.33

(£699 ex VAT) **PRODUCT INFORMATION**

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

Systemax Inspire 3157

REVIEW October 2003, p138 RRP £1,173.83

(£999 ex VAT) **PRODUCT INFORMATION**

Systemax 0870 729 7366 www.systemaxpc.co.uk



The Athlon 3000+ still offers excellent value for money here, teamed with 512MB of Ram and an MSI Geforce FX5600 Personal Cinema. A remote control is also included.

HIGH-END PC

Hi-Grade Ultis PV4 GPW02

REVIEW February 2003, p109 RRP £1,410

(£1,200 ex VAT) **PRODUCT INFORMATION**

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 C6700

REVIEW September 2003, p48 RRP £1,643

(£1,399 ex VAT) **PRODUCT INFORMATION**

Hi-Grade 020 8532 6123 www.higrade.com



Widescreen notebooks are good for work and leisure. The M6700 features a Pentium M processor supported by 512MB of Ram and an Nvidia S200 Go graphics chip, giving great performance.

ULTRA-PORTABLE NOTEBOOK

Sony PEG-TRIMP

REVIEW August 2003, p47 RRP £1,802.45

(£1,534 ex VAT) **PRODUCT INFORMATION**

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 CD-RW/DVD drive, as well as USB2 and Firewire ports.

BUDGET NOTEBOOK

Rock Quaddra XT

REVIEW September 2002, p116 RRP £1,173

(£999 ex VAT) **PRODUCT INFORMATION**

Rock 0870 990 9090 www.rockdirect.com



It might be heavy, but this notebook combines excellent battery life with all the trimmings you need. The three-year collect and return warranty offers peace of mind and there's even a built-in webcam.

FLAT-PANEL MONITOR

CTX PV722E

REVIEW May 2003, p69 RRP £449 (£382.13 ex VAT)

PRODUCT INFORMATION CTX 01923 810 800

www.ctxeurope.com



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 RRP £163.33

(£139 ex VAT) **PRODUCT INFORMATION**

NEC-Mitsubishi 08701 201 160 www.nec-mitsubishi.com



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 RRP £319

(£271.49 ex VAT) **PRODUCT INFORMATION**

CTX 01923 810 800 www.ctxeurope.com



Excellent image quality, as well as a USB hub, make this 19in monitor more than worth its £319 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 RRP £299

(£254.47 ex VAT) **PRODUCT INFORMATION**

Palm 0118 974 2700 www.palm.com/uk



The first device to adopt Palm OSS 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.

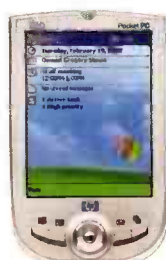
POCKET PC

HP Ipaq 1910

REVIEW May 2003, p72 RRP £199

(£169.36 ex VAT) **PRODUCT INFORMATION**

HP 0845 270 4222 www.hp.com/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

HP PSC 2210

REVIEW October 2003, p122 RRP £299

(£254.47 ex VAT) **PRODUCT INFORMATION**

HP 08705 474 747 www.hp.co.uk



The HP PSC 2210 is a true multifunction device, with standalone fax as well as print, scan and copy. It is also possible to print from a camera memory card.

SCANNER

HP Scanjet 4500c

REVIEW February 2003, p125 RRP £129

(£109.79 ex VAT) **PRODUCT INFORMATION**

HP 08705 474 747 www.hp.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.

LASER PRINTER

Kyocera Mita FS-1010

REVIEW April 2003, p180 RRP £250.27 (£213 ex VAT)

PRODUCT INFORMATION Kyocera Mita

0845 710 3104 www.kyoceramita.co.uk



The FS-1010 offers high quality printing at a good speed. Many of its parts can also be recycled making this a very environmentally friendly printer.

INKJET PRINTER

Canon i470D

REVIEW September 2003, p126 RRP £179

(£152.34 ex VAT) **PRODUCT INFORMATION**

Canon 0870 514 3723 www.canon.co.uk



This printer offers borderless printing and the ability to read four different Flash cards, along with very fast high-quality printing for an inkjet. Ideal for the business user.

PROJECTOR

IBM ILM300

REVIEW September 2003, p60 RRP £1,828.63

(£1,556.28 ex VAT) **PRODUCT INFORMATION**

IBM www.ibm.com/pc/europe



The ILM300 projector offers quality without compromising on noise or size. The remote control can take mouse control and includes an integral laser pointer. Picture quality is very high.

SPEAKERS

Acoustic Energy Aego2

REVIEW April 2002, p138 RRP £199.95

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 high price.

SOUND CARD

Creative Audigy 2 Platinum EX

REVIEW May 2003, p76 RRP £199.99

(£170.20 ex VAT) **PRODUCT INFORMATION**

Creative <http://europe.creative.com>



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 T7700 7.1 speakers

REVIEW October 2003, p59 RRP £129.99

(£110.63 ex VAT) **PRODUCT INFORMATION**

Creative <http://europe.creative.com>



These 7.1 speakers are great sounding, and not too bad to look at either. They are also capable of 'upmixing' a 5.1 signal to a 7.1 one, as well as having one of the lowest signal-to-noise ratios around.

ATHLON MOTHERBOARD

Gigabyte 7VXP-A Ultra

REVIEW August 2003, p116 RRP £101.05

(£86 ex VAT) **PRODUCT INFORMATION**

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 RRP £157.45

(£134 ex VAT) **PRODUCT INFORMATION**

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 Serial adaptor for parallel hard drives.

DIGITAL VIDEO CAMERA

Sony TRV33E

REVIEW July 2003, p142 RRP £750 (£638.30 ex VAT)

PRODUCT INFORMATION Sony 0870 511 1999

www.sony.co.uk



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

GRAPHICS CARD

Gainward Powerpack Pro/450 TV

REVIEW August 2002, p118 RRP £43.09

(£36.67 ex VAT) PRODUCT INFORMATION

Gainward www.gainward.com



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 RRP £178.44

(£151.86 ex VAT) PRODUCT INFORMATION

Hercules 020 8665 1881 www.hercules-uk.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 RRP £299

(£254.47 ex VAT) PRODUCT INFORMATION

Canon 0870 514 3723 www.canon.co.uk



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 RRP £128

(£107.25 ex VAT) PRODUCT INFORMATION

NEC 0870 106 3225 www.nec.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

Cyberdrive C099D

REVIEW October 2003, p65 RRP £39.99

(£34.03 ex VAT) PRODUCT INFORMATION

Cyberdrive www.cyberdrive.de



Running at a blistering 52x, this is one of the fastest drives on the market, although its CD-RW formatting times leave a little to be desired. It comes bundled with Nero 5.5 burning software.

OFFICE SOFTWARE

Ability Office

REVIEW April 2003, p194 RRP £49.36 (£42 ex VAT)

PRODUCT INFORMATION Ability 020 7231 6310

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.

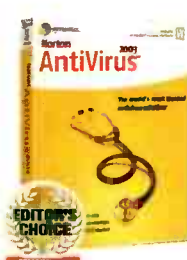
ANTI-VIRUS SOFTWARE

Symantec Norton Anti-virus 2003

REVIEW August 2003, p140 RRP £44.99

(£38.30 ex VAT) PRODUCT INFORMATION

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 RRP £374.83

(£319 ex VAT) PRODUCT INFORMATION

Macromedia 0800 169 8216 www.macromedia.com/uk



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

IMAGE-EDITING SOFTWARE

Corel Draw Graphics Suite 11

REVIEW July 2003, p128 RRP £457.08

(£389 ex VAT) PRODUCT INFORMATION

Corel www.corel.co.uk



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 RRP £42.24

(£35.95 ex VAT) PRODUCT INFORMATION

Ulead 01327 844 880 www.ulead.co.uk



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.

UTILITY SOFTWARE

Zone Labs Zonealarm Pro

REVIEW February 2003, p73 PRICE \$39.95

(£25 approx) CONTACT Zone Labs

www.zonelabs.com



Building on the success of the free version, Zonealarm Pro offers more security but keeps the easy-to-use interface. However, support is limited to email and it is only available online.





Cracking Windows

WORDS: TIM NOTT ILLUSTRATION: DAVID ANGEL

Discover the hidden depths of Windows and give your PC a much needed boost. *PCW's* Windows expert reveals a multitude of tips on a variety of subjects

Microsoft takes great care to configure the default installation of Windows in a way that new users will find welcoming and easy to use, while steering them away from trouble. Fine for the average user – but you're not an average user. You're a *PCW* reader. You probably turned off the 'Welcome' screen the first time it appeared. In the following pages we're going to show you how to take control of many aspects of Windows. We've got tips for performance, appearance and saving time; sections on safer and untroubled surfing and taking control of email; advice on eliminating annoyances and even some hints and other trivia concerning the Windows games. Many of these tips involve delving into well-hidden dialogues, but there is a section for those attempting Registry editing. We're not going to deluge you with add-ons, but we will suggest some essential utilities for online and offline convenience.

You'll find some tips are for XP only, but there are plenty of others covering 2000, NT4, ME, 98 and 95, and even a section devoted to 3.1 users. Finally, to go with the flow and improve readability, we've listed all the download sites and other links mentioned in the text in a separate box on the last page of this feature.



Before you install Windows

Think carefully about partitioning and formatting your hard disk. When you partition a disk, the operating system treats it as if each partition was a separate drive. There are no 'one size fits all' rules here, as everyone has their own requirements, but there are a few general principles. The first is to keep data segregated from programs and the operating system. This has three advantages. First it makes backing up data more straightforward. Second it slows down 'fragmentation' of the hard disk: data files that are frequently changed will occupy non-contiguous areas of physical disk space, slowing down performance. Third, short of a physical disk failure, it's unlikely that corruption on one partition will affect another, so if your Windows system goes catastrophically wrong your data should still be unscathed. If you are planning on creating very large files – for instance video – then these, too, will benefit from a dedicated partition. Finally, it's a good idea to create a small partition – say 1GB – to dedicate to the Windows swap file. If you have more than one physical hard disk, then use the fastest one for this.

We're don't have room to give a blow-by-blow account of using Fdisk, the partitioning tool that ships with Windows, but Windows 95/98/ME users can find full instructions by going to Microsoft Support and searching the Knowledgebase for Article ID 255867 (see screenshot 1), and there's an XP version in article 313348. Having partitioned a disk, you then need to format it – again, the details can be found in the above articles, so we'll just concentrate on the issues. Windows hard disk formats come in three flavours. The oldest, Fat16, became obsolete with the Service Release 1 of Windows 95, so you should only encounter it on very old PCs with small hard disks: it doesn't support partitions greater than 2GB. Its replacement, Fat32, supports much larger partitions and makes more efficient use of cluster size – the minimum physical storage unit on a disk – so small files take up less space (see screenshot 2). When you partition a disk for Windows 95 SR2, 98 or ME, you'll be asked if you want to enable Fat32, also known as 'large disk support' – unless you are creating a partition of less than 512MB, you do.

Windows NT, 2000 and XP users have a third option, NTFS. Originally developed for the corporate market,

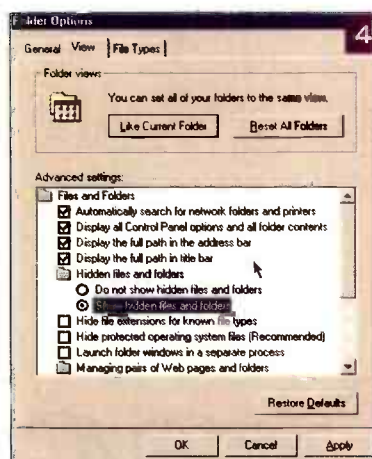
NTFS has several advantages over Fat32. First, it is more robust: as a 'journalled' file system in which all disk transactions are logged, the risk of losing data is smaller, and you can recover from a power failure, for example, more easily and reliably. Second, it supports encryption: you can password-protect files and folders. Third, unlike Fat32 it doesn't impose a 4GB limit on file size – although this sounds huge, it only represents 20 minutes of high-quality video. NTFS file size is limited only by the maximum partition size of two terabytes (see screenshot 3). One drawback is that Windows 95/98/ME won't see an NTFS partition, so bear this in mind if you are planning to set up a dual-boot system.

First things

With a fresh installation of Windows there are certain things you can do before installing any applications which can pay handsome long-term dividends. First, take control of Explorer. You're a power user, right? So you're not foolish enough to delete essential files and you want to be able to see exactly what files are on your computer and what type they are. So, from Explorer's Tools menu (or View menu in 95/98) go to Folder Options, and click on the View tab. Make sure that 'View all files' is selected and that 'Hide extensions for known file types' is unselected. You might also want to unselect 'Hide protected operating system files' in some versions of Windows. One other little tip here is to 'Display the full path in the address bar': this makes copying paths easy (see screenshot 4).

The next candidate is the Windows swap file.

This is a file that Windows uses to cache code that it isn't currently needed in memory but that it reckons might be needed again soon. If you've dedicated a partition for this, as mentioned previously, go to Control Panel, System Properties and turn to the 'Performance' tab. Click the 'Virtual Memory' button. Things are a little different in 2000 and XP – to get to the dialogue in the former, go through System Properties, Advanced, Performance Options and click the 'Change' button. In XP, go to System Properties, Advanced. Click 'Settings' in the Performance section, then the Advanced tab, where you will, at last, find a 'Change' button for Virtual Memory. Now select the 'Let me specify my own virtual memory settings' option, and you will find the greyed-out section



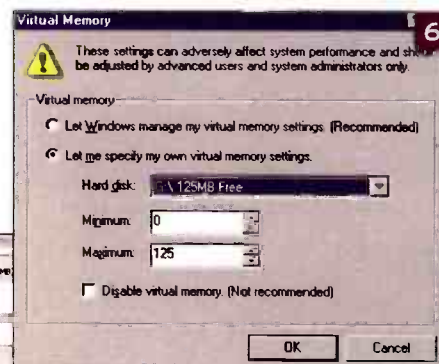
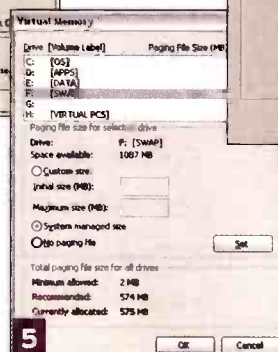
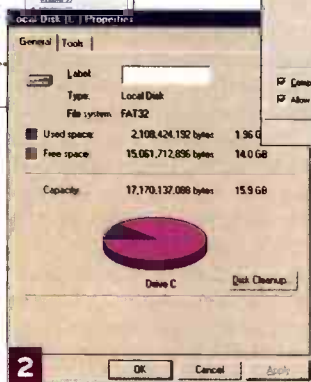
Make sure you can see what you've got



Above: All you need to know about partitioning and formatting

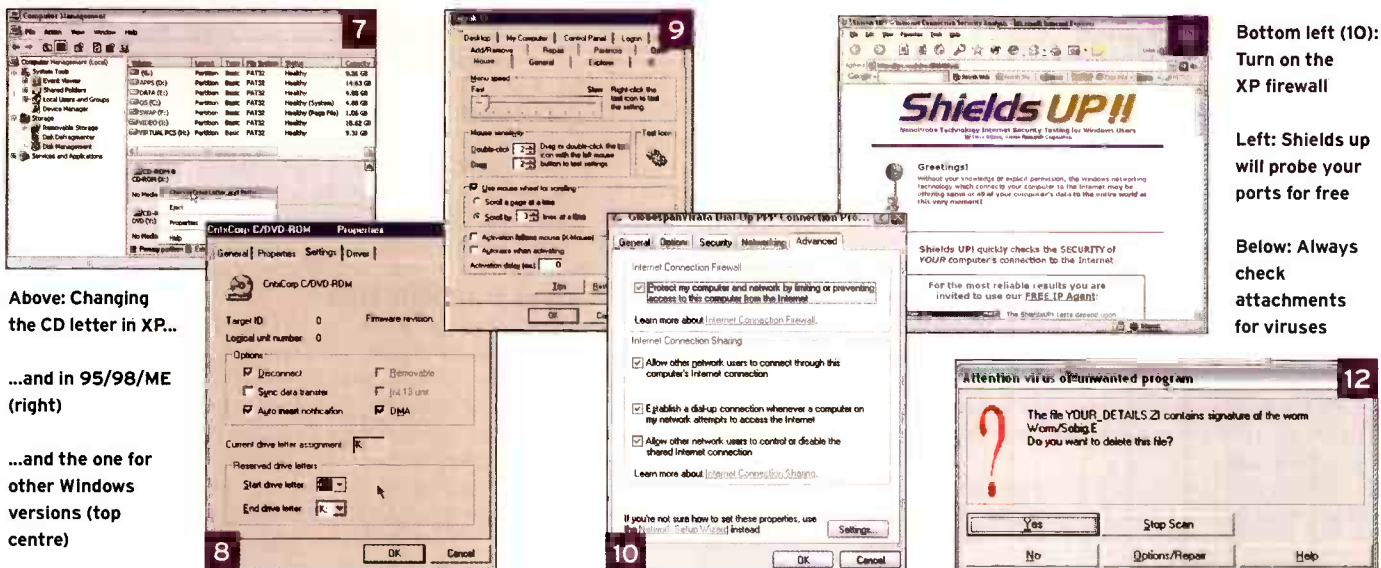
Right: The standard file system for 95SR1, 98 and ME

Top centre: NTFS – for NT, 2000 and XP users only



Above: Setting the swapfile drive in 98

Left: Setting the swapfile drive in XP



Above: Changing the CD letter in XP...

...and in 95/98/ME (right)

...and the one for other Windows versions (top centre)

Bottom left (10): Turn on the XP firewall

Left: Shields up will probe your ports for free

Below: Always check attachments for viruses

of the dialogue springs into life. You can now choose the drive you want for the swapfile: if this contains no other files – or at least no other changing files – this will keep your swapfile unfragmented and fast. In XP and 2000 you can choose more than one drive, but there's little point in this. There's also little point in changing the size settings – Windows tends to manage the size of the swapfile efficiently and these are best left alone. If you then OK the changes (and confirm you want to do this at any warning message), when you return to the dialogue, you'll see that once again, Windows is managing Virtual Memory settings, but on the partition of your choice (see screenshots 5 and 6).

The next thing to take control of is your CD and DVD drive letters. By default, these start at the first available letter after your hard disk partitions. This is fine until you add extra storage – another hard disk or removable device – when they will get bumped down the alphabet. Consequently every application that expects to find a CD in drive D:, for example, won't find it. Although most software will let you browse to the new location, and then remember that for future occasions, it's still a pain. So, forestall this by going to System Properties, Device Manager. Select your CD-Rom or DVD drive from the device list, open its Properties and click on the Settings tab. In the 'Reserved Drive Letters' section set both boxes to the letter you want to use for that drive. OK out and repeat for any other CD or DVD drives – though obviously not with the same letter. Close the System Properties dialogue and restart the PC. Once again XP and 2000 do things differently, so run Computer Management from the Administrative tools. In the Storage branch, select Disk Management and you'll see, in the right-hand pane, a list of all your hard disk partitions and other drives. Right-click on the CD drive(s) and choose 'Change Drive Letter and Paths' (see screenshots 7 and 8).

Essential utilities

We're not going to go mad with add-ons, but there are certain things that you can't do without and many of them are free. Your first item on the download list should be Tweak UI. This comes in two versions – one for XP and

another for all other versions of Windows. Both are free, and at the XP download page you'll find several other 'Powertoys' that you may find useful. With either version of Tweak UI you can change many settings that can't normally be reached within the Windows interface without editing the Registry. To take a few examples, you can remove the arrows on shortcut icons, log on automatically, change thumbnail display size, hide system icons on your Desktop, hide drives, get rid of the 'ghosts' of programs that have been uninstalled but still appear in the Add/Remove list and much more (see screenshot 9).

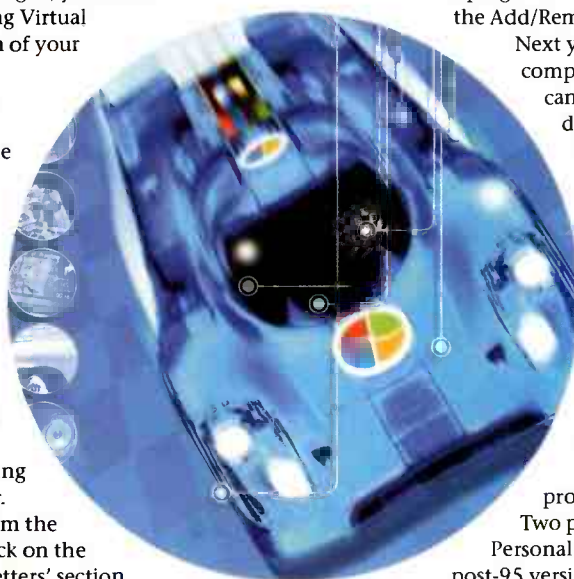
Next you need a firewall: this protects your computer from assaults across the Internet, and can monitor outgoing traffic, such as unwanted dial-ups. XP comes with a built-in firewall: although this only blocks incoming access it should be adequate to keep intruders at bay. But you do need to have the latest version: that included in the XP SP1 update and you need to make sure it is turned on: go to the properties of your dial-up or broadband connection, turn to the Advanced tab and make sure the box marked 'Protect my computer and network by limiting or preventing access to this computer from the Internet' is ticked (see screenshot 10).

If you are not using XP or you want better protection, then install a third-party firewall.

Two popular free ones are Zone Alarm and Kerio Personal Edition: both are free and work on all post-95 versions of Windows. Don't just trust your firewall – test it. If you go to the Gibson Research website you'll find two tests – Shieldsup and Leaktest – that will probe respectively for incoming and outgoing security holes (see screenshot 11).

Virus protection is another essential. We're not going to go into great detail on products as we ran a group test in August's issue, but another good free personal anti-virus product is Antivir. Do remember to keep the signature files up to date: most packages have an option to automate this.

Always run an 'on-demand' check on files you have downloaded from the Internet or received on disk before you open them: most virus checkers add an item to the right-click menu for this (see screenshot 12). Don't open unknown attachments, even if they come with an email from someone you know: most viruses propagate through people's address books.





Pop go the pop-ups

Pop-up advertisements that appear uninvited in small browser windows are a bane of online life and, sadly, even respectable sites such as *The Economist* and the *Financial Times* seem to be using these. Fortunately there are ways of stopping this. Pop-up killers seem to have become a major industry. You'll find dozens with a web search, but few of these are freeware. Two that are free are the Proxomitron (see screenshot 13) and the Google Toolbar 2.0, which at the time of writing is in beta version.

Alternatively, consider using a different browser. Opera, for example, comes in two flavours – a free version that is subsidised by banner ads (though it isn't spyware) and a paid-for version that sells for \$39 (approx £24). This has some excellent features such as tabbed web pages and a set of quick options to block unwanted pop-ups (see screenshot 14).

Mozilla, the free version of Netscape, also has tabbed pages and a pop-up killer. Though the latter is more trouble to configure than Opera, you don't get any banner ads. Finally, some firewalls (but not the free versions) come with pop-up killers, so you could solve both problems with one purchase.

Cosmetics revamp

You'll either love or hate the XP interface. The default blue theme is pretty eye-watering for over-fives, and the Display Properties dialogue is, to say the least, confusing. However, if you stick to the Windows XP theme in the Themes tab then go to the Appearance tab, you can change the colour scheme to olive or silver. If you then hit the Advanced button, you can downsize the Active and Inactive title bars. If you change these to 22point the standard window buttons become rather less obtrusively toy-like (see screenshot 15). Incidentally, when in Display Properties you can save a lot of time by making all your changes in the separate tabs before hitting the 'Apply' button.

Transparent icon titles are one of the more elegant features of the XP Desktop – no more rectangles of colour spoiling your carefully chosen wallpaper. Finding out how to turn this feature on is something of a challenge. You need to go to System Properties, Advanced, and click the Settings button in the Performance section. On the next dialogue, turn to the Visual Effects tab and choose the Custom option. Near the bottom of the list you'll find 'Use drop shadows for icon labels on the Desktop' – that's the one. This also works in Windows 'Classic' style. Users of other versions of Windows can

download Jay Guerette's tiny (25KB) Transparent utility (see screenshot 16).

If you don't like the names 'My Computer' and 'My Documents' you can change them from the right-click menu. More importantly, in view of what we said earlier about segregating data and programs, you can change the location of the latter as it's just a pointer. Right-click, choose Properties and you'll be able to specify a different target folder.

Recycle Bin tips

The Recycle Bin gives you the chance to recover 'deleted' files, so unless you're a real belt-and-braces type you probably won't want the bother of confirming each time you send files to the bin. Right-click on the bin icon, select Properties, and you'll get the option to turn confirmation off (see screenshot 17). You can also, should you wish, set limits on the size of the Recycle Bin either on a per-drive basis or globally. When the bin reaches this limit, the oldest items are removed to make room for new ones. You'll still get a confirmation dialogue when emptying the bin, or deleting a file too big to go in the bin, as this permanently removes the item.

Two more bin tips: although you can drag-and-drop items on to the bin icon, this is unnecessarily cumbersome and, as with a real bin, can make a lot of mess if you miss.

Just highlight the files and press the Delete key.

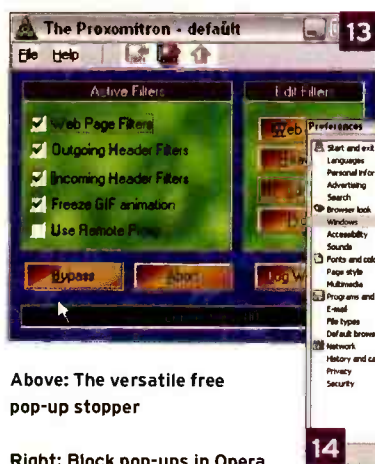
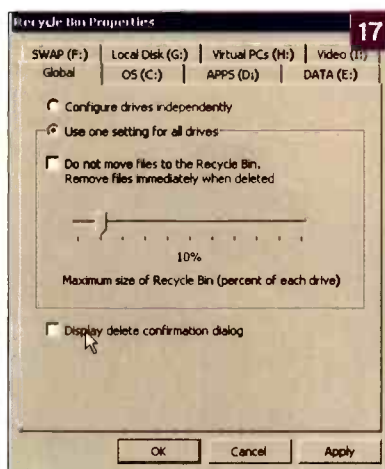
If you are certain you no longer want a file, then Shift + Delete bypasses the bin, sending the file straight to oblivion. Finally, on a related matter, don't forget the very useful Undo command on the right-click menu in a folder or on the Desktop. This works on all file actions, not just recycling, and keeps the last 10 actions in memory during the current Windows session. Better still, an action involving multiple files or folders can be reversed with a single Undo, making this an excellent way of recovering from drag-and-drop mishaps.

Send to flexibility

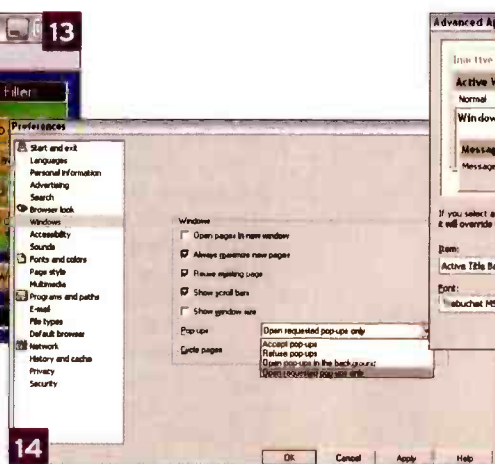
One very useful feature is the ability to right-click on a file and send it to various destinations, such as a floppy disk or to a Desktop shortcut. What isn't so obvious is that you can add your own destinations by opening

the Send To folder and creating appropriate shortcuts. The folder's location depends on the version of Windows, so the easiest way to find it is to type 'SENDTO' into the Start, Run box. You are not limited to sending files to a destination on disk – you can also send them to a program. A shortcut to Notepad, for example, is the

Below: Turning off confirmation



Above: The versatile free pop-up stopper



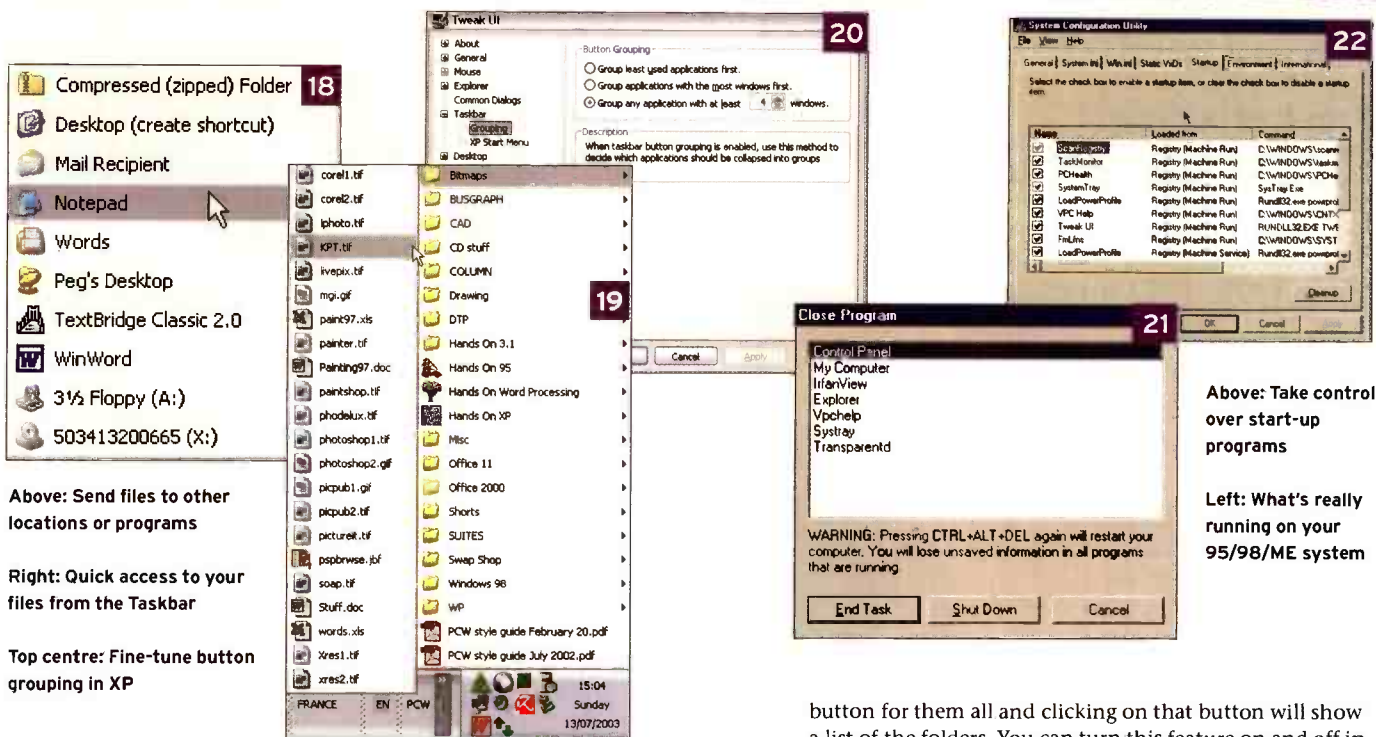
Right: Block pop-ups in Opera



Left: Shrink those chunky XP buttons

Below: You don't need XP to have see-through icon titles





Above: Send files to other locations or programs

Right: Quick access to your files from the Taskbar

Top centre: Fine-tune button grouping in XP

Above: Take control over start-up programs

Left: What's really running on your 95/98/ME system

quickest way to examine a non-standard (eg 'readme.1st') text file or investigate a mystery script or batch file that might have harmful content (see screenshot 18).

Start Menu and Taskbar

Most readers will be adept at finding their way around the Start menu, so we'll skip the basics and get straight on to the power tips. In Windows 98 and later you can drag items up and down in a Start menu sub-folder. You can also right-click and arrange them alphabetically. Also, you don't have to right-click and Open the Start button to add items: if you drag a shortcut onto the Start button the menu will open after a short pause and you can continue dragging the shortcut through the menu structure.

One of the most handy features in Windows 98 was the addition of items such as the Quick Launch toolbar to the Taskbar. But you aren't limited to the standard bars on offer as you can drag any folder on to the Taskbar. Though this may seem a fairly pointless exercise, it's extremely useful if done right. Let's say you have a folder where you keep documents or a music collection. Drag this out of Explorer and onto the Taskbar – you may have to hunt around with the mouse to get rid of the 'no parking' cursor. When you've dropped the folder, you'll see its title, and some of its contents, including sub-folders, ranged alongside. Right-click on it, and make sure you have 'Show title' ticked and 'Show text' unticked. You'll now see a selection of indistinguishable folder or file icons, which may not look promising, but bear with us. Grab the handle of the new toolbar (the raised or dotted vertical bar at its left edge) and drag this to the right until just the folder name and a double arrow are visible. Click on the latter and you'll get a list of the folder contents in menu form. Clicking on a sub-folder in this menu will open a cascading sub-menu, and so on all the way down (see screenshot 19). Although you don't get any file details, it's a faster way of digging down to a document or populating a music playlist than using Explorer. This process doesn't change the location of the folder on your hard disk but, unlike the Quick Launch toolbar, the entries aren't just shortcuts: a right-click followed by Delete or Rename will affect the file or folder itself. Finally, as with the Start menu, double-clicking on a folder will open it in Explorer.

XP has a useful feature to group Taskbar buttons – if you have several folders open, for example, you'll get one

button for them all and clicking on that button will show a list of the folders. You can turn this feature on and off in Taskbar properties, but if you want to fine tune the settings look in the Taskbar section of TweakUI (see screenshot 20). You can close all members of a group at once from the right-click menu. Although earlier versions of Windows don't have this feature, in Windows 98 and later you can press Control and then click to select multiple Taskbar buttons and then right-click to close them all with a single command, regardless of whether they are folders or programs.

Startup housekeeping

Programs that load automatically when Windows starts are a mixed blessing. Some, such as virus scanners may be essential. Others, such as Transparent, may be desirable. Some, such as third-party applications that 'phone home' to check for new versions every few hours are a pain in the neck. And others still, such as programs that persistently reset your browser home page and search engine, are unequivocally malware. All consume resources and slow down booting, so it's a good idea to take a hard look at what's running on your computer.

If you press Control & Alt & Delete after starting Windows but before opening anything else, you'll see a list of all running programs (see screenshot 21) – on XP you'll get 'Services' as well. On a barebones system with no folders or applications this will consist of just Explorer – which runs the Start menu and Taskbar – and Systray – which manages the icons shown in the System Tray, next to the clock. You will almost certainly see several more: these programs will have been started by shortcuts in the Startup folder or 'Run' keys in the Registry. Windows 98 and later provides a way of checking all of these sources at once. The System Configuration Utility is buried deep in the System Information menus, but can be more easily run from Start, Run, msconfig.exe. Turn to the Startup tab and you'll see a list of programs that start with Windows. If you clear the check box next to an item, it won't load next time you boot, but will stay on the list so you can re-enable it. You may need to do some detective work on the commands to find out what each program is. And don't worry if you find two entries for LoadPowerProfile and TweakUI – these are both needed (see screenshot 22). Unfortunately some of these will keep coming back, as the parent application reinstates them, so you either have to uninstall the parent, or check MSCONFIG regularly.



Pain-free updates

From Windows 98, Microsoft made keeping your PC up to date with all the various patches and fixes a relatively pain-free business. However there are a couple of things you need to know. First, don't be in too much of a hurry. Occasionally, updates can cause problems, such as the 811493 security patch for XP, issued earlier this year, which caused PCs with certain anti-virus software to slow down dramatically. This was later corrected, but it was a source of trouble for early adopters. Bad news travels fast, so postpone updates for a few days and keep an eye on reliable news sites such as PCW's. If you have a problem with updating, then Microsoft has an extensive troubleshooting section at the update site.

Although the automated download-and-install process makes updating effortless, there may be reasons you would rather download the update and keep the file – you may want to install it on more than one computer, or you may be planning to reinstall Windows. In this case, connect to Windows Update and in the left pane click on 'Personalize'. This will produce an option to 'Display the link to the Windows Update Catalog under See Also'. Check the box, and click the 'Save Settings' button above. You'll then have access to the Update Catalog, where you can download and save updates for any supported version of Windows (see screenshot 23).

OE identities and beacons

If more than one person is using OE each can have an 'Identity', complete with their own message folders and address book. You don't need to have multiple users enabled in Windows and each identity can be password protected for privacy. It's very simple to set this up: go to File, Identities, Manage Identities... and click the New button. After supplying a name, and an optional password, OE will restart in the new identity, and a wizard will prompt for the details of the email account. Make sure that the 'Use this identity when starting a program' box is not checked (or choose 'Ask me' in OES) and that, when using XP, you quit OE by going to File, Exit and Log off Identity, rather than just closing it. This

way OE will prompt for an identity whenever it is started (see screenshot 24).

One problem with OE for dial-up users is the way it can attempt to reconnect after you have done a 'Send and Receive All' and then hung up. The usual reason for this is that a message contains a reference to a file on a remote server, such as a graphic – or, rather more worrying, a 'beacon' that will confirm your existence to the sender. You can check if this is the case by right-clicking on the message in the list and choosing Properties. When the Properties dialogue appears, click on details then click the Message Source button. You'll get a new window full of raw HTML. If there's code of the form

```
src= "http://www.server.com/
folder/graphic.gif"
```

then that's what is 'phoning home'. One solution is to work offline (File menu) – you won't get reconnected until the next 'Send and Receive' and the remote graphics will appear as empty boxes. A less fiddly and more drastic remedy is to go to Tools, Options, Read and check the option to 'Read all messages in plain text': to get this you'll need the Internet Explorer Service Pack 1 installed (see screenshot 25).

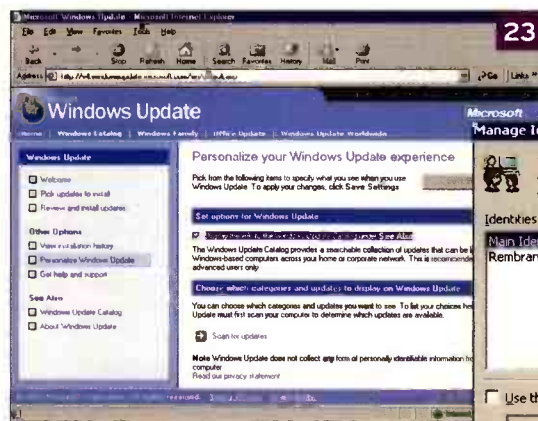
The SP1 update will also give you the opportunity to block access to potentially hazardous attachments (see screenshot 26).

As with many OE settings, this option can be set on a per-identity basis, so you can allow access to attachments under your own identity while protecting less-experienced users from being hoodwinked into opening a virus.

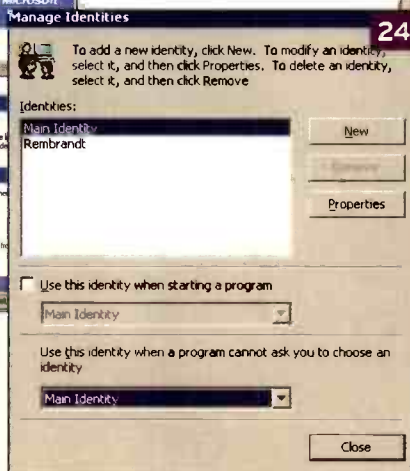
Finally, don't forget this tiny tip: a shortcut with just 'mailto:' in the command line will open a 'New Message' window directly in OE or your default email program.

Exploring Explorer

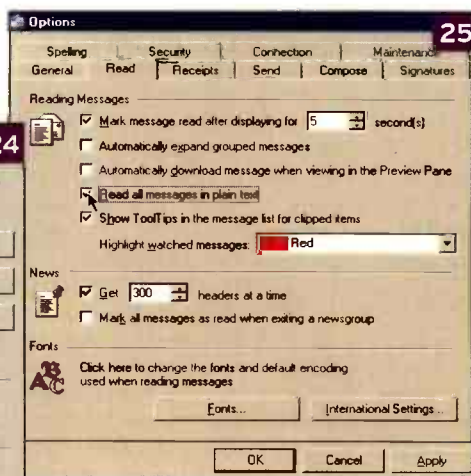
In all versions of Windows, what you see in Explorer – even with 'Show all files' checked – may not reflect the true contents of a folder. Shortcuts, for example, still have their .lnk file extension suppressed, and the History folder still contains invisible .dat files after being cleared. In these cases, you can't beat the old Windows 3.x-style File Manager, which tells the truth, the whole truth and nothing but the truth (see screenshot 27 and 28).



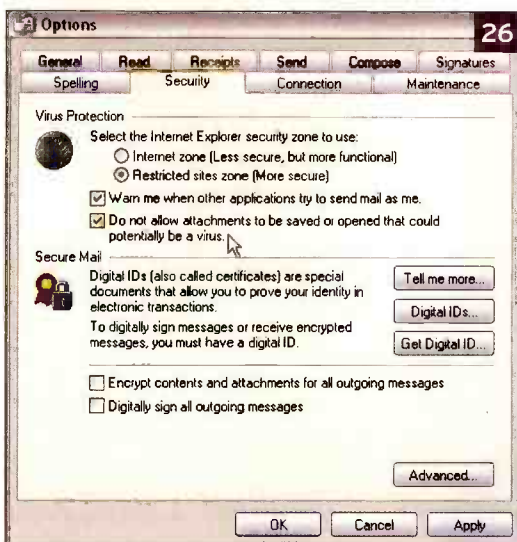
Above: Download and save those updates



Right: Keep your mail private with Outlook Express Identities



Far right: Stop messages 'phoning home'

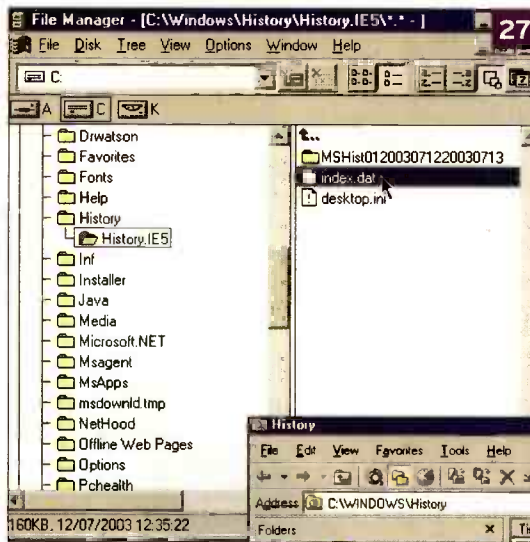


Although it doesn't have a Start Menu shortcut by default you can find winfile.exe in the Windows folder of 95, 98 and ME. See the Windows 3.1 boxout below for details of how to get it to show you everything. One snag about Winfile is that it doesn't support long filenames, but that can be rectified with a free add-on with the snappy name of FmLfn 1.1. Windows 2000 and XP don't come with File Manager, but the old NT version will work with them and support long file names.

Upgrading to Windows XP

If you don't mind spending some money, and your hardware is up to it, then the most dramatic improvement you can make to Windows is to upgrade to XP. If you are running Windows 98 or ME then you can buy an upgrade version of XP Home or Pro. Similarly, NT4 and 2000 users can upgrade to XP Pro, (but not Home) and XP Home users can upgrade to XP Pro. Users of earlier versions will have to buy the full version, but in any case it's doubtful that a PC bought in the days of Windows 95 or NT 3.5 will be adequate for XP – the minimum specification is a 300MHz processor, 128MB of Ram and 1.5GB of free disk space. You can do a clean install of an upgrade to a reformatted hard disk: the XP installation will prompt you to insert the CD for a qualifying product, such as ME or 98.

At the time of writing an XP Home upgrade costs around £85 or £165 for the full version and the Professional around £165 for the upgrade or £250 for the full version, so it's important to make the right choice. The main advantages of the Professional edition are



Left: Restrict access to dangerous attachments in Outlook Express

Rewriting history – as Explorer sees it (right) and as File Manager sees it (above)



support for large networks (including user/machine policies), multiple processors, remote access and file encryption. You can find a complete account at the Microsoft XP Upgrade Centre, but in general if you're a home or small business user on a standalone machine or workgroup network, then Home should prove adequate.

If you have cherished older applications, such as Dos-based games, check they will run under XP. Although XP has a 'Compatibility Wizard' for older software, it's not a panacea. One solution to this is to set up a dual-boot machine. For this you need at least two disk partitions. Install Windows 98 or ME, as normal, to C: then install the older applications here. Then install XP: you'll be asked if you want to upgrade the existing version of Windows or install XP to a separate partition. If you do the latter, you'll be presented with a choice of operating systems at start-up – you don't need additional boot management software.

Working with Windows 3.11

Here are some tips that will greatly improve the quality of Windows 3.x life. In File Manager, go to the View menu and check that 'Tree and Directory' and 'All File Details' are ticked. In the same menu, click on 'By File Type...' and in the next dialogue check that the 'Name' box shows *.* and that all other options are checked. This will give you a full view of the files on your computer (see screenshot right).

Next get the child windows arranged the way you want them to appear whenever you start File Manager. A single click on a drive icon opens that drive in the same child window. A double-click opens a new child window and you can arrange these any way you want within File Manager. Beat that, Explorer. Having got things the way you want, go to the Options menu and tick 'Save settings on exit' option. Now close File Manager then open it again and untick the 'Save settings...' option. This will ensure that File Manager will always open in your ideal layout, rather than the mess you last left it in. You can apply the same trick to Program Manager, though closing it will mean you have to restart Windows.



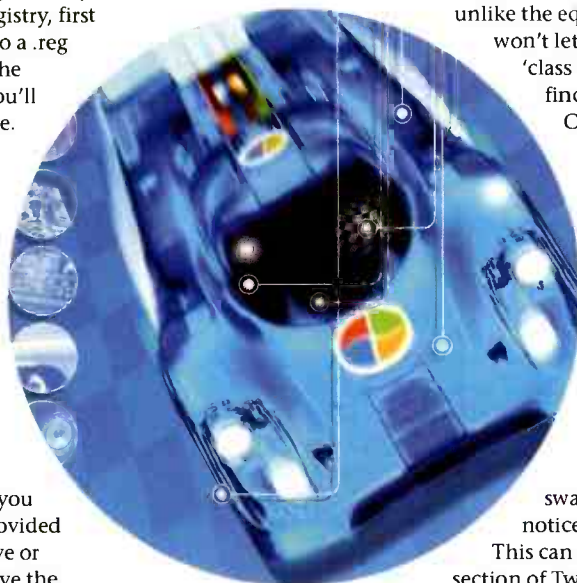


Hot stuff in the Registry

In this section we look at some trickier ways of penetrating to the heart of Windows. Some of these tips involve Registry editing, so the usual precaution applies: back up the Registry before editing. If you are running Windows XP or ME then you can create a System Restore point. In Windows 98 or ME, you can type 'scanregw.exe' into the Start, Run box to get the opportunity to back up. In Windows 95 you have the choice between the Emergency Recovery or the Configuration Backup utilities. You're now ready to hit the Start button, choose Run and type in regedit.exe.

Power regedit users have another safeguard. If you are about to change a key or value in the Registry, first select the containing key, and export it to a .reg file from the Registry menu. Make sure the 'Selected Branch' option is checked or you'll export the whole thing to a very large file. This .reg file can then be used to undo any changes you subsequently make to that branch by right-clicking and merging it back into the Registry. Note that for the sake of brevity we use the standard abbreviations HKLM and HKCU for the HKEY_LOCAL_MACHINE and HKEY_CURRENT_USER sections of the Registry.

One common irritation is the branding of Internet Explorer and Outlook Express by ISPs. You're paying them money every month: why should you be grateful that IE and OE have been 'provided by Dearsurf'? There are utilities to remove or customise the branding, but why not have the satisfaction of taking matters into your own hands? Go to HKCU\Software\Microsoft\Internet Explorer\Main. Select the 'Window Title' string value in the right pane and delete it. If the toolbar background and the animated logo top right are also branded, then you



can remove this from the HKCU\Software\Microsoft\Internet Explorer\Toolbar key. Here you'll find the following string values. BrandBitmap and SmBrandBitmap set the path to the large and small versions of the spinning logo. BackBitmap and/or BackBitmapIES set the toolbar background. You can delete these to revert to the IE defaults. For the Outlook Express title, go to HKCU\Identities\[identifier]\Software\Microsoft\Outlook Express\5.0, where [identifier] is a 32-character hexadecimal number. Here you'll find a string value named WindowTitle, which again you can delete. If you have more than one Identity set up in OE, repeat for each.

Many people find 'Recycle Bin' a pretty lame name. And unlike the equally irritating 'My Computer' Windows won't let you rename it. So, browse down to the 'class identity' of this object, which you will find at HKEY_CLASSES_ROOT\

CLSID\{645FF040-5081-101B-9F08-00AA002F954E}. Click on the ShellFolder subkey and then double-click on the Attributes value in the right-hand pane. Change this from 40 01 00 20 to 50 01 00 20. Close the Registry editor and you'll find that the Recycle Bin right-click menu now has a working 'Rename' entry (see screenshot 29). This does not appear to work in XP, as there is no 'Rename' entry, but if you select the Bin and press F2 you will find that you can rename it.

A common Windows malady is the swapping of icons: this is particularly noticeable on the Quick Launch toolbar.

This can be mended either from the 'Repair' section of Tweak UI, or by changing a setting such as the icon size or colour depth in Display Properties, applying the change, then changing it back. Both these methods rebuild the icon cache. For a permanent cure you can change the size of the icon cache. Go to HKLM\Software\Microsoft\Windows\CurrentVersion\

Games people play

As we all know, the real reason for buying Windows is to play the games that come with it. So here is a brief selection of hints, cheats and other trivia to help you get the most out of your timewasting.

We'll start with Solitaire, the original that came with Windows 3. If you check the 'timed games' option, you'll find that some of the card backs are animated. Not all the animations are continuous, so watch out for surprises. If you're playing the grown-up version, turning over three cards at a time and the card you need obstinately refuses to come to the top, then do what any intelligent person would do: cheat. Hold down Control & Alt & Shift as you click the pile and a single card will be turned. XP users don't get the animated backs, but as in 2000 can save effort by right-clicking – all eligible cards will then be moved up to the stacks.

There's a rather lame cheat in Freecell to fake a win if you press Control & Shift & F10. But don't spend too much time on game number 11982 (see screenshot above right). According to a sadly dedicated group of players on the Cix conferencing system, it's the only game that isn't solvable. And if you don't know whether that buried Ace is a heart or a diamond, right-click on it.

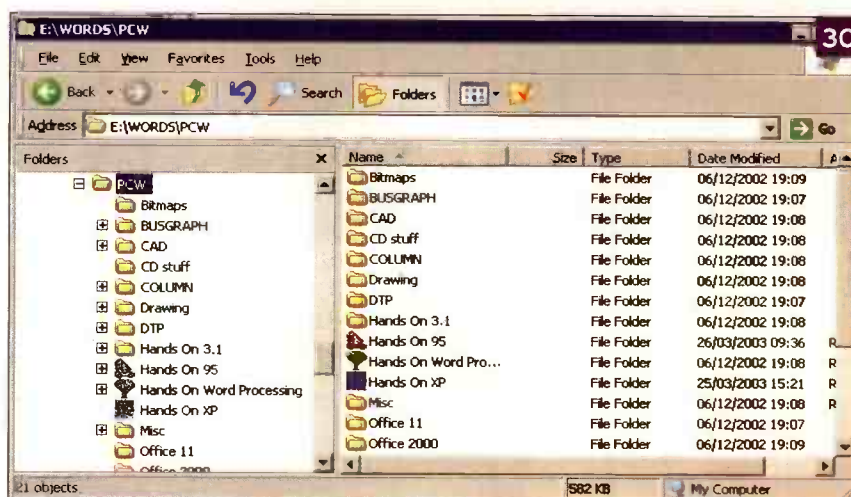
This is not really a cheat for Spider Solitaire, but if you hit F2 to start a new game before you move any cards, you don't get the confirmation dialogue and the game isn't added to the statistics.



This one's a certain loser so don't waste your time on it

So you can prevent a 'four-King hell' deal from spoiling your run of wins.

Finally, here's a definite cheat for Minesweeper. Type 'xyzzzy' and then hold down the Shift key. The top left pixel of your Desktop will light up when you move the cursor over a safe square. You'll need a dark background and acute eyesight for this.



explorer and add a new string value named 'Max Cached Icons' (don't type the quotes). Double-click on this and give it a value of 2048.

In the Start Menu section, we mentioned sorting the menus by name. The only problem with this is that you have to do it for every Start Menu sub-folder. Power users can hit the lot at one swoop by going to HKCU \Software\Microsoft\Windows\CurrentVersion\Explorer\MenuOrder and highlighting the Start Menu key. Delete this key and the Start menu and all its sub-menus will revert to alphabetical order. The same trick works with the Favorites key, and both these keys will be recreated if you change the order manually.

Custom folder icons

Here's a tip that requires accurate typing but no Registry tweaking. Windows provides custom icons for special folders, such as My Documents and Favorites. You don't have to settle for the default yellow folder icon for folders that you have created yourself in Windows 98 or later, and it can be very useful to have your most-used document folders sporting a distinguishing icon (see screenshot 32). First you need to create plain text file in Notepad. Type in the following:

```
[.ShellClassInfo]
IconFile=
IconIndex=
```

and save this with the name desktop.ini in the folder you want to customise. Next, catch your icon. The easiest way to do this is to copy an .ico file to the folder (in fact a .bmp file works just as well) and type its name after IconFile=, then type a zero after IconIndex=.

If you want to use one of the Windows icons stored in the system files, then this needs a little more cunning. First, select any shortcut on your system, right-click on it and choose Properties. On the Shortcut tab, click the Change Icon button: don't worry because you are not actually going to change the icon for that shortcut. Hit the Browse button and go to Windows\System\Shell32.dll (in Windows XP and 2000 this file is in the Windows\System32 folder). Now choose an icon from the selection available. From the top-left icon (which is number 0) count down, then across to the next column and so on until you reach the object of your desire. Type this number after IconIndex=, and the full file path, which you can copy from the Change Icon dialogue, after IconFile=. Save the changes to desktop.ini, and cancel the 'Change Icon' dialogue for your shortcut. If you are feeling adventurous you can explore other files for icons: progman.exe has some rather colourful ones.

Above left: You can rename the Recycle Bin with a Registry tweak

Above right: Personalise your folder icons

The final step is to set the System attribute on the custom folder. You can do this in File Manager, by selecting the folder and going to File, Properties. Alternatively, you can open an MS-Dos window, navigate to the folder containing the one you want to customise and type `Attrib +s myfolder`. Replace 'myfolder' to suit and enclose it in quotes if it's longer than eight characters or contains spaces.

Useful websites

Antivir www.free-av.com

Fmlfns
www.wincorner.com

Gibson Research <http://grc.com/default.htm>

Google toolbar <http://toolbar.google.com>

Kerio Personal Firewall
www.kerio.com/kpf_home.html

Microsoft Support Knowledgebase
<http://support.microsoft.com>

PCW www.pcw.co.uk

Proxomitron www.spamblocked.com/proxomitron

Transparent
<http://home.comcast.net/~jquerette/transparent>

Tweak UI (XP)
www.microsoft.com/windowsxp/pro/downloads/powertoys.asp

Tweak UI (other versions)
www.microsoft.com/networkstation/downloads/powertoys/networking/nttweakui.asp

Windows Update Troubleshooter
<http://v4.windowsupdate.microsoft.com/troubleshoot>

Windows XP Upgrade Centre
www.microsoft.com/windowsxp/pro/howtobuy/upgrading/default.asp

Zone Alarm www.zonelabs.com

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REVIEWS

Toy that talks to your friends

The Finepix 6900 Zoom is Fujifilm's latest high-end digital camera for the consumer market and uses a combination of Fujinon optics and a 3.3Megapixel Super CCD. Aesthetically interesting, it offers powerful manual control and thoughtful features, but with some design oversights to buy one. Full review

PCs for your home

If you're looking for a PC with a laser printer that is suitable for office tasks, take a look at this month's group test. More on that

UPDATE

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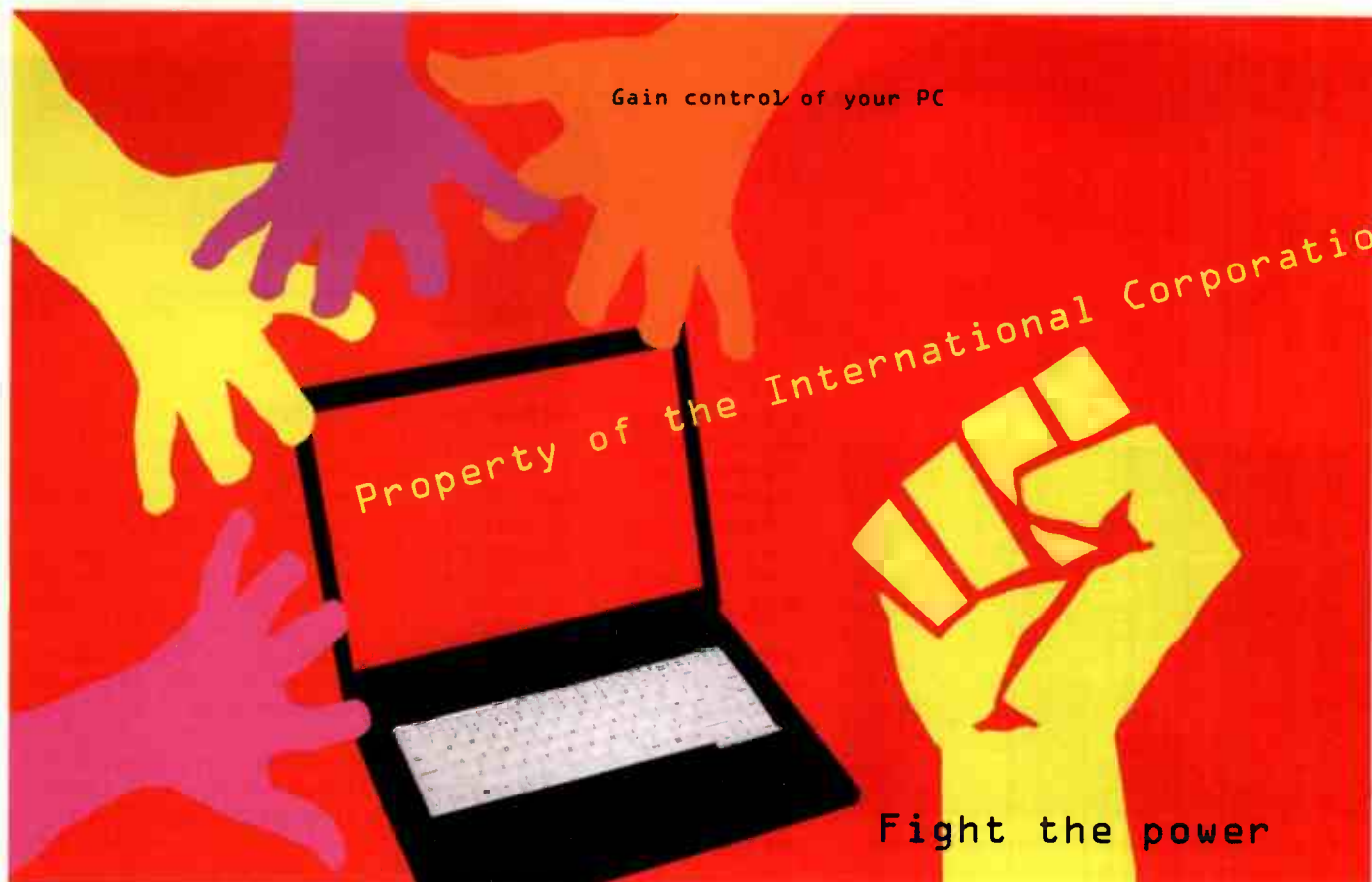
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WORDS: SIMON WILLIAMS

Whose PC is it anyway?

Just who owns the software you run on your PC? Spyware and other programs infringe your privacy or restrict what you do, so should we make a stand?

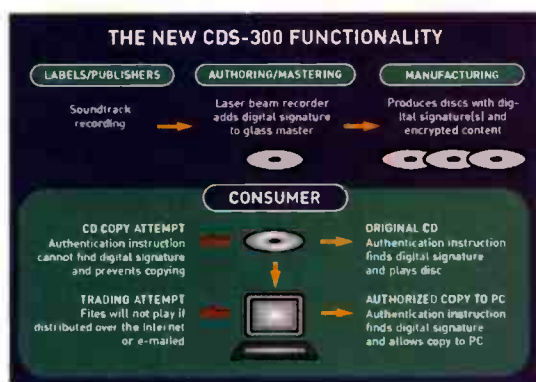
When you buy a PC today, how much of it is actually yours? The hardware, pretty obviously, belongs to you, and you're free to use it where you like, lend it to people, sell it on or give it away. But when it comes to the software and firmware, though, things look very different. In many cases, these elements of your computing life don't belong to you at all, and restrictions are placed on what you can do with them.

Most people are aware of Microsoft's insistence that you authenticate new copies of Windows XP, by ringing the company or contacting it through the Internet, and that you are only buying a licence to use the software. Restrictions on your use of software and media, such as music CDs and DVDs, tie you down still further.

And then there's spyware, used by various Internet sites to maintain all kinds of statistics about your computer use. The companies pushing cookies and other programs onto your computer use them to help sell you things, to target you for marketing ploys and to keep an eye on how you use the web.

This isn't a steady state of affairs, either. New developments, such as the Intel-led Trusted Computing Group (TCG), and its Microsoft friend, the Next Generation Secure Computing Base (NGSCB, or 'enscub'), aim to take this invasion further, by stipulating which software can be run on your PC and refusing to run anything that the software company thinks may be illicit. Do you feel uncomfortable yet?





Macrovision has launched its CDS-300 copy-protection system (see above), which it claims removes many 'unintentional' playing restrictions

A CD-R or CD-RW drive like this (above left) can make an exact digital copy of an unprotected data, music or video CD. Hence the move to copy-protection

Creative's MuVo MP3 player (above right) is one way of taking music with you, and music providers are beginning to realise that MP3 is here to stay

Are all people pirates?

The presumption in these protection regimes is that everybody playing a CD on a computer is intending to make illegal copies. In fact, even though music-swapping Internet services such as Napster and, more recently, Kazaa, have proved so popular, they're used by a tiny proportion of all computer users and many more people legitimately listen to music on their PCs than swap tracks.

Computer manufacturers and sound specialists like Creative and Pure Digital sell their products specifically as being able to reproduce sound from music CDs, and one of the selling points of most multimedia PCs is that you're buying not just a computer but also a complete leisure centre. As well as the serious stuff of your business day, you'll be equipped to view photographs, listen to music, watch DVD movies and play games... if your content providers permit it.

So far, the number of CD titles protected in this way is comparatively small, though the total number of protected CDs exceeds 100 million. As we went to press, it was estimated that there are over 400 CD titles using some form of copy protection. The number is rising all the time, too, with most of the major players planning to release all future CDs only as copy-protected discs. If you want some idea of which CDs are protected, you can find a useful list at <http://fatchucks.com>.

CDs on PCs

Should you be allowed to copy a music CD to your hard drive so that it's handier for you to play it, and should you be allowed to convert the tracks to MP3, so you can take the same content with you on a portable player when you go jogging? You've paid for the CD, but what you really want is the music, so shouldn't you be entitled to listen to this in whatever form is most convenient?

Surprisingly, some people within the music industry feel this is reasonable, too, and some forms of copy protection currently being trialled may allow this. One approach is to include two separate 'sessions' of the music on a music CD.

The first will be a copy-protected full-audio version for playing on standard CD players, while a second session, provided specifically for computer use, could be encoded in MP3 or wma format with extra multimedia features.

One of the ideas here is that by providing the second session, music buyers would even be allowed to make up demo material to email to a friend and encourage them to make a separate purchase of the same CD. The demo would only be playable once.

There is obviously a balance to be hit here between the rights of the purchaser of the music and those of the music provider, who wants to reduce illicit copying.

While the computer user may only be able to hear an

>> Software/CD/DVD copy protection

Keep that music down

When you buy a music CD, you might think it is up to you where you play it. You should be able to play it in a CD player that's part of your hi-fi system, in the car if you have a CD player there and on your computer while you're working. Well, two out of three isn't bad.

Some music companies, such as BMG and EMI, are already using copy protection systems which may prevent you playing their CDs on a PC. When fitted with so-called copy-protection systems, CDs play OK on regular, standalone players, but when you try them on a CD drive in a PC, using the digital output favoured by recent versions of Windows, they can refuse to play. You can get no response at all, or an error message saying the disc is corrupt. Some hi-fi and car CD players are also tricked by the CDs.

The way copy protection typically works is to introduce artificial noise onto the soundtrack of the music CD. The error correction in standalone CD player filters this out, but the digital output read by a PC sees the signal as too noisy to reproduce. Later versions of some of the more popular copy-protection systems claim to permit playback on computer CD players, but there's still a wide mix of different regimes used in the recording industry.

As well as restricting your use of the music on the CD you've bought, you may rightly feel indignant that your CD could be of a lower sound quality than an unprotected CD, because of the noise introduced in the copy protection.



'The presumption is that everybody playing a CD on a computer is intending to make illegal copies'

MP3 or wma version of the music, this might be sufficient if balanced by extra, computer-related features.

Being able to legitimately copy the content of a commercial CD for personal use is enshrined in US fair-use legislation, but only to the extent that individuals can't be sued for copyright infringement when making these copies. There's nothing in the statutes that says recording companies have to make these copies possible. Finding a balance acceptable to both parties could reduce piracy and provide an enhanced experience of the content of a CD.

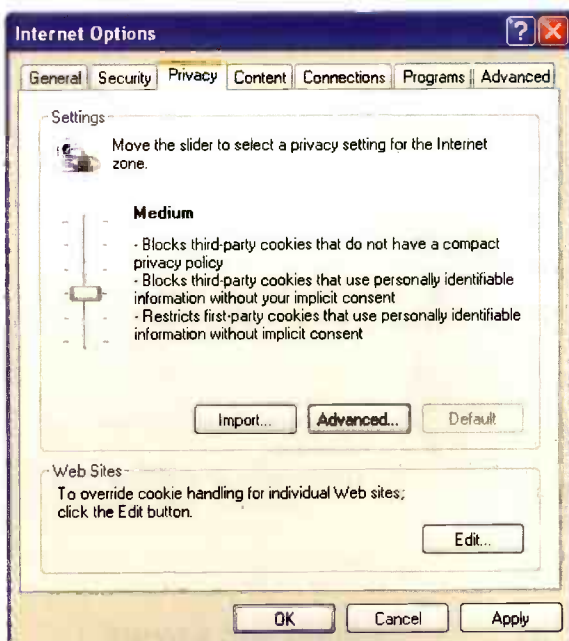
>> Cookies and spyware

The cookie monster

Most of the software you use on your PC has been invited in. When you install a new application, you tacitly give permission to install all the necessary programs that make it up. Similarly, when you download material from the Internet you have actively requested it and accept the files as legitimate.

In some cases, though, files that are downloaded to your computer are not requested and are there to provide benefit to the people putting them there, rather than to you. The simplest of these are known as 'cookies' – the term derives from the 'magic cookie' objects used in Unix.

In their simplest form, cookies contain information you have provided to a website, which the site's server then stores on your computer for future reference. It might help to provide a personalised welcome page the next time you visit the site, or to determine which ads to display, based on previous transactions. You can delete cookies at any time from within Internet Explorer or Netscape and make the browsers refuse to accept them (see screenshot below).



By altering the privacy level in Internet Explorer, you can banish all cookies. You may not be able to access some Internet sites, though

An awkward legacy

Connecting external devices to your computer relies on compatible plugs and sockets and the standards which drive them. For many years, printers have been connected to computers using a parallel interface. Similarly, external devices like modems have been connected through serial ports and small amounts of data have been carried around on 1.44MB floppy disks.

All of this is now changing, as Intel tries to remove the so-called 'legacy' connections. It intends to remove serial ports, parallel ports and floppy drive interfaces from future system board designs, and where Intel leads, other manufacturers normally follow.

There's no real reason for a Luddite revolt against these changes, as the replacements for all three standards are already in place and offer considerable improvements. Parallel and serial ports have been replaced by USB2 and Firewire (IEEE 1394), which offer fast serial access for printers, scanners and all kinds of external storage.

The requirement for removable disks that the floppy provided for so long has now largely been superseded by CD-R and CD-RW discs. With much higher capacities and similar cost, these two media represent faster and more convenient removable storage than the disk they're set to replace.



Out with the old and in with the new, at least as far as removable storage is concerned: Intel will be killing off the floppy drive soon

This ploy may help you remain anonymous on the Internet, but may also prevent access to certain sites. Some online banking facilities, for example, refuse to work if cookies are turned off. Cookies can't be used as agents for viruses or Trojan horses, but they can access your hard drive to check certain aspects of your system, and many people find this intrusive.

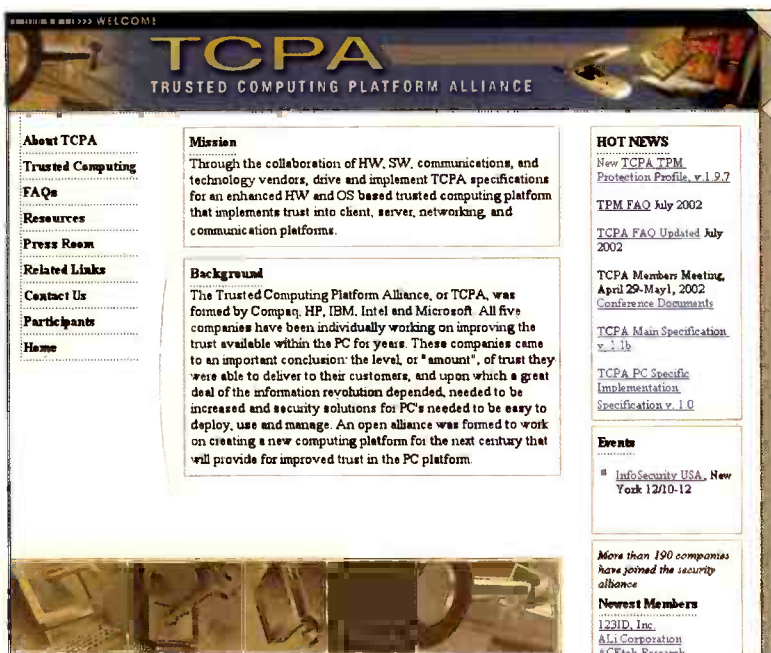
More onerous is so-called spyware, which extends the power of cookies to examine how you make use of the Internet. This information, usually used for advertising, is sent back to its owner to build up a profile of the things that interest you, so that you may be targeted for email or pop-up advertising. This kind of program works similarly to many Trojan horses.

>> Trusted and legacy-free computing

Trust me, I'm a PC

Two new developments by major hardware and software suppliers are perhaps the most worrying of all restrictions on computer use. They go under the umbrella term 'trusted computing'. The Intel-founded TCG, formerly the Trusted Computing Platform Alliance (TCPA), is the less worrying of the two. The Alliance (home site www.trustedpc.org) includes Compaq, HP, IBM and Microsoft, as well as Intel itself.

The idea behind this project is to produce a PC platform which is 'trusted'. In its least contentious form, this means that a TCG computer will perform a series of tests at start-up, to ensure all its components are correct and untampered with. It will do this by checking components



against a list of approved parts. It also checks that the software components have been authorised and that their serial numbers are legitimate.

In the same way Windows XP may refuse to authenticate your PC if you make substantial changes to its configuration, a TCG computer may well need to check things out when you change components. By making these checks, a TCG computer can ensure it's started up into a known state and, according to the proposed standards, is fit to handle secure documents and to exchange information with other trusted computers.

The second development, NGSCB, previously code-named Palladium, takes this idea further by checking all your software licences and reporting to third-party media suppliers, such as music or movie download sites, that you have an approved player and are entitled to make use of any content you request. From one point of view, none of this sounds too bad, and you can see the advantage to

The Trusted Computing Platform Alliance aims to make PCs more secure

The book analogy

One analogy that used to be made quite regularly to demonstrate a fair-use regime for software was that of the book. The argument ran that when you buy a book you can read it, lend it to a friend (without retaining a copy yourself) and sell it on second hand, individually or as part of a library.

To most people, this seems reasonable. You have paid for a copy of the book and, as long as there's only ever one copy around, you should be allowed to use it and dispose of it as you see fit.

As far as copying a book goes, the UK copyright law means you'd be hard put to find a library prepared to let you photocopy a complete book. In any case, it would be likely to cost you more than buying a second copy from the bookshop next door.

Move to software, music CDs or video DVDs, and the means of copying is much cheaper – in most cases, just the cost of the blank media. Add to this that the copy is identical to the original (rather than a sheaf of scruffy photocopies) and the temptation to duplicate is much greater. You can see why most music and film companies look on file sharing, in whatever form, as theft.



Copying a book is a daunting task. Not so with a CD... where you get an exact copy every time

government, military and commercial enterprises of having 'trusted' computers throughout their organisations, which will check themselves against leaks and only deal with other computers that are in a known state. Files can be routinely encrypted, too, to ensure they don't fall into the wrong hands. We'll leave aside for the moment the potential for misuse of this kind of built-in security.

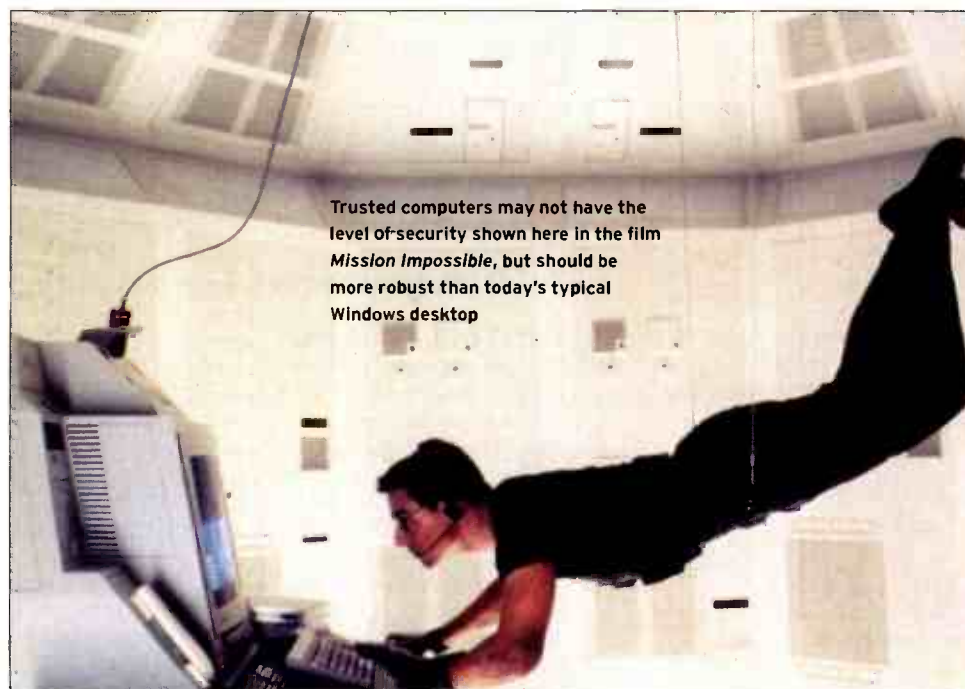
Microsoft is claiming NGSCB will put an end to viruses and spam, which it says will be rejected automatically as untrustworthy code. This would certainly be a major benefit to virtually anybody who makes use of the Internet and is constantly troubled by unwanted programs, emails and advertising.

It's hard to see, though, how a 'trusted' PC could distinguish between legitimate email and spam, if they both come from another 'trusted' source. It's not beyond the budgets of most spammers to set themselves up with replacement computers that abide by NGSCB rules.

It's also difficult to believe that with the undoubted cunning of most virus writers, they couldn't find ways to circumvent the checks performed on them by a trusted computer.

Rights and wrongs

What NGSCB is really about is Digital Rights Management (DRM), the ability to prevent illicit copying of music,



Trusted computers may not have the level of security shown here in the film *Mission Impossible*, but should be more robust than today's typical Windows desktop

'Accepting the content providers' rules because they have a virtual monopoly affects our freedom'

pictures and video. Microsoft, and most of the major content providers on the Internet, have long wanted to prevent their copyright material being shared freely from person to person and, however you may feel about the power of the major corporations, you have to have a certain amount of sympathy with this view.

As a writer, musician, photographer or film-maker, your only source of income is the book, album, photo or film you produce. For people to give copies to others without paying you anything for your efforts is galling and potentially impoverishing.

Enforced DRM could be used to redress the balance and provide a fair compromise between the interests of content users and content providers. NGSCB can potentially do this by forcing all media played on a PC to be paid for. In the extreme, it could be used to remotely delete illicit files that haven't been paid for.

It could also open up new marketing regimes where, for example, you could download music or movies for a limited number of plays, at a reduced price. Once you have tried out the media, you could pay extra for a full copy or try something else at the same low trial rate. There are many opportunities for different kinds of payment regimes, once a trusted computing environment can be established.

The danger, of course, is that this kind of monitoring of the content of your PC can easily be misused and that, as an individual, you're subject to the whims of the major music companies. And when the policing system is controlled by the same company that provides much of the content, there's a danger the balance could swing too far in the direction of a few, very large corporations.

Microsoft has already gone some way down the road towards remote management of your computer. The user agreement in the latest Windows Media Player requires you to agree to a process where 'security related updates to the OS Components... will be automatically downloaded onto your computer. These security related updates may disable your ability to copy and/or play Secure Content and use other software on your computer'.

A process where a third-party program gains access to your PC and changes programs so they no longer work as they did is very similar to what happens in a virus attack.

Judge dread

How would a trusted PC know which files were legitimate and which should be prevented from running as potentially pirated? Microsoft's proposed answer is to have a hot-list of suspect files on an Internet server, which would be interrogated by your NGSCB-driven PC when you try to run media.

There are a number of questions which immediately spring to mind in this scenario. For a start, it implies all PCs have always-on, high-speed Internet connections to a Microsoft server, which will take virtually no time to validate a run request.

This certainly doesn't ring true of most home-based systems in the UK at the moment, most of which still make use of a standard 56Kbits/sec modem. And with the number of concurrent requests that will be made by all the millions of PCs trying to run software or content, it's hard

to believe there won't be congestion – at the start of each working day, for example.

Then there's the question of how meticulously the database will be maintained. Imagine if, rather than being advised by Windows XP that a new driver has not been digitally signed by Microsoft's WHQL laboratory, you were actually prevented from running the device which used it. There wouldn't be much new hardware available for use, except from very major manufacturers.

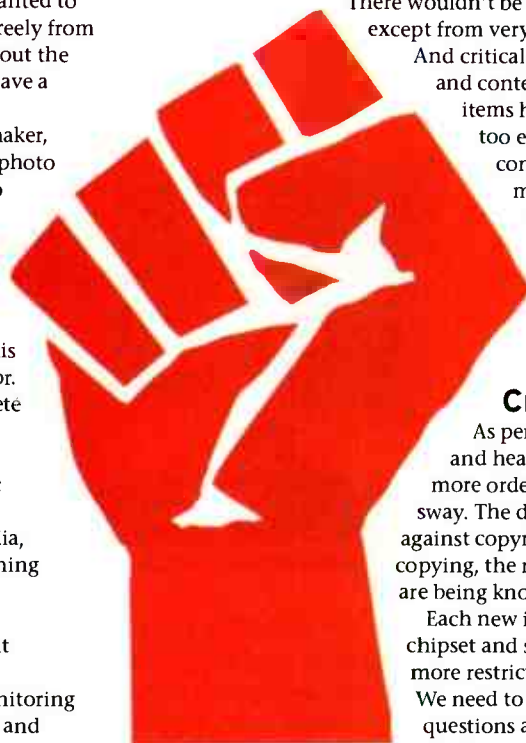
And critically, who is to decide which programs and content are included on the list of suspect items held by Microsoft? Couldn't it be all too easily misused for censorship or to gain commercial advantage? And even if the maintainers of the list weren't tempted to bend the rules, such a register would be an ideal target for hackers. Putting this kind of control into the hands of any company with a vested commercial interest is bad for personal rights.

Creeping restrictions

As personal computing matures, the wild and heady days of its youth are giving way to a more ordered society where the rule of law holds sway. The danger is, though, that in a backswing against copyright theft through file sharing and CD copying, the rights of the legitimate computer user are being knocked for six.

Each new iteration of Windows and each new chipset and system board from Intel imposes more restrictions on the way we use our computers. We need to be extremely vigilant and raise valid questions at every stage, before new regulations are imposed on us.

Accepting the content-provider's rules because they have a virtual monopoly of the hardware and software we need to use for business or want to use for leisure, affects our real freedom. We still have the ultimate veto of voting with our wallets.



First round inconclusive

Intel has already made an attempt to introduce an 'identifier' for a specific computer, in the form of the Processor Serial Number (PSN), which was introduced with the Pentium III processor and is still there in current Pentium 4 chips. The idea of the PSN was to provide a security handle in online transactions, to ensure a computer could tell which other machine it was dealing with.

What the company didn't seem to realise was that the same serial number could be used for government surveillance or other undesirable invasions of personal privacy. Under pressure from civil rights bodies and complaints from individual and corporate users, Intel changed the feature from being 'normally on' to 'normally off', and most responsible PC suppliers now provide their machines with the feature disengaged.

Disengaged doesn't mean disabled, though, and it can still be switched on through software. Even so, the changes made and the lack of take-up of the facility demonstrates that protest against intrusive moves can change things, even with companies the size of Intel. Whether that's also true of NGSCB and Microsoft remains to be seen.

Remember this? Intel's original Pentium III with the embedded serial number. Pressure from civil rights groups persuaded the company to disengage the feature



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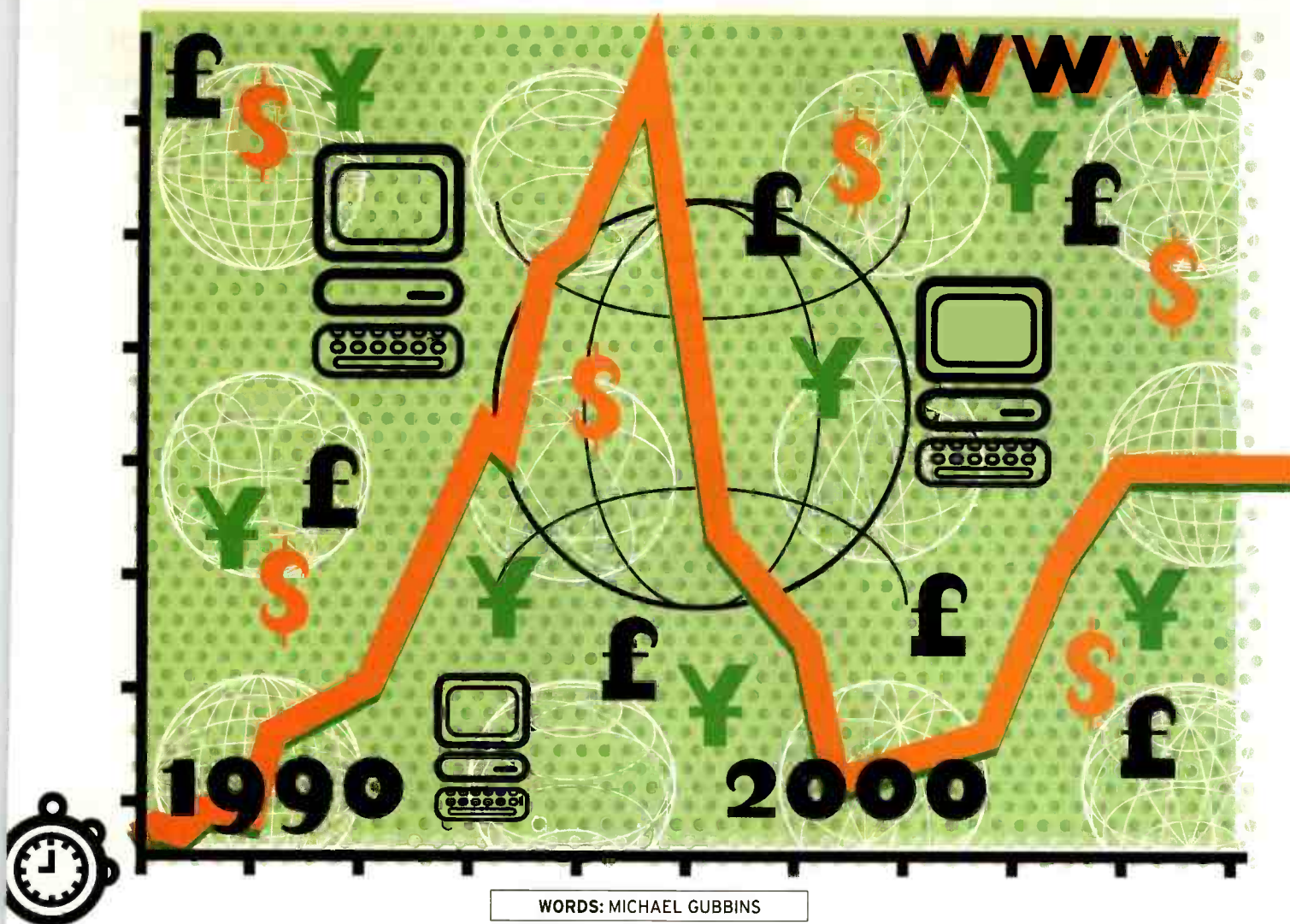
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Return of the dot coms

After the grand dreams of the 1990s and their spectacular collapse, isn't a dot com revival a bit far-fetched? Prepare to be surprised...

In the darkest days of the dot com collapse there was a lot of speculation about the 'bounce back'. It took a couple of years before the world woke up to the fact that the boom days were never coming back.

And then we had the backlash: businesses pulled investments, venture capital dried up and analysts fought over who could be most pessimistic. To a certain extent the doom-mongers were right. The dot com boom was a collective loss of business sanity on a colossal scale – and the crash was spectacular.

It may have been a necessary part of the evolution of the Internet, but it was no less dizzying in its descent for that. Since the turn of the millennium, when tech stocks accounted for a quarter of the total market capitalisation, nearly 5,000 ebusiness ventures have gone under or have been bought out, says researcher Webmergers.

The idea of an ecommerce revival seems pretty limp. Try finding a venture capitalist now to fund your online business. Yet, while we were rubber-necking the wreckage of big name businesses, we missed the good news about the companies that have succeeded in the online business.





'You could have embroidered a map of the Himalayas in the time it took your online transaction to be completed'

Left: Patricia Hewitt says the UK has made real progress

Below: Marc Andreessen reckons it takes up to five years for consumers to get into the net

New businesses, such as the search engine Google, became household names during the 'bust', and icons of the dot com era like Amazon, Ebay and the UK's own Lastminute.com have started turning a profit. And many supposedly old economy businesses, particularly in retail and banking, have made serious advances in taking customers online.

So if it's not exactly a recovery, can we at least see a sustainable upward trend?

If we compare this year's performance to last, the answer is clearly yes. Happily, the UK is at the forefront of the upward trend, with 28 million people online, up six per cent on 2001. The Office of National Statistics says Internet shopping now accounts for six per cent of all retail sales, and this at a time of declining high-street sales.

Consultancy Booz Allen Hamilton (BAH) says we are now the second-best place in the world as a competitive online business market. 'It's an achievement many thought impossible four years ago,' said Trade and Industry Secretary Patricia Hewitt. 'We've made real progress in key areas: a growing IT sector, among the world's lowest prices for Internet access, and the highest penetration of digital TV in the world,' she said. Even given a little spin doctoring, there are provable changes for the better.

Technology issues

Many of the previous technology problems are now at least close to resolution. Security is considerably more sophisticated, married to better business models and tighter regulation. The remarkable growth of broadband adoption in the UK is now killing off one of the biggest letdowns of ecommerce: the discovery that shopping online was as slow and depressing as a Radiohead album.

Back in the boom days, dodgy operating systems, bug-ridden software and snail's pace modems were a permanent headache. It felt like you could have popped down the shops, knocked back a couple of pints and embroidered a relief map of the Himalayas in the time it took for your online transaction to be successfully completed. Now broadband brings an always-on service at something approaching realtime. And then, of course,

there are new delivery mechanisms, such as wireless networks and smart phones.

Confidence building

One of the plus points of the new wave of technologies is that they take out much of the fear factor. The author Germaine Greer points out that successfully using the Internet via a modem meant adopting both the skills and thinking of a geek. But more intuitive technology and education has changed all that.

According to Internet pioneer and Netscape founder Marc Andreessen, confident users are driving the current uptake, and smarter, safer and simpler services will encourage ecommerce virgins to become more adventurous.

'I spent a year at AOL and we did a lot of research and found it takes consumers three to five years to really get into the Internet, he said.

'In year one, they might do email. In year two they might surf the web as well, in year three they might buy a book on Amazon.

'And then they're emailing, processing digital pictures, buying their groceries, booking their holidays and so on. They love it and they'll never go back.'

This gradual building of customer confidence means that online businesses, or businesses online, can achieve something like organic growth.

'A lot of the monthly variability has gone,' said Meta Group vice president Jeffrey Mann. 'For most shoppers, the novelty and hype of buying online has worn off, which is helping the sector to stabilise.'

Back to boring

Maybe Andreessen goes a bit far in talking about 'love', but simple efficiency will go a long way.

Tim Miller, a senior analyst at the Interactive Media in Retail Group (IMRG) says 36 months of pain is at last beginning to give way to a conservative degree of gain. 'We are certain that the shake-out is nearly over and that has cleared the decks for a second wave of rapid-but-sane growth.'

His emphasis on sanity is echoed by most of the leading commentators. Perhaps Richard Holway, of analyst Ovum Holway, put it best when he characterises this period as 'back

to boring'. That's the key to the new ecommerce era. By boring, we mean conventional, customer-focused and planned along traditional business models.

Ecommerce pioneer and Amazon chief executive Jeff Bezos has one of the best reasons to crow about this year's improvements. The online bookstore was often used as the prime example of dot com excess: all hype and no profits. Now his business is regularly in the black. But you won't hear him talking about a return to the gold rush mentality. He is interested in more conservative business plans, like selling on the Amazon technology to third parties.



Below: The sector is stabilising says Jeffrey Mann



Winners and losers

If you're really looking for a site representative of the current upturn, try Global Recycle (www.globalrecycle.net), the winner of last year's prestigious National Ecommerce Award, sponsored by UK Online for Business.

It's simple, fast, efficient and, for anyone not directly in the business, pretty dull.

It's a trading exchange for producers, consumers and traders of scrap, recycled and secondary materials around the world. In other words, you use it to find people and companies to do business with – and it's a major success.

The site has quadrupled business in the last year because, says managing director Warren MacLeod, it gives customers control.

'We are a barebones operation with hardly any overheads at all. Our main philosophy is 'keep it simple'.'

The company moved from trying to charge for transactions to a membership model, which acted as a meeting point for would-be business partners. They contact each other online, talk business and often deal later offline.

'We learned that you can never know better than your customers. We originally put in features that we thought were great but people weren't using them, so we learned to step back.'



The contrast with the dot com failures could hardly be greater. They knew best and the customers were expected to adapt. The collapse of British fashion site Boo.com says it all. The original (the brand now has a new owner) lasted just six months despite huge hype, £100m and big name backing.

One of its biggest problems was that it insisted on cutting-edge fancy graphics. They were way too advanced for the average customer and took an age to appear when using any kind of modem, as broadband just wasn't affordable or much available at the time. With brilliant ideas and no-one buying, the founders burned through cash at an astonishing speed. *Fortune* magazine called it 'cool' – customers just wanted efficient.

The collapse spawned a fascinating book, *Boo Hoo: a dot com story*. It's a cautionary tale that any would-be ecommerce business should read. The dot com tale ended with the not very astonishing discovery that, yes, the customer did know best. And that's where the new ecommerce trend begins.

'Many retailers are deciding that web sales will represent only five to 10 per cent of their business, not 50 per cent as so many had anticipated,' he said. But he will tell you that's a pretty healthy – and potentially highly-profitable – return.

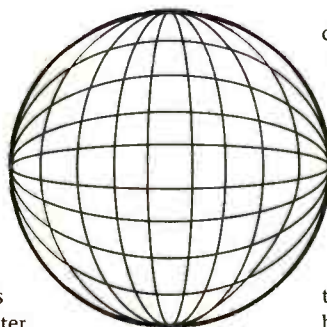
Price, convenience, choice

It's tempting to think that ecommerce has slotted happily into a comfortable and relatively minor business niche, but the smart companies don't see it that way. For them, online and offline trading should be one coherent and preferably seamless part of a strategy. They understand and ruthlessly exploit the advantages of ecommerce.

The dot coms talked the talk, promising huge price advantages by cutting out the middlemen, but found it difficult to walk the walk. The truth is that many of the existing retailers have been smarter than most of the 'pure-play' Internet businesses.

Take Easyjet, an airline that unashamedly makes low cost its reason for existence. It quickly realised that traditional booking methods were an expensive overhead, just like the in-flight meal. It now takes 95 per cent of bookings through its website. The feat was achieved simply enough – it just made eflights cheaper.

'Online fares are all discounted, we run deals exclusively online and provide online-only access to a number of routes,' says the airline's web manager Simon Pritchard.



'And we're constantly thinking about how we can improve the easyjet.com platform with other deals and products that can drive even more customers online.'

It has succeeded because booking offline effectively carries a surcharge.

Retailers face more complex challenges, such as deliveries and inventory, problems which killed dot coms like Webvan. The convenience of home shopping is a winning message for many retailers but one that only a few have been able to turn into healthy profits.

John Lewis Direct – the online arm of the John Lewis chain – boasts three times the demand it had three years ago by keeping to simple business rules.

Managing director Simon Palethorpe says the art is to listen to customers and let your business be guided by their growing needs and aspirations.

'We see people, who had previously only been buying books and CDs, branching out to more ambitious purchases as they become more sophisticated Internet users.'

'The art is to listen to customers and let your business be guided by their growing needs and aspirations'





Left: Jeff Bezos has proved his detractors wrong, as Amazon now makes a profit

'How can you establish trust with a company that lets criminals off the hook for fear of tarnishing its name?'

tenanted by merchants of all sizes, with thousands of SMEs nibbling away at major brands' trade.'

So if the net has a winning formula, a growing and sophisticated customer base and a new business focus, how come the recovery is so modest?

A DTI report shows that only 20 per cent of businesses are transacting online. And Hewitt says only one in 10 UK citizens have used online government services – compared to half of the Canadian population.

DTI Ecommerce Minister Stephen Timms said: 'The issue that comes up time and time again is trust. People see the new technologies not only as an opportunity but also as a threat.'

Fear of becoming a target of spam or the victim of online fraud may bear no relation to the actual threat, but that does not make it any less dangerous.

A Pricewaterhousecoopers survey in July showed just one in five incidents of business fraud was Internet-related. Yet the study revealed that nearly half feared they would be a cybercrime victim in the next five years.

The consumer is even more wary. A Mori survey on behalf of IT security firm RSA estimated that six million potential customers were shunning online banking because they feared their transaction would not be adequately protected.

Confidence isn't helped by the attitude of business. The National Hi Tech Crime Unit (NHTCU) says only 56 per cent of larger companies report electronic crime to the police. The figure is lower among small businesses.

How can you establish trust with a company that lets criminals off the hook for fear of tarnishing its brand name? The widespread adoption of ecommerce is being hindered by a failure to consider the human aspects of transacting online.

A Department of Trade and Industry (DTI) report published in July says businesses are too focused on the technology supporting their ecommerce strategies – only three per cent of companies take into account how ebusiness affects people.

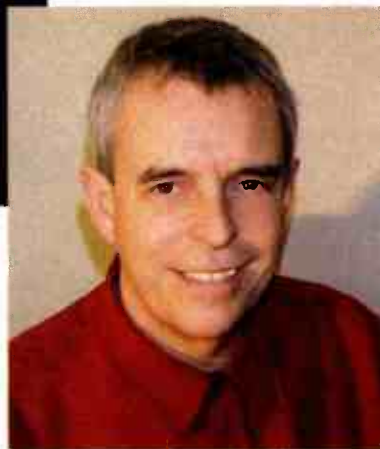
'There is evidence of an undue focus on technology and a lack of attention to human and organisational issues,' said Timms.

Add to that list the lack of venture capital, reduced IT budgets, new legislation and skills shortages and you get a sense of the challenges ahead.

But, however modest this revival, it is clear that today's online businesses have a working model on which to build, in stark contrast to the unplanned mess of the dot com era. Then the entrepreneurs and gurus promised revolution, to overthrow the existing order and change human nature.

Today, the words and tone are much more modest. We all found out that the dot com Emperor had no clothes and we're back to hailing the customer as king. Ebusiness is just, well, business.

It's boring in the best possible sense – and that's why, this time around, it will succeed.



Above: James Roper sees the internet as a 'super-supermarket'

The dot com era was dominated by businesses talking about how they would change the customer, but now it's the other way around, he believes.

That does not necessarily make price the silver bullet; the web has been able to exploit the increasingly bland Americanism of the high street.

Hockey Heaven is an award-winning specialist selling the kind of sports equipment you'd be hard



pressed to find in any department store. Founder Deep Bassi believes online businesses can build the kind of relationships with

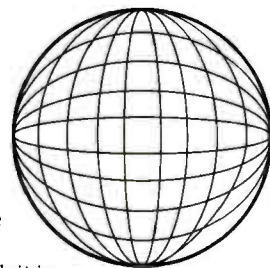
customers that one might once have associated with the specialist store that has disappeared from most UK towns and cities.

'Today's users are far more sophisticated than before and they expect value. But they like something more, and with smaller sites like us they can have a close and friendly relationship.'

It's a trend that IMRG chief executive James Roper calls: 'The wholesale reinvention of self-service shopping, with the Internet becoming a 'super-supermarket' that is



Left: Online sports equipment specialist Hockey Heaven creates close relationships with its customers



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Print, copy, scan, fax

WORDS: NIGEL DONNELLY TESTING: VNU LABS PHOTOS: BRUCE MACKIE

If your peripherals are starting to invade precious desk space, it might be time to invest in an all-in-one colour printer, scanner, copier and fax

The growing popularity of notebook PCs and TFT displays is testament to the fact that space saving sells. If your desk space is shrinking, upgrading to a multifunction device might be sensible.

The term 'multifunction device' commonly refers to a printer with a scanner mounted on top. If that sounds simplistic, it is, but many of the early devices (and some of the current ones) looked like somebody had glued one to the other in order to save space. Such devices have been popular in offices for years, but they were normally based on mono laser printers and sheet-fed scanners, and included fax capabilities. Home users are more likely to want to scan photos, so sheet-fed devices have given way to flatbeds,

and mono lasers have been ousted in favour of colour inkjets. In many cases, fax technology is left out to keep pricing keen.

Combining printers with scanners has several advantages. One is that it can be used as a cheap document copier. Also, as they tend to be based on a manufacturer's existing printer and scanner technology, they can usually match the performance of standalone devices. For many, though the main selling point is that they take up less desk space.

If a multifunction device can print good-quality photos, scan documents and images to a high quality and save you having to buy a new desk, so they certainly warrant consideration. We've rounded up 10, ranging in price from under £100 to £300.





Brother MFC-4820C

We're not going to say that Brother isn't a name you'd expect in a round-up of multifunction devices, because that is not quite true. Brother is quite prevalent in the laser multifunction device market, but the MFC-4820C is the company's first attempt at the colour inkjet market.

The MFC-4820C is the most attractive device on test, sitting lower and looking sleeker than any of the other models. It feels well put together and is a thoroughly integrated unit rather than a scanner balanced on top of a printer. There are slots for Smartmedia, Compact Flash (CF) and Memory Stick (MS) so you can print straight from your memory cards.

Setting up the MFC-4820C isn't too difficult, but, as it is a standalone fax machine as well as a printer, the documentation is quite complex. There are four ink cartridges, which slide in beneath the output tray. The cartridges remain stationary while the ink is piped to the moving print head. Every other device here mounts cartridges on the print head and then flings them up and down as printing takes place. Having the cartridges separate and mounted low contributes to the slimline look of the printer and makes it one of the quietest on test.

Performance was reasonable – photo reproduction was good,

although the output was a little milky, and on fine details and gradual variations in colour it lost out to the best in this test. Text quality was good but not the speed of printing, at only three pages of text every minute. Scans were fine, but the LED-based contact image sensor (CIS) technology used to make it so compact means scan quality suffers if anything other than a flat object is reproduced.

Installing the supplied software is a protracted process involving numerous check boxes. We had a problem where we ended up with two printers installed, the default one of which did not work. This is an area in which Brother needs to catch up with the other manufacturers on test.

DETAILS

RRP £249 (£211.91 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Brother 0870 830 4030

www.brother.co.uk

PROS Small; smart and simple to use

CONS Quite slow; ragged software

VERDICT

The Brother is a great little machine, held back by a couple of niggling faults

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL



Canon Smartbase MPC 190

This is the first of three Canon multifunction devices to appear in this test. The fact that the company has so many indicates that this is a market it takes seriously. It's a big player in the office market with photocopiers, fax machines and printers, and we were keen to see how it fared with smaller scale products.

The Smartbase MPC 190 is the entry-level model, but it is immediately apparent that it wouldn't look out of place in a small office. It's quite a large device, although the blue and white colour scheme does its best to blend in with the background.

Canon doesn't shy away from providing plenty of paperwork. We counted nine pieces in the box but there was no owner's manual among them.

The only bit you really need to worry about is the setup poster. Compared to the friendly HP and Epson posters, the Canon is very curt. The information is all there, but the small diagrams and confusing instructions don't make things easy. The software was time-consuming to install and then proved quite challenging and unfriendly to use. However, using the copier functions from the front of the device was simple.

Printing more than six pages of text every minute and a half, and producing an A4 photograph in

around three minutes put the Canon near the top for speed in our tests. The photos weren't the best in the group, but the colours were vivid and the results acceptable for snapshots. Text was sharp and readable at all font sizes down to 2pt, even on cheap copier paper. Scanning speed was second best in the group.

The build of the MPC 190 was not as solid as the others here, with the cartridge cover in particular feeling like it would come off in our hand. Getting access to the cartridges was fiddly and, as there is so little ink in each one, you may be changing them often. On a positive note, Canon's cartridges are cheap to buy so running costs are affordable.

DETAILS

RRP £149 (£126.81 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Canon 08705 143 723

www.canon.co.uk

PROS Good performance

CONS Build quality; unfriendly literature and driver

VERDICT

The MPC190 is difficult to recommend over other devices on test

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL





Canon Smartbase MPC 200 Photo

We were confused that the Canon MPC 200 Photo costs more than either the 190 or 400 models tested this month. Naming conventions usually work with higher-specced machines sporting higher model numbers, as well as higher prices. Canon has eschewed such conventions with the MPC 200 and initially this looked to us like the best model in its range for home users.

With it parked on the table next to the MPC 190 and 400, there is a definite family resemblance. All have the same lantern-jawed look that gives the impression that a scanner has been crudely grafted onto the top of a printer.

The control panel is similar to the other models. It's not quite self-explanatory, but a couple of minutes with the instructions had us mastering the basics.

The main difference between the 200 and the 400 is the inclusion of direct photo printing. Rather than having a separate slot for each memory card, there is a single PC Card slot on the front of the device, just below the control panel. You mount your CF memory card in the supplied PC Card adaptor and plug it in for direct photo printing. Owners of cameras using other memory standards need to invest in a PC Card adaptor themselves, which

can add upwards of £30 to the printer's asking price.

Print speeds were in the centre of our tests, managing just over five pages of black text every minute, while an A4 photo took around three minutes. Results were quite sharp, but colours were a little anaemic. Borderless printing on A4 and 6 x 4in specialist paper reinforced its claims as a photo printer.

The software installation was long-winded, although the MPC 200 has a generous bundle of applications to help you fine tune your photos before you print them out. Although not very friendly, the driver is flexible and lets you tweak settings to your heart's content.

DETAILS

RRP £199 (£169.36 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Canon 08705 143 723

www.canon.co.uk

PROS Direct photo printing; cheap cartridges

CONS Photo prints were disappointing; functional looks

VERDICT

The best Canon machine for the home, but still not good enough

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



Canon Smartbase MPC 400

Our immediate feeling on getting the MPC 400 out of the box was that we'd asked for the wrong product. This is very much geared to the small office rather than the home, but you wouldn't want too small an office – this is a very large device.

We took a look at the MPC 400 on its own merits and, putting the size issue to one side, it's not a bad device. Print quality was good and it was the fastest device to output an A4 photo, delivering in two minutes. However, the initial prints weren't very sharp and the colours seemed a little pale. We played with the settings and ran a few diagnostic tests on the printer and the photo output improved, but it still wasn't a match for the HP PSC 2210 or the Lexmark X5150.

Text output was excellent though, and it was one of the quicker scanners on test. It was also one of the cheapest when it came to running costs. It uses separate tanks for each ink colour so when a particular one runs out, it can be replaced, rather than a cartridge with three colours in it which may still have other colour inks remaining.

There was no setup poster with the MPC 400, just a 32-page quick-start guide. This guide also covered the next model up in the range, which has an integrated fax machine

and a document feeder built into the lid of the scanner. That meant a lot of the information wasn't relevant, which made reading the pamphlet even more of a challenge.

The control panels on both the other Canon devices are quite complicated, but there aren't too many buttons to cope with. The MPC 400 is something of a button bonanza, and users would be advised to keep the handbook in close attendance when trying to use it. Simple copying tasks are easy to complete, but beyond that things get quite tough. The MPC 400 did feel more robust than the other two Canon devices, and access to the cartridge bay was easy enough.

DETAILS

RRP £189 (£160.85 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Canon 08705 143 723

www.canon.co.uk

PROS Fast; good text quality; separate inks

CONS Size

VERDICT

This is more of a device for the workplace rather than the home office

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



Epson Stylus CX3200

Epson inkjets are held in high regard as photo printers, and we felt that both Epson models sent in for review were going to perform well in our photo test. The CX3200 has been around for a little while now and it doesn't stand up well in terms of its looks. Compared to the HP, Brother and Lexmark models, it looks a bit portly and old fashioned. We're not going to hold that against the CX3200, however, as it has plenty to offer if you can overlook a bit of middle-aged spread.

The first thing that struck us about the Epson was the ease of setup. Once out of the box, we found several setup posters and, when we had found the English language PC version, we followed its instructions and had it churning out prints within five minutes. A hefty owner's manual accompanied the package but the poster was detailed enough to cover all the basics.

The front panel looks a lot scarier than it is. The buttons are clearly labelled and after a few minutes investigation you'll be comfortable with the basics. Similarly, replacing the two ink cartridges is very simple, with the flip-top scanner providing plenty of room for even the chunkiest digits to operate.

Performance from the Epson was very good. It managed to

produce six pages of text every minute, although at over seven minutes to print an A4 photo, it is showing its age a little. It's worth the wait, though, as the photos are very sharp. Printed colours are a little flat compared to the others, but scanning speed was about average.

The CX3200 looks like a reasonable bet. At £149, it's not expensive, and the shock of paying more than £20 for ink cartridges can be offset against the high yield the company claims. It may lack extras like memory card slots, and the software is not as slick as that from Lexmark or HP, but it is still an excellent all-rounder which, due to its age, may be found lurking at a bargain price.

DETAILS

RRP £149 (£126.80 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Epson 0800 220 546

www.epson.co.uk

PROS Solid performer; easy to live with

CONS Big; unattractive; clumsy software

VERDICT

A good device that is worth buying if you can find it cheap

FEATURES

PERFORMANCE ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★



Epson CX5200

The CX5200 from Epson looks superficially similar to the cheaper CX3200 and, with just a £50 price premium distinguishing one from the other, we were not surprised to find plenty of common features.

The main similarities are the design and the control panel. Like its cheaper stable-mate, the setup documentation is first class and enables even the greenest computer user to have the device up and running in minutes. In terms of performance, we achieved fairly identical print speed scores for both Epson models, managing a whisker under seven pages a minute for text. Less impressive is the seven minutes required to produce an A4 photo print.

Print performance was similar, but the technology in the two models is slightly different. The CX5200 uses separate ink tanks for each colour, whereas the CX3200 uses a single three-colour cartridge. Separate ink tanks keep running costs at a more sensible level, as you replace cheaper single colour cartridges when the colour you want has exhausted, not just when one colour has gone. Despite the extra ink tank, we struggled to see improvements in print performance, and had to spend longer fine tuning the settings to get the same results as

the cheaper CX3200. The scanner features a higher resolution than the one fitted to the cheaper model, which may be a factor to consider if you do a lot of photo scanning. That said, if you are serious about your scanning needs, the lack of any advanced scanning features, such as a transparency adaptor, would probably be more of a concern. For that reason, the 600dpi (dots per inch) scanner on the cheaper model will probably be adequate.

The CX5200 is a very good product, but we feel that for most home users, its extra features and capabilities won't matter as much as the £50 price difference. As with the CX3200, it has been around a while, so at a bargain price it warrants consideration.

DETAILS

RRP £199 (£169.36 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Epson 0800 220 546

www.epson.co.uk

PROS Well built; simple to get going

CONS Quite large; not handsome

VERDICT

A really good device, but difficult to recommend over its cheaper relative

FEATURES

PERFORMANCE ★★★★★

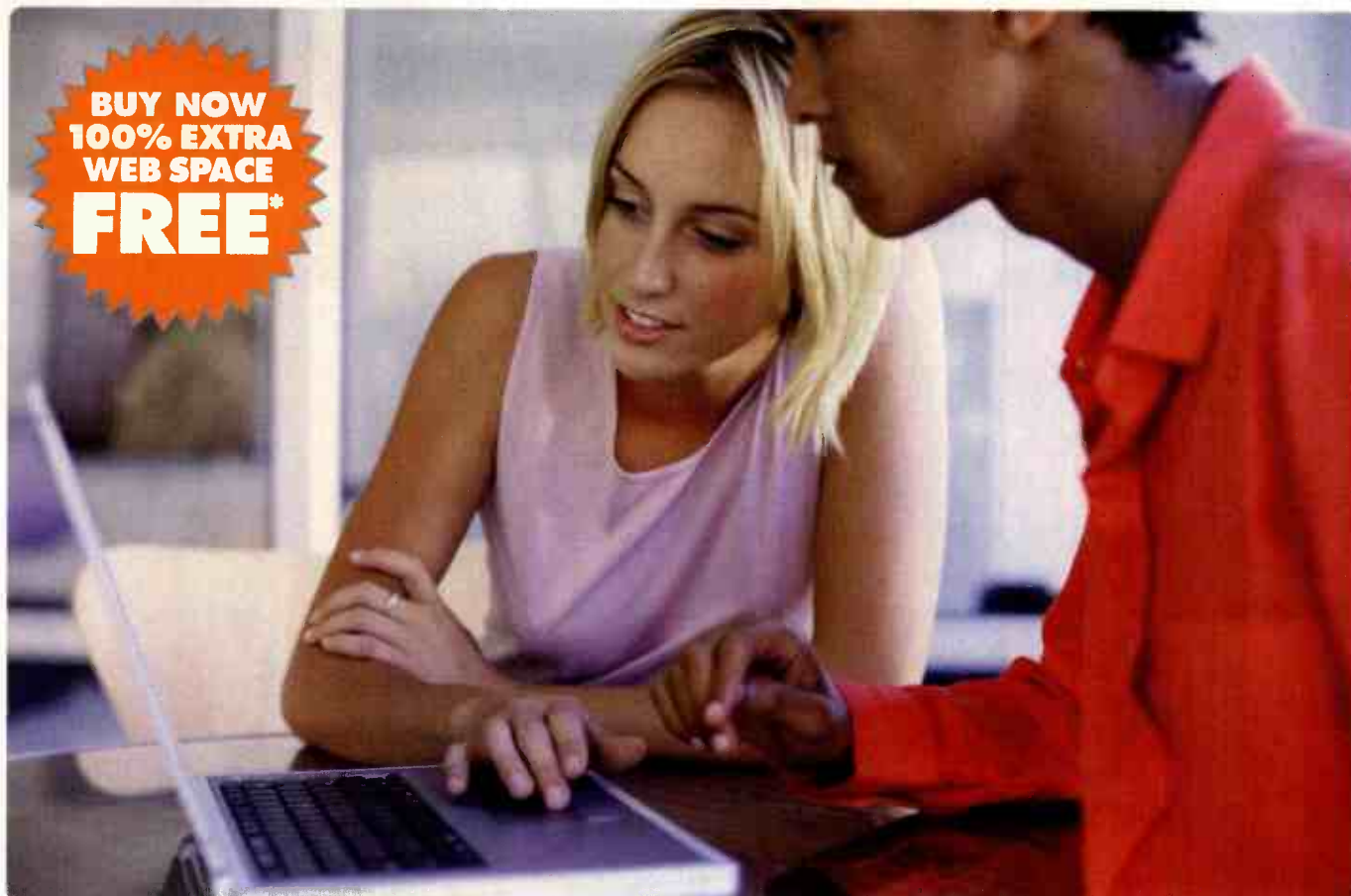
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Internet Connection	56K Modem, Ethernet LAN built in	56K Modem, Ethernet LAN built in
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HP PSC 1205

HP claims that the PSC 1205 is the smallest flatbed multifunction device on the market, and we'd have to agree. Stack five PC keyboards on top of each other and you'll have a fair idea of the size of this baby HP.

Getting started with the PSC 1205 is very simple. It's well put together and accessing the cartridges is simple. It feels like a device that has been designed as a single integrated unit, rather than an inkjet printer that has had a scanner glued to the lid. Sat on the table, its green and grey colour scheme is both unusual and attractive.

The PSC 1205 is very easy to set up and use. The paperwork supplied is comprehensive and as idiot-proof as we've come to expect from HP. Installing the supplied software was only a couple of clicks' work.

Often, cheaper multifunction devices can only work as a copier via the PC or at least while connected to the PC. We were pleasantly surprised to find that the copier functions are quite advanced for a device that is surely conceived as a very occasional copier for the smallest of home offices.

In terms of performance, the PSC 1205 was a bit of a mixed bag. We were ready to champion this underdog's case but, to be fair, if the photo prints

had emerged from a £100 dedicated printer, we'd be a little concerned about them. We aligned the print heads several times, carried out the cleaning as suggested by the documentation, but we never did manage to rid the photo output of slight banding and dottiness. Still, this should really be assessed as a printer and scanner bundle for £100 and, at that price the results weren't too bad. Text quality was excellent, even on cheap copier paper.

It's fair to say that this little HP was built for comfort rather than speed and, in our tests, it was in the middle of the pack, and matched this performance where scanning speeds were concerned.

DETAILS

RRP £99 (£84.26 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP 08705 474 747

www.hp.co.uk

PROS Cheap; cheerful; good to look at

CONS Not very fast; photos only adequate

VERDICT

Worth the asking price but no more

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL



HP PSC 2175

The PSC 2175 is the newest addition to HP's family of multifunction devices.

Compared to the Epson and Canon machinery, the PSC 2175 seems quite compact, although it isn't in the same league as the Brother. The silver and grey finish is understated and unlikely to offend, while the control panel, mounted on the right-hand side of the device rather than along the front, is clearly labelled and very simple to get to grips with. Access to the cartridges is gained by lifting up the scanner much like a car bonnet. In itself this is easy, but getting your hands on the cartridges for replacement is more difficult as there isn't a great deal of room inside.

There are memory card slots for the most common camera media types located on the lower front left of the device, but no support for the XD format favoured by Fuji and Olympus.

HP printers always come with superb setup literature, and that is the case here, with the handbook and setup poster both the best on offer. The software is friendly and installation requires minimal attention from the user.

While getting the PSC 2175 up and running was simple, producing the sort of print results we expected took longer. Text output was excellent and very sharp, even on copier paper. Photo output is traditionally a

strong point for HP, and we had no complaints about its photo printing speed. After cartridge cleaning and print head aligning, things improved, but even then the images weren't among the best on test, with noticeable banding afflicting our photos. HP recommends using the optional photo cartridge for optimum photo printing, but we feel many users won't bother, or will plump for a device that doesn't require cartridge swapping for good performance.

Printing just under five pages of black text every minute and an A4 photograph in four and a half minutes made this printer an average performer all round. It was, however, one of the fastest scanners on test.

DETAILS

RRP £199 (£169.36 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP 08705 474 747

www.hp.co.uk

PROS Direct photo printing; smart looks

CONS Average photo quality

VERDICT

It may be good looking, but we struggled to make it perform

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL





HP PSC 2210

There were comedy double takes all round when the PSC 2210 tumbled out of its cardboard garage onto the PCW bench. It is based around an identical chassis to the PSC 2175 model reviewed on the previous page, and is difficult to tell apart from its little brother, aside from a slightly different, darker colour scheme. We had to look a little harder to see what our extra £100 bought us.

Broadly speaking, the 2210 is very similar in specification to the 2175, sporting the same 1,200 x 1,200 print resolution and 1,200 x 2,400dpi scan resolution. Claimed print speeds for both models differ to the tune of one page per minute for both black and colour images in favour of the PSC 2175, but in our tests we found the 2210 to be twice as fast.

The big difference between the two models is the fact that the 2210 is a four-in-one device, incorporating a fax facility as well as the standard printer, scanner and copier. Whether or not this is worth an extra £100 depends to a large extent on how much faxing you do. Configuring the fax facilities is very simple, as a wizard walks you through it.

Like the PSC 2175, for the very best photo prints, HP offers a supplementary ink cartridge – the photo cartridge – in order to get the best possible print on photos. With the standard cartridges, it

produced quite good photos, although the colours were a little flatter than we'd like. The level of fine detail was good and the overall print quality was among the best here. The method of printing pictures from the memory cards is the same as the cheaper model, too.

Once you've put the card in, a contact sheet is produced. You mark on the contact sheet which images you would like printed, and then use the scanner to read the contact sheet and print out your photos. Do it once and from then on it seems second nature. The card slots are detected in Windows as removable drives, so images can be copied to the PC through the printer as with any conventional card reader.

DETAILS

RRP £299 (£254.47 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP 08705 474 747 www.hp.co.uk

PROS A comprehensive all-in-one package

CONS Photo cartridges are extra hassle

VERDICT

A very accomplished device – the best here if you can live with the photo cartridge palaver

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



Lexmark X5150

Lexmark printers have often been saddled with the presumption that they are cheap to buy, expensive to run and simply not as good as the offerings from other manufacturers. Still, Lexmark is a big player in the home multifunction market, jockeying for top spot with HP.

The current Lexmark range starts with the ultra-budget X1150 which was reviewed in PCW September 2003 (page 66). The X5150 is the current top-of-the-range product until the X6150 and X6170 are launched in the autumn.

The X5150 is a reasonably large device, but a sophisticated colour scheme and design mean it's not bad looking. The control panel is clutter-free and among the simplest that we have used.

The software and setup materials are excellent. The poster is clear, large and easy to follow, while the software is installed in a couple of clicks. Once in place, using the driver to customise your print jobs is easy and the interface is user-friendly.

One thing that surprised us about the X5150 was the quality of the photo output. Lexmark claims the highest print resolution on test at 4,800 x 1,200dpi, but its models have traditionally struggled against the best inkjets from HP and Epson. The photo prints we

produced using this device had none of the graininess that has afflicted previous Lexmark models. Colours were a touch too vivid for our tastes, but ultimately we were impressed.

Text quality has always been a strong suite for Lexmark products, but this time they didn't look quite as sharp as the best on test at very small point sizes. Print speeds were good on text but it was quite slow to produce photos, taking almost five minutes to output an A4 image, while scan speeds were slow. Happily, the X5150's good performance wasn't undermined by expensive consumables, which cost no more than the test average. At £149 this is a good bet apart from the slow scanning.

DETAILS

RRP £149 (£126.81 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Lexmark

0870 444 0044

www.lexmark.co.uk

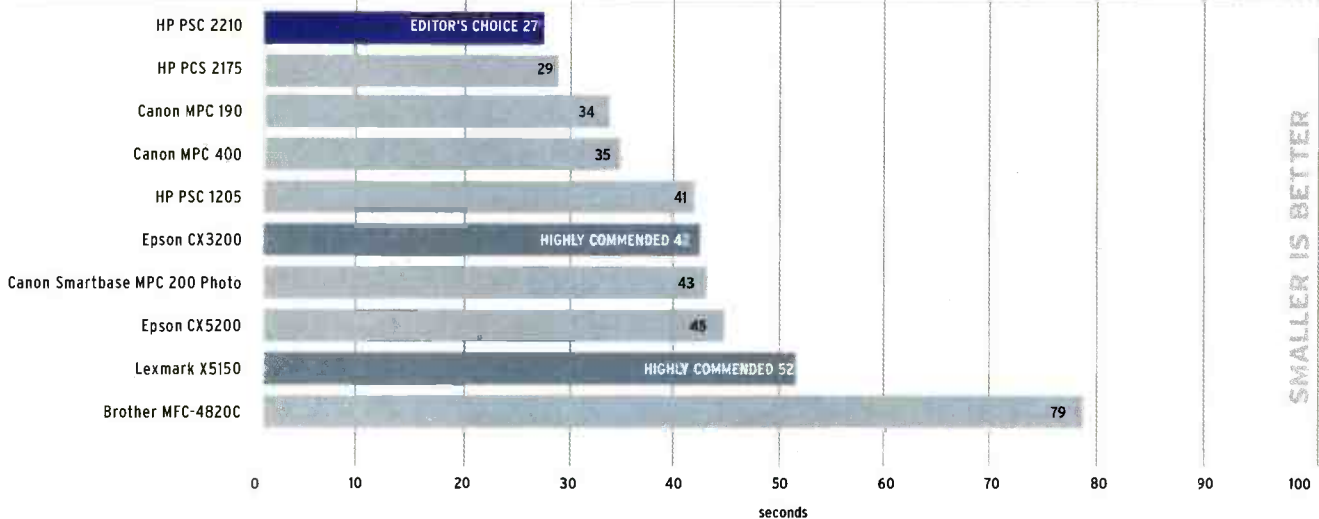
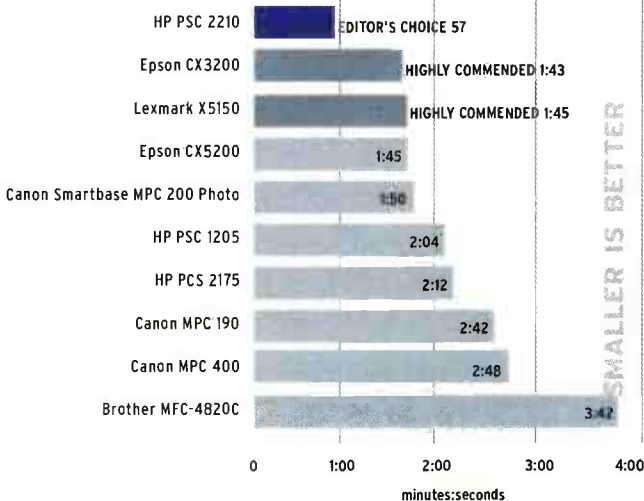
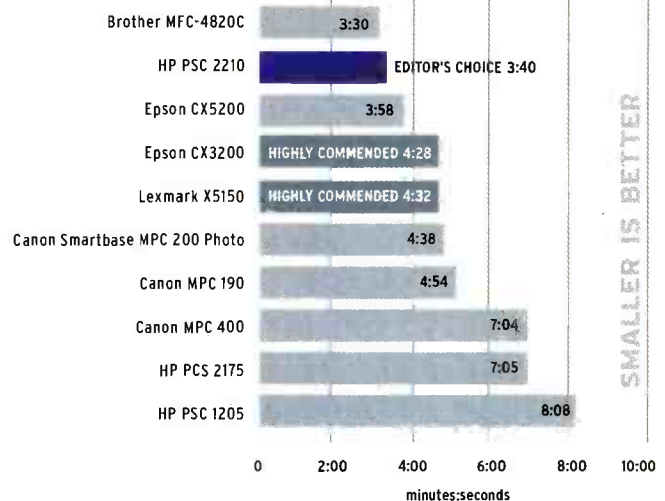
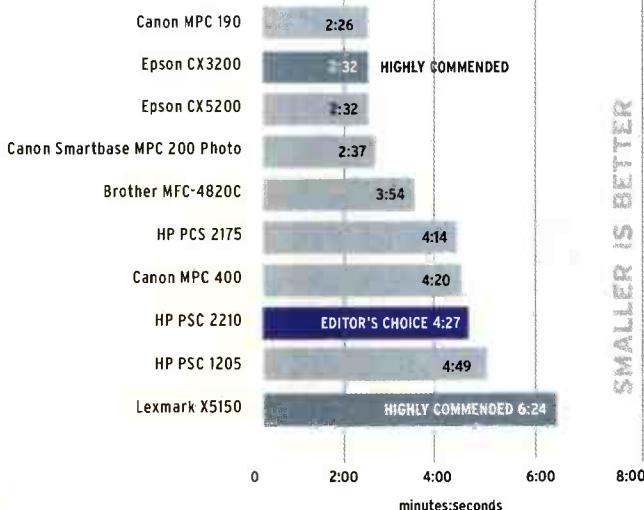
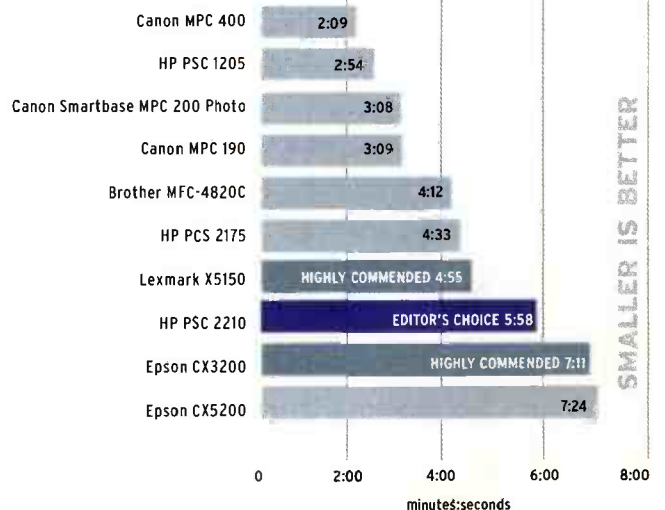
PROS Easy to set up; good photos

CONS Slow scanning

VERDICT

The X5150 is a good value multifunction device and deservedly wins an award

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

Lab results**Time taken to scan the PCW cover at 300dpi in 24bit colour****Time taken to print 10 pages of text****Time taken to print 10 pdf pages****Time taken to print 10 pages of mixed content****Time taken to print a test photo**



How did the multifunction devices perform?

We ran our standard inkjet tests on each of the devices featured in this group test, as well as speed tests for the scanning components. The printing tests featured plain text, pdf and mixed content documents, as well as a full-page A4 photo. All tests were timed and the output compared. Below we have

reproduced eight samples of the output. These are not necessarily the best and worst examples in each case, but they do demonstrate clearly the kind of thing we were looking for. Note that the production processes involved in printing a magazine may change some colours or the quality of some of the samples.

EPSON CX5200

THIS IS 36
This is 24 point
This is 12 point
This is 10 point
This is 6 point
This is 4 point

CANON MPC 190

THIS IS 36
This is 24 point
This is 12 point
This is 10 point
This is 6 point
This is 4 point

The Epson CX5200 (far left) produced some of the best-quality small typefaces in the test, with characters clearly legible down to 2pt. While the Canon Smartbase MPC 190 (left) came close to matching it, the bolder fonts are less clear

HP PSC 1205

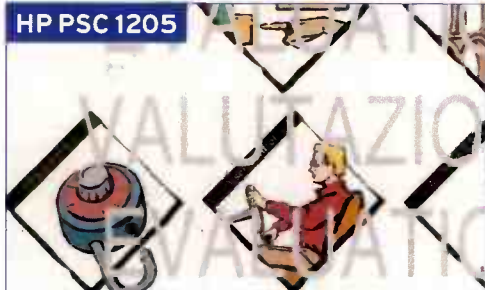
disk takes care of internal storage, the standard floppy drive. The DVI STB Riva TNT2 card provides solid The 17in monitor is a decent enough

EPSON STYLUS CX3200

disk takes care of internal storage, the standard floppy drive. The DVI STB Riva TNT2 card provides solid The 17in monitor is a decent enough

The HP PSC 1205 (far left) produced some of the best all-round text output on plain photocopy paper. Sadly the quality of the Epson CX3200 was slightly lower

HP PSC 1205



BROTHER MFC-4820C

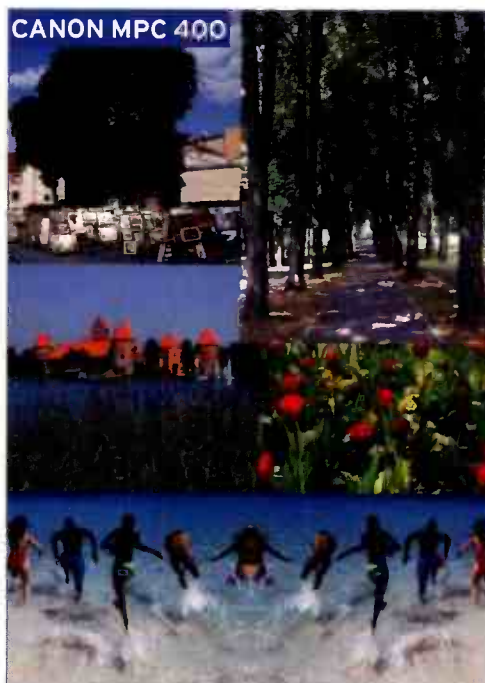


In our PDF test, the HP PSC 1205 (far left) excelled, producing good, strong tones and smooth shading of coloured icons. The output of the Brother MFC-4820C (left) was grainy in comparison

HP PSC 2175



CANON MPC 400



It's often a matter of personal preference when it comes to pictures, and these two examples show two ends of the scale, with the HP PSC 2175 (far left) producing far less saturated, vivid colours than the Canon Smartbase MPC 400 (left). Overall, we find the HP output more realistic and appealing

Table of features

For the best MFD prices try www.pcw.co.uk/bestprices

					
MANUFACTURER	BROTHER	CANON	CANON	CANON	EPSON
MODEL	MFC-4820C	MPC 190	MPC200 PHOTO	MPC 400	CX3200
Price inc VAT and delivery (ex VAT)	£249 (£211.91)	£149 (£126.81)	£199 (£169.36)	£189 (£160.85)	£149 (£126.81)
Product information	www.brother.co.uk	www.canon.co.uk	www.canon.co.uk	www.canon.co.uk	www.epson.co.uk
Phone	0870 830 4030	08705 143 723	08705 143 723	08705 143 723	0800 220 546
Dimensions (w x d x h in mm)	427 x 398 x 156	396 x 413 x 256	396 x 413 x 256	440 x 523 x 228	475 x 395 x 240
Number of cartridges	4	2	4	4	2
Maximum printing resolution	2,400 x 1,200	2,400 x 1,200	2,400 x 1,200	2,400 x 1,200	5,760 x 720
Borderless printing	x	✓	x	x	✓
Connections	USB	USB	USB/parallel	USB/parallel	USB
Scan resolution	600 x 2,400	600 x 1,200	600 x 1,200	600 x 1,200	600 x 1,200
Colour depth internal/output	36bit/24bit	36bit/24bit	36bit/24bit	36bit/24bit	48bit
Scanner technology	CIS	CCD	CCD	CCD	CCD
Other features	Integrated fax, speakerphone, answerphone, memory card slots	N/A	PC Card slot	N/A	N/A
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

Table of features

					
MANUFACTURER	EPSON	HP	HP	HP	LEXMARK
MODEL	CX5200	PSC 1205	PSC 2175	PSC 2210	X5150
Price inc VAT and delivery (ex VAT)	£199 (£169.36)	£99 (£84.26)	£199 (£169.36)	£299 (£254.47)	£149 (£126.81)
Product information	www.epson.co.uk	www.hp.co.uk	www.hp.co.uk	www.hp.co.uk	www.lexmark.co.uk
Phone	0800 220 546	08705 474 747	08705 474 747	08705 474 747	0870 444 0044
Dimensions (w x d x h in mm)	453 x 434 x 254	426 x 259 x 170	463 x 370 x 220	463 x 370 x 220	469 x 395 x 240
Number of cartridges	4	2	2	2	2
Maximum printing resolution	5,760 x 720	600 x 600	1,200 x 1,200	1,200 x 1,200	4,800 x 1,200
Borderless printing	✓	x	x	x	x
Connections	USB	USB	USB	USB	USB
Scan resolution	1,200 x 2,400	600 x 1,200	1,200 x 2,400	1,200 x 2,400	600 x 2,400
Colour depth internal/output	48bit/24bit	36bit/24bit	48bit/24bit	48bit/24bit	48bit/24bit
Scanner technology	CCD	CCD	CCD	CCD	CCD
Other features	N/A	N/A	Memory card slots	Memory card slots, integrated fax	N/A
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

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0906 906 0519

Editor's Choice

As more of us set up office at home, often in a small room shut away from the family, the demand for space-saving equipment grows. Each of the products tested here was designed with that need in mind, and each aped the abilities of stand-alone printers and scanners to a varying degree. Having subjected them to a series of punishing tests, timed their performance and compared the results, we have picked out the best of the bunch.

Brother has made an encouraging entry into the multifunction market with the MFC-4820C but, in the end, the slimline profile was not enough to curry our favour as far as an award. It's likely, however, that several of the competitors here will be borrowing ideas from that lowline design and we expect the next generation of models from all manufacturers to be a little more streamlined.

Talking of streamlined models, the budget HP PSC 1205 deserves a mention. It was the cheapest device we featured, but we grew to like its unashamedly boxy shape and friendly controls. Its budget origins showed through in the testing, though, with slow printing. That said, printed results weren't too shabby, despite the lack of Photoret 4 photo technology that characterises its two big brothers here. If your budget is as tight as your desk space, the baby HP is well worth a look.

'We expect the next generation of models to be a little more streamlined'

The winners

The winner's circle was populated by three models, and only one scaled the top of the podium. In third place is the **Lexmark X5150** and that may surprise you. It did us, but it is a worthy recipient of our first **Highly Commended** award. Lexmark printers have started to make real strides in photo reproduction and this has filtered through to the X5150, which tops the Lexmark range at the moment. Text quality was good as well, but scanning speeds were less impressive. The Lexmark software was easy to install and less infuriating to use than any of the others here, although some advanced scanning options were squirreled away out of sight.



HP PSC 2210



Epson CX3200



Lexmark X5150

In the second **Highly Commended** slot was **Epson's CX3200**. This is a slightly difficult call as the CX3200 is a very capable machine but its scanner is inferior to that of the CX5200. If you are planning to do a lot of scanning, that may be a factor and, if so, hunt down a CX5200 and you will not be disappointed. If your scanner is likely to be a convenient shelf for your coffee cup more often than not, the price difference between these two machines is hard to justify, particularly as we couldn't separate them on print quality, print speed or any ease-of-use considerations. They also share the same software, but we found this was bitty and complicated to navigate when compared to the HP and Lexmark offerings.

In the end, the winner of this test was the **HP PSC 2210**, and so it goes home with an **Editor's Choice** award. This is very similar to the PSC 2175, but while we had to spend a lot of time getting good photos out of the cheaper model, the PSC2210 was good straight from the box. We're not going to tell you that it blitzed everything else on test because it didn't; this was a hard fought battle between the top two and the HP just nosed on a couple of points. The first is print quality. The Epson and the Lexmark both produced excellent photo prints, but under close inspection, the HP's were better. Even under intense spyglass scrutiny, we struggled to find too much worth grizzling about in photo prints, but the results weren't as good as you'll get from a dedicated standalone photo printer. Nonetheless, they were the best here.

Another winning suite for the HP is the list of features. At a price of £300, the PSC 2210 isn't cheap, but with a little shopping around we were able to find it for less than £250, as it has been around for about six months now. For that price you get an excellent scanner, a very good printer and direct printing from your digital camera's memory cards. Card slots are still uncommon on multifunction devices, although HP is obviously looking that way as two of its three machines here have the facility. To be honest, though, if you are serious about printing photos you would probably want to look for a better scanner, with this one having no facility for scanning transparencies or negatives. The fax facility is a bonus if you need one.

We've made the PSC 2210 top dog because of what it is: a great all-rounder. For photo and general printing, occasional scanning and copying, it is a good device that is reasonably compact, affordable to refuel and easy to use. At present, you can wish for nothing more from an inkjet multifunction device.

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£999 PCs

WORDS: EMILIE MARTIN TESTING: VNU LABS PHOTOS: BRUCE MACKIE

There are some powerful systems out there for £999, so whatever you want to use them for, these 10 PCs should inspire you

The summer season can be a pricey time, with family holidays to pay for, not to mention new school uniforms for the kids. But if you have managed to make it through the summer months with a little money left in the bank, you might want to think about treating yourself to a new PC.

You may well have an arsenal of digital holiday snaps or photos from summer weddings and family barbeques that are swamping your old home PC and would be better archived on a beefier hard disk or even burnt to disc with a CD writer. And don't you think you should edit all those movie clips you shot with your digital video camera over the summer, so you can

compile them on a DVD and play them in your living room?

If this sounds appealing, then this month's PC group test will be right up your street, as we have tested 10 of the best systems you can buy today for £999 ex VAT. The participating manufacturers have submitted powerful, well-specified systems, and there are some great features in there to keep you entertained during the winter months.

Furthermore, there are ports aplenty, so you can hook up all your peripherals and still have a few sockets left to accommodate those products that you're going to try and sneak onto your Christmas list.

Who said you get less for your money these days?





Advent 3317

As usual, Advent has built its system around a micro-ATX board – in this case an MSI Microstar MS-6777 – that reduces the overall size of this PC, which is handy if space is an issue. This houses an Athlon XP 3000+ processor with a clock speed of 2.06GHz and a single 512MB module of DDR SD-Ram system memory, which occupies one of the two Dimm slots.

Using a smaller system case obviously means that the interior is less roomy, with less space for air to move about to cool the system core. Advent has addressed this by fitting a plastic funnel over the processor to direct heat straight from the heatsink and processor fan to a case fan at the back of the system.

Underneath this you will find three PCI slots, of which one is occupied by a modem card with both a modem socket and a telephone pass-through socket.

At the front of the system, both optical drive bays are occupied, one with a 16-speed DVD-Rom drive and the other with an LG CD-RW and DVD+/-RW multidrive, so you don't have to choose between formats. Just below this, a 120GB Maxtor hard disk drive and a floppy disk drive take up two of the 3.5in drive bays, leaving a further two free.

The Advent put in a fair performance in our tests, with an

overall Sysmark score of 224. The Nvidia Geforce FX 5600 graphics card in the AGP slot helped it notch up a score of 9,614 in 3Dmark and 58fps (frames per second) in Unreal Tournament.

Connectivity options are good with four USB2 ports (two of which are front-mounted), Firewire, VGA and DVI sockets.

The bundled 17in Philips 170B4 LCD flat-panel supports both analogue and digital input and, despite having an integrated power supply, maintains a small footprint. There are also integrated stereo speakers with their own controls, and the unit can turn through 360 degrees.

DETAILS

RRP £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT

INFORMATION PC World 08705 464 464

www.pcworld.co.uk

PROS Monitor; small system tower; DVD+RW and -RW formats; connectivity options

CONS Smaller motherboard means less upgrade potential

VERDICT

Will free up some desktop space, but the small form factor board limits the upgrade path, and others were faster

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



CCL X-Force 75

The CCL will catch the eye of any modding enthusiast, with four cutaway sections on the side panel filled with plastic panes that reveal the inside of the system. A case fan has been mounted in the middle of these panels and is illuminated by red, green and blue LEDs.

The side-mounted fan makes opening the system a little fiddly. As the interior is on display, CCL has neatly clipped up the power cable connecting the fan, meaning you have to take the top panel off the tower and slip your hand inside to disconnect the power cable before you can get the side panel off.

Inside, the system core is bristling with components, such as a Creative Soundblaster Audigy 2 sound card with Firewire and 6.1-channel audio support, a Pinnacle Systems PC TV Pro card boasting TV, FM radio and digital video recording functions, and a two-port modem card. In theory, this leaves two of the five PCI slots vacant, but a two-port Firewire hub and Midi and serial port hubs occupy the remaining two backplates.

The Athlon XP 2700+ processor is not the most powerful CPU in this month's PCs, which may have contributed to the CCL's slightly below-par Sysmark score of 214. With a Radeon 9700 graphics

card in the AGP slot with 128MB of dedicated memory, it fared better in 3Dmark and Unreal Tournament with scores of 13,671 and 66.3fps respectively.

Two sticks of 256MB DDR SD-Ram memory sit across two of the three Dimm slots with a 120GB Maxtor hard disk drive under the Sony DVD+/-RW and 16-speed DVD-Rom optical drives. There are two front-mounted USB2 ports with a further four at the rear, along with a DVI socket in addition to the usual VGA port. A 17in (16in diagonal) Iiyama Vision Master Pro 413 CRT monitor is bundled, as is a set of Videologic 7.1-channel speakers.

DETAILS

RRP £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT

INFORMATION CCL 01274 471 201

www.cclcomputers.co.uk

PROS Sound card and TV card; DVD writer supports multiple formats; eye-catching system case; two Firewire ports; 7.1-channel speakers

CONS Sysmark score; CRT monitor adds to the overall footprint

VERDICT

Fared worse than some of the competition, but offers some great features. Worth a look if raw power is not a priority

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



Evesham Axis 2800+

There seems to be a penchant for LEDs among this month's manufacturers. The Axis 2800+ is encased in a black and silver system tower, and cutaway sections on the bottom half of the front panel reveal the glow of a number of blue LEDs.

A flap at the foot of the system tower conceals two USB2 ports, with headphone and microphone mini jack sockets, while a 52x 24x 52x Sony CD-RW drive and a Sony DVD+-RW drive open out of the front.

The Axis 2800+ is built around an Athlon XP 2800+ CPU, mounted on an MSI K7N2 Delta-ILSR motherboard. A total of 512MB of DDR SD-Ram system memory is arranged as two modules across two of the three Dimm slots present on this board. A 120GB Western Digital Caviar hard disk drive occupies one of the five 3.5in drive bays.

There is a modem card sitting in one of the five PCI slots, with a modem port and phone pass-through socket coming off the back, leaving the other four slots free, although a two-port USB2 hub and two-port Firewire hub sit on the backplate of the lowest PCI slot. The cables connecting these hubs to headers on the motherboard are clipped to the bottom panel of the system case.

All the PCI slots are screw-free and plastic levers are at the front

of the case to release the front-panel fascia – which can be replaced with other styles – and at the back to release the side panel. A Radeon 9600 graphics card occupies the AGP slot.

The Evesham put in a decent performance in Sysmark with an overall score of 229, but fared less well in our graphics processing tests with the lowest 3Dmark score in this group at 8,992 and 65.5fps in Unreal Tournament.

The bundled 17in Philips 170B4 LCD flat-panel monitor – the same one that is bundled with the Advent system – is a great addition and supports digital and analogue input.

DETAILS

RRP £1,173.83 (£999 ex VAT)
BEST PRICE & PRODUCT INFORMATION Evesham 0870 160 9500 www.evesham.com
PROS Multiple format DVD drive; good connectivity options; screw-free PCI slots; LCD flat-panel monitor
CONS Graphics processing performance; 5.1-channel speakers may disappoint audiophiles
VERDICT

A good all-round system, but it lacks the features of the CCL or the muscle of the Nethighstreet

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



Intellect Q28C

Supporting a similar system core to the Poweroid on page 138, the Intellect is built around a 2.8GHz Pentium 4, with 512MB DDR SD-Ram of system memory and a 120GB Seagate Barracuda hard disk. An Asus P4P800 motherboard based around an Intel 865PE chipset forms the backbone of the system interior and offers support for hyperthreading, dual-channel DDR memory and Gigabit Lan.

Only two of the four Dimm slots on this board house memory modules and, as the board supports a maximum 4GB of system memory, you could expand it to 2.5GB in this configuration. A two-port modem card and a Creative Soundblaster Audigy 2 sound card, with Firewire and mini jack sockets for 6.1-channel audio coming off the back, take up two of the five PCI card slots. A Midi port hub occupies the backplate of the lowest slot.

The Intellect achieved the third highest overall score in both Sysmark at 259, and Unreal Tournament, at 68.2fps. It scored 11,580 in 3Dmark, placing it towards the bottom of this group.

Three of the seven 3.5in drive bays at the front of the system case are occupied, as Intellect has thrown in a four-in-one card reader that lets you access information from Memory Stick, Secure Digital (SD), Smart

Media and Compact Flash (CF) media. There are also two USB2 ports at the front of the tower, with four more round the back.

A 16-speed Asus DVD-Rom also opens out of the front panel, along with a Lite-on 52x 24x 52x CD-RW drive. There is no DVD writer, however.

There is a good range of connectivity options on the back panel of the tower, including both DVI and VGA ports, a Firewire port, serial and parallel ports and an S/PDIF-out socket. The bundled 17in Sharp LCD flat-panel monitor features two built-in speakers with a headphone jack socket and can be swivelled.

DETAILS

RRP £1,173.83 (£999 ex VAT)
BEST PRICE & PRODUCT INFORMATION Intellect 08701 225 590 www.intellect.uk.com
PROS Monitor; sound card; four-in-one card reader; motherboard supports dual-channel DDR memory; performance
CONS No DVD writer
VERDICT

A well-specified system capable of great performance, although the omission of a DVD writer is a drawback

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



Jal FX3000

Jal has housed its system in a two-tone black and cream tower case with matt silver trimmings. Fold up the small silver flap at the foot of the tower and two USB2 ports are exposed, supplementing four further USB2 ports at the rear of the system. A floppy disk drive, 16-speed DVD-Rom drive and a 52x 32x 52x CD-RW drive also open out of the front of the case. There's no DVD writer, though.

The Jal is built around an AMD Athlon XP 3000+ processor with a clock speed of 2.17GHz mounted on a Gigabyte GA-7N400 Pro motherboard. This features four Dimm slots, of which two are occupied, each with a 256MB stick of DDR SD-Ram system memory, and supports dual-channel DDR system memory, which should speed up system performance.

There are two unoccupied optical drive bays at the front of the system and a 120GB Maxtor hard disk drive perches above the two free 3.5in bays.

A Leadtek Winfast Geforce FX 5600 Ultra graphics card sits in the AGP slot and helped clock up 11,947 in 3Dmark and 67.2fps in Unreal Tournament. The Jal also managed 240 in Sysmark, with individual scores of 332 for Internet content creation and 174 for office productivity.

Only one of five PCI slots is occupied, by a modem card with

modem and phone pass-through sockets coming off the back. In this configuration, a further two slots are unusable, as a Firewire bracket with a mini and regular size port and a bracket housing speaker jack sockets, an RCA socket and an optical-out port sit on the backplates.

The usual ports and sockets are found at the back of the system tower, including a DVI and VGA port, TV-out socket, a Lan port, two serial and one parallel port.

The Jal comes with a 17in NEC-Mitsubishi LCD flat-panel monitor, with a height-adjustable stand and support for both analogue and digital input.

DETAILS

RRP £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT

INFORMATION Jal

01782 848 100

www.jal.co.uk

PROS Monitor; connectivity options; motherboard supports dual-channel DDR memory; decent performance

CONS No DVD writer

VERDICT

A good system in its own right, but lacks some of the panache of the more powerful or feature-rich systems on test here

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



Mesh Matrix 3000+ MX CRT

Mesh has put together a powerful system this month, submitting a PC with an Athlon XP 3000+ processor at its heart, to which 512MB of DDR SD-Ram memory has been added, along with a 120GB Maxtor hard disk drive. Its Sysmark score of 244 places the Mesh in the middle of the pack in terms of performance, with scores of 334 and 178 for Internet content creation and office productivity respectively.

It excelled in our graphics tests, however, coming top of the class with a score of 72.2fps in Unreal Tournament and a close second to the Nethighstreet system with 15,935 in 3Dmark. No doubt the powerful Radeon 9800 graphics card helped it along here.

The Asus A7N8X motherboard has five PCI slots, one of which is occupied with a two-port modem card. Another of the backplates is taken up by a connector hooking the Midi port up to the motherboard.

At the front of the system there are two free optical drive bays ready to house additional drives; the other two house a 16-speed Pioneer DVD-Rom drive and a Sony DVD+/-RW multiride. Mesh has mounted three of the four 3.5in drive bays at 90 degrees to the side panel of the system case, which makes installing or removing drives a bit easier. A case fan sits on the back panel to

help air to circulate round the system core, and there's also the usual CPU fan.

There are two USB2 ports mounted on the front panel of the lockable system tower with another four at the rear. There are also two Lan sockets here along with serial and parallel sockets and DVI and VGA sockets.

The black and silver 18in NEC-Mitsubishi Diamond Pro flat-screen CRT monitor supports only analogue signals, so you'd have to splash out on an LCD display before you could feel the benefits of that DVI connection.

DETAILS

RRP £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT

INFORMATION Mesh

0870 046 4747

www.meshcomputers.com

PROS Graphics processing power; DVD writer supports both +RW and -RW formats

CONS The CRT monitor will eat up your desk space

VERDICT

Great graphics performance makes this an appealing choice for the gamer, but other PCs offer more imaginative features

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



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Multivision Ionix 98 EX

The Multivision is a sleek-looking machine in its matt black casing with a blue LED strip running down the centre of the front panel. It is bundled with a black wired Logitech Internet keyboard, a wired optical scroll mouse and the same 18in flat-screen CRT as the Mesh, which does take up a fair amount of desktop space.

A discreet flap located on the right-hand side panel conceals two USB2 ports, and there are a further two at the rear. A 16-speed DVD-Rom drive and a DVD-/RW multidrive open out of the front of the tower. The remaining two unoccupied optical drive bays are concealed behind flaps that pop open when you push on the pressure points in the corners.

The case has thumbscrews and a handle to release the side panel, which opens to reveal a well-balanced system core. An Athlon XP 3200+ powers the system, with 512MB of DDR SD-Ram system memory, arranged in two modules to leave a third Dimm slot unoccupied, and a 120GB Samsung hard disk drive.

Underneath the Radeon 9800 Pro graphics card sitting in the AGP slot, four of the five PCI slots are unoccupied, with a lone two-port modem card in the fifth, providing good upgrade potential. One other backplate is taken up by a hub providing

Firewire, audio, RCA and S/PDIF optical-out connectivity. The cable that hooks this up to the header on the motherboard might make it fiddly to get a PCI card into another of the slots.

It scored 221 overall in Sysmark, which puts it near the bottom of this group in terms of performance, with individual scores of 310 for Internet content creation and 158 for office productivity. However, it powered through our graphics processing benchmarks with 15,088 in 3Dmark and 63.6fps in Unreal Tournament, which will appeal to gamers or those using graphics-intensive packages.

DETAILS

RRP £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT INFORMATION Multivision 0870 066 0885

www.multivision.co.uk

PROS Graphics processing performance; multiple format DVD writer; good upgrade potential

CONS That CRT monitor may put you off if you want to save desktop space

VERDICT

A well-specified machine on paper that failed to live up to expectations in Sysmark

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



Nethighstreet PCW999

Nethighstreet is one of three manufacturers this month to have submitted a system based on a Pentium 4 processor, in this case a hyperthreading-enabled CPU with a rated clock speed of 3.06GHz. This has been coupled with 512MB of DDR SD-Ram system memory arranged across two of the three Dimm slots on the MSI 865PE motherboard with dual-channel DDR memory and a meaty 120GB hard disk.

All this is packed into an unexceptional beige system case that belies the muscle this PC proved it is capable of flexing in our tests. In Sysmark it topped the league, with an overall score of 273 that stomped all over the Poweroid, which came a close second. It went on to clock up a massive score of 16,241 in 3Dmark and 72.1fps in Unreal Tournament.

Nethighstreet has thrown in a little surprise when you open up the system case: there is a fan squatting over the northbridge on the motherboard that has been fitted with red, green and blue LEDs that flash in a variety of sequences. Once you've taken this in and go on to explore the rest of the system, you'll find a Radeon 9800 Pro graphics card in the AGP slot with 128MB of dedicated memory, with one of the five PCI slots occupied by a two-port modem card just below.

There is also good potential for memory upgrade, with only two of the four Dimm slots housing memory modules.

There are five spare 3.5in drive bays at the front and two spare optical drive bays, the other two being occupied by a 52x 24x 52x CD-RW and a DVD/CD-RW combo drive. Two USB2 ports sit at the front of the system tower with another six at the rear, taking the total up to eight. There are also serial, parallel and Lan ports back there and the choice of DVI or VGA sockets, although the 19in (18in diagonal) Samsung flat-screen CRT monitor supports only analogue input.

DETAILS

RRP £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT INFORMATION Nethighstreet 0870 777 5252

www.nethighstreet.com

PROS Performance; eight USB ports; 19in monitor handy for image-editing; multi-format DVD writer

CONS Bundled CRT takes up space; no Firewire connectivity

VERDICT

A very powerful PC, but not the most well-balanced specification of all the systems on test this month

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

"Sleek Package Attractive Price"

PC Advisor September 2003 - AJP 8080

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 DVD-RW/CD-RW or 2nd HDD)
- Built in 56K fax/modem
- Built in 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 onboard
- Built in Smart Card Reader (supports MMC/SD/SMMS)
- Microsoft® Windows® XP Professional
- Up to 4.5 Hours Battery Life
- 318(W)x277(D)x25-30mm(H) / Weight: 2.4Kg
- Case, 36 months RTB Warranty***

Other 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**

£875
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AJP D410E - High End Notebook

- 15" TFT SXGA+ (1400x1050)
- 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 DVD/CDRW Combo Drive (Optional DVD-RW/CD-RW)
- Built in 3.5" FDD
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- ATI Mobility Radeon 9000 with Integrated AGP 4x
- 64MB DDR Video RAM
- IEEE 1394 Firewire 400Mbps port
- Ports: 3xUSB 2.0, TV-Out, Parallel, Serial, Monitor, PS/2
- Built in Video Camera
- Built in Bluetooth Technology
- Built in Wireless antenna
- 329(W)x275(D)x36mm (H) / Weight: 3.3Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3D Sound & Speakers, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Carry Case, Windows XP Home with CD & Manual, Wireless LAN module (Optional)

15" TFT | **P4 2.8GHz** | **512MB RAM** | **60GB HDD** | **Combo Drive**

£999
ex. VAT
£1173.83
inc. VAT



Built in Video Camera

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***

Other Features: Built in 3.5" FDD, Built in 3D Sound & Speakers, 2x PC Card Slot, Windows XP Home with CD & Manual, (Optional) Wireless LAN module

17.1" TFT | **P4 2.66GHz** | **512MB RAM** | **120GB HDD** | **Combo Drive**

£999
ex. VAT
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WhatPC? Recommended

What PC? Recommended 02



PC Home Silver Award 02

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"Excellent Specification"

What Laptop Silver Award (8880E) - May 2003



Big is Beautiful! Experience the new 17-inch Widescreen Notebook from AJP, featuring a superior WXGA screen with 1440x900 resolution. It is fantastic for multimedia entertainment, viewing large quantities of data, making professional presentations or even watching your favourite DVD whilst working. With sound quality second to none the D480W comes with 4 built in speakers and a powerful subwoofer to give you that extra deep precise bass sound.

For superior features and performance the AJP D480W is the perfect choice.

Built in Video Camera

AJP D480W - Widescreen Ultimate Desktop Replacement

- 17" TFT WXGA (1440x900) Widescreen
- 2.8GHz Intel® Pentium 4 with 512K Cache (Optional 3.06GHz - Hyper Threading)
- 1024MB 333DDR RAM
- 80GB HDD
- Combo DVD/CD-RW Drive (Optional DVD-RW/CD-RW)
- Built in 3.5" FDD
- 4x Built in Speakers & Sub Woofer Module
- Sub Woofer swappable with TV-Tuner or 6-in-1 Smart Card Reader
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- ATI Mobility Radeon 9000 with Integrated AGP 4x
- 64MB DDR Video RAM
- IEEE 1394 Firewire 400Mbps port
- Ports: 3xUSB 2.0, IrDA, TV-Out, Video In (with TV Tuner only), Parallel, Serial, Monitor, PS/2, S/P DIF output
- Built in Video Camera
- Built in Bluetooth Support
- Built in Wireless LAN antenna
- Full Size Keyboard & Separate Numeric Keypad
- 393(W)x275(D)x37.5mm(H) / Weight: 3.8Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3.5" FDD, Built in 3D Sound, 1x PC Card Slot, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Windows XP Home with CD & Manual, Bluetooth module (Optional), Wireless LAN module (Optional)

P4
2.8GHz

1024MB
RAM

80GB
HDD

Combo
& FDD

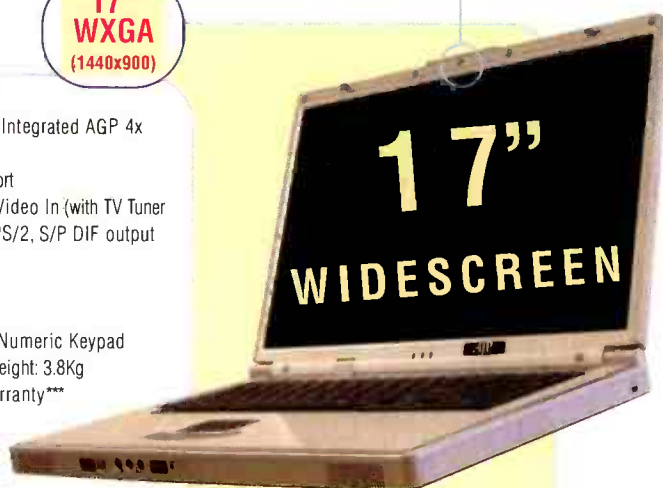
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Sub
Woofer

4x
Speakers

Video
Camera

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 (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***

Other Features: 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, 4x IP Sharing Module for Networking/ADSL (Optional), Wireless LAN module (Optional)

16.1"
TFT

P4
2.8GHz

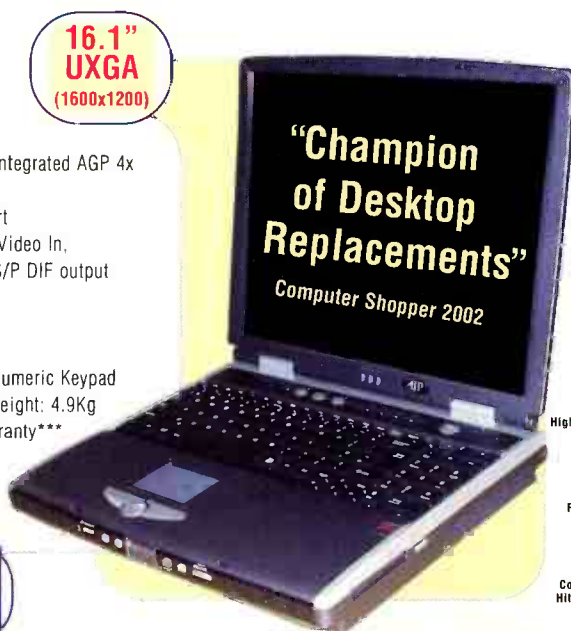
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Poweroid 3203

In common with Intellect, Poweroid has submitted a system built around a 2.8GHz Pentium 4 processor coupled with 512MB of DDR SD-Ram memory and a 120GB Seagate Barracuda hard disk drive.

Noise-dampening foam pads have been fitted on the inside of the side panel, along the bottom of the case interior and on the inside surface of the back panel. The pads on the back panel cover the ventilation perforations, but a quiet Cooler Master fan has been fitted on the northbridge with another fan sitting over the CPU, to help keep the system core cool.

The Poweroid did well in our benchmark tests, achieving an overall score of 271 that places it just behind the Nethighstreet, and individual scores of 379 in Internet content creation and 193 for office productivity. The ATI Radeon All-in-Wonder 9700 graphics card helped it attain scores of 14,412 in 3Dmark and 64.7fps in Unreal Tournament.

Just below the graphics card are three PCI slots ready to house additional cards should you want to upgrade the system, although one is blocked by a two-port USB2 hub. A two-port modem card and a three-port Firewire card occupy the other two. Two of the four Dimm slots on the Abit IS7-E series motherboard are occupied, and the board supports hyperthreading and dual-

channel DDR system memory. At the front of the chassis, an NEC DVD+RW drive and a 16-speed Sony DVD-Rom drive that reads CD-Roms at 24-speed occupy two of the four optical drive bays, while four of the 3.5in drive bays are vacant.

There are two front-mounted USB2 ports on the front of the system tower to supplement the six at the rear, and a DVI port to connect the 18in Iiyama LCD flat-panel, but no VGA port if you're planning to hook up older monitors. You also get serial and parallel ports in addition to optical S/PDIF-in and -out ports and a CATV connection.

DETAILS

RRP £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT

INFORMATION Poweroid
0870 220 0444

www.poweroid.com

PROS Performance; 18in flat-panel monitor; noise-dampening pads; good connectivity options

CONS DVD writer supports +RW format only; no VGA socket for an older monitor

VERDICT

A good all-round system for users looking to hook up a range of peripherals

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



Systemax Inspire 3157

The Systemax Inspire 3157 should raise the pulse of multimedia fans as it comes with an MSI Geforce FX 5600 Personal Cinema graphics card, which features an integrated TV encoder and mpeg-2 decoder and an Nvidia multimedia radio frequency remote control. This links up to the PC via a wireless receiver that plugs into one of the four USB2 slots on this system, two of which are front-mounted.

The remote has controls for the system's CD and DVD player, TV tuner, personal video recorder and MP3 player and there is a huge navigation button that moves in eight directions so you can control the mouse remotely. Faux-left and right mouse buttons sit underneath.

The system core is built around an Athlon XP 3000+ processor, with 512MB of DDR SD-Ram memory arranged in two modules, leaving the third Dimm slot free. All these components sit on an MSI motherboard built around an Nvidia Nforce2 chipset. A 52-speed CD-Rom drive and a Sony DVD+/-RW multidrive occupy two of the three optical drive bays, while a 160GB hard disk drive and floppy disk drive occupy two of the four 3.5in drive bays.

The Systemax achieved an overall score of 254 in Sysmark, with individual scores of 321 and 201 for Internet content

creation and office productivity respectively. It managed scores of 10,747 in 3Dmark and 62fps in Unreal Tournament, placing it second to last in this group.

There is good upgrade potential with a two-port modem card taking up just one of the five PCI slots, but a hub with Firewire, RCA and optical-out ports, and speaker mini jack sockets does take up another backplate.

At the rear of the system you'll also find serial and parallel ports and a Lan connection. The bundled 17in CTX LCD flat-panel will free up some desktop space and a set of Videologic 7.1-channel speakers is also included.

DETAILS

RRP £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT

INFORMATION Systemax
0870 729 7366

www.systemaxpc.co.uk

PROS Huge hard disk; graphics card with TV, personal video recorder and FM radio functions; multiple format DVD writer; 7.1-channel speakers; LCD flat-panel

CONS Hard to fault

VERDICT

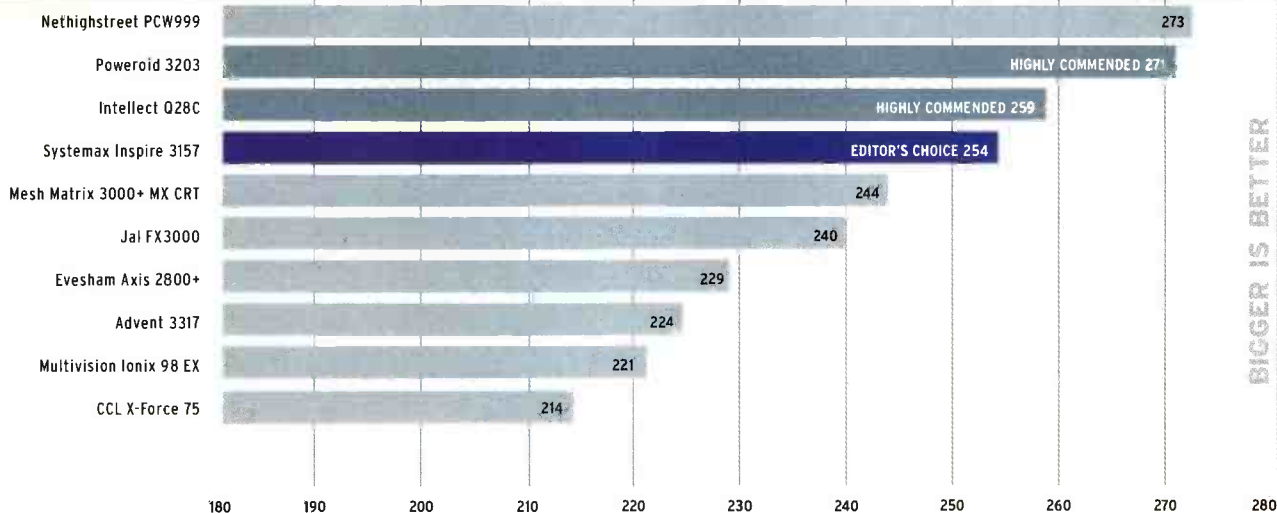
A very well-specified system with a fantastic range of features. The leader of this pack

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

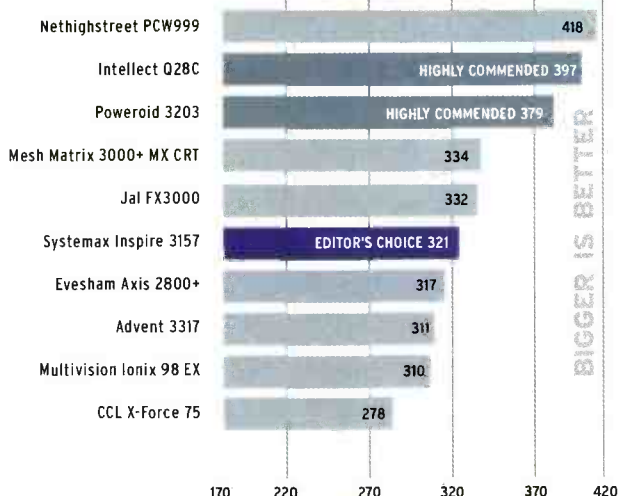
Lab results



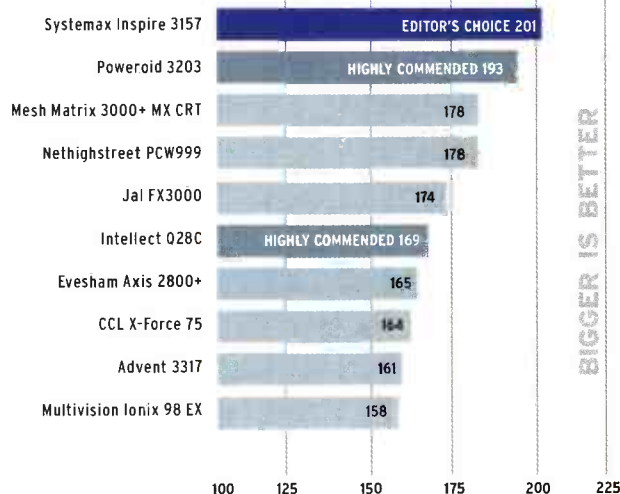
Sysmark 2002 overall



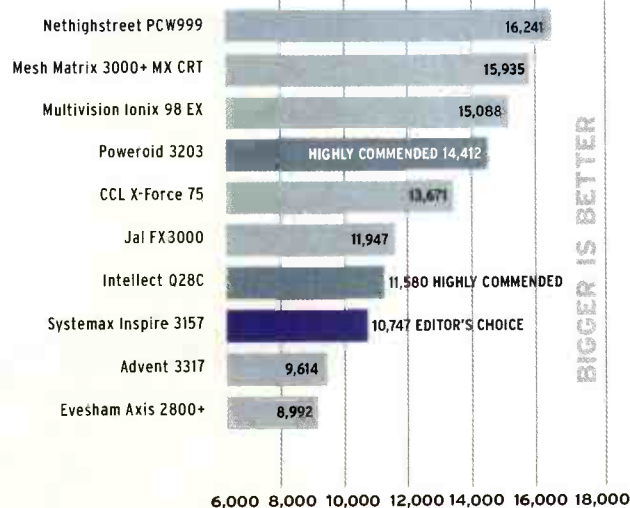
Sysmark 2002 Internet content creation



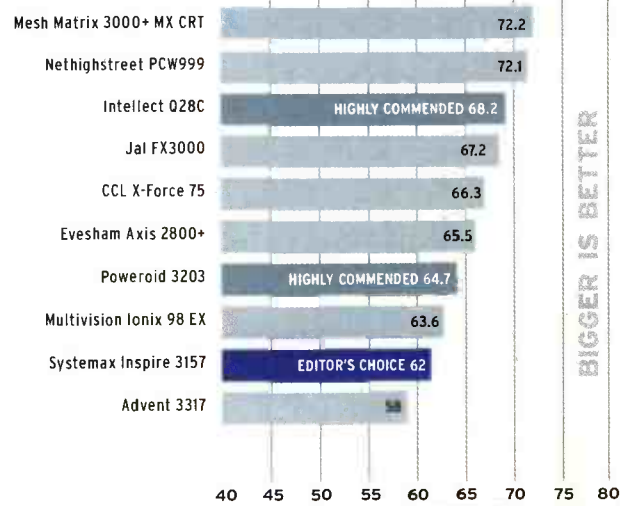
Sysmark 2002 office productivity



3Dmark 2001 (1,024 x 768 at 32bit)







Unreal Tournament (fps) (1,024 x 768)



Please see page 12 for an explanation of how we tested the PCs

Table of features

				
MANUFACTURER	ADVENT	CCL	EVESHAM	INTELLECT
MODEL NAME	3317	X-FORCE 75	AXIS 2800+	Q28C
Price inc VAT and delivery (ex VAT)	£1,173.83 (£999)	£1,173.83 (£999)	£1,173.83 (£999)	£1,173.83 (£999)
Phone	08705 464 464	01274 471 201	0870 160 9500	08701 225 590
URL	www.pcworld.co.uk	www.cclcomputers.co.uk	www.evesham.com	www.intellect.uk.com
HARDWARE SPECS				
Processor	AMD Athlon XP 3000+ 2.06GHz	AMD Athlon XP 2700+ 2.17GHz	AMD Athlon XP 2800+ 2.06GHz	Intel Pentium 4 2.8GHz
Memory quantity and type	512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC3200	512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC3200
Occupied/spare memory (Ram) slots	1/1	2/1	2/1	2/2
Max memory in this configuration	1.5GB	1.5GB	1.5GB	2.5GB
Maximum memory supported by motherboard	2GB	3GB	3GB	4GB
Hard disk manufacturer and model	Maxtor 6Y120LO	Maxtor 6Y120MO	Western Digital WDC WD1200JB	Seagate ST3120026AS
Hard disk size	120GB UltraDMA133	120GB Serial ATA/150	120GB UltraDMA100	120GB Serial ATA/150
Storage drive manufacturer	LG DVD-Ram GMA-4020B	Sony DVD-RW DW-U10A	Sony DVD+/-RW DWU14A-BK	Liteon CD-RW LTR-52246S
Drive speed	DVD Ram 2x/2x, DVD-RW 1x/8x, DVD+R/RW 8x, DVD-R 2x/8x, CD 24x/8x/32x DVD-Ram/ DVD+/-RW/CD-RW	DVD+RW 2.4x/2.4x, DVD-RW 4x/2x, DVD-Rom 8x, CD 24x/10x/ 32x DVD+RW/DVD-RW/CD-RW	DVD+/-RW 4x/DVD-R 4x/DVD-RW 2x/DVD-Rom 12x/CD-R 24x/ CD-RW 16x/CD-Rom 32x	52x 24x 52x
MOTHERBOARD COMPONENTS				
Motherboard manufacturer/model	MSI MS-6777	EpoX EP-8RDA3+	MSI MS-6777	Asus P4P800
Chipset manufacturer/model	Nvidia nForce2	Nvidia nForce2	Nvidia nForce2	Intel Springdale 865PE
EXPANSION AND I/O				
No of 3.5/5.25in bays	4/2	6/4	5/4	7/4
No of free 3.5/5.25in bays	2/0	4/2	3/2	4/2
No of PCI/shared/AMR slots	3/0/0	5/0/0	5/0/0	5/0/0
No of free PCI/shared/AMR slots	2/0/0	0/0/0	3/0/0	2/0/0
No of USB 1.1/USB2/Firewire	0/4/2	0/6/3	0/6/2	0/6/2
No of serial/parallel/PS/2	1/1/02	0/1/2	1/1/2	1/1/2
MULTIMEDIA				
Second optical drive	Liteon DVD-Rom	Sony DVD-Rom DDUI621	Sony CD-RW CRX220E1	Asus DVD-Rom E616
Drive speed	16x	16x	52x 24x 52x	16x DVD-Rom
Sound card manufacturer and model	Integrated Nvidia nForce2 MCP	Creative Soundblaster Audigy 2	Integrated Nvidia nForce MCP	Creative Soundblaster Audigy 2
Speakers manufacturer and model	Harman International JBL Creature 2.1	Videologic 7.1 ZXR750	Creative Inspire 5.1 5300	Built into monitor
Graphics card manufacturer and model	MSI GeForce FX 5600	Sapphire Radeon 9700 RTL	ATI Radeon 9600 Pro	Gigabyte GV-R96P128D
Chipset	Nvidia GeForce FX 5600	ATI Radeon 9700	ATI Radeon 9600 Pro	ATI Radeon 9600
Memory and type	256MB DDR	128MB DDR	256MB DDR	128MB DDR
Monitor manufacturer and model	Philips 170B4MG/002	Iiyama HM703UT-A Vision Master Pro 413	Philips 17084	Sharp LL-T17D3-H
Max viewable diagonal	17in	16in	17in	17in
Maximum resolution (at Vesa refresh for CRT monitors)	1,280 x 1,024	1,600 x 1,200	1,280 x 1,024	1,280 x 1,024
OTHER INFORMATION				
Misc hardware/modem	0EM SoftK56 modem, Advent 320IU keyboard and mouse	Conexant HCF V.92 56K modem, Pinnacle Studio PC TV Pro, Genius Twintouch Wireless keyboard and mouse	CNXT V.92 modem, Microsoft Wireless Multimedia keyboard and mouse	Card reader, 3Com Gigabit Lan, Intel 536EP modem, Microsoft Multimedia keyboard and mouse
Bundled software	Microsoft Windows XP Home Edition, PowerDVD XP, Pinnacle Instant CD/DVD, Microsoft Works	Microsoft Windows XP Home Edition, Ability Office 2002, Panda Antivirus Titanium, Pinnacle Instant CD/DVD, Pinnacle PCTV, Pinnacle Trex, PowerDVD XP Home	Microsoft Windows XP Home Edition, Ahead Nero Vision Express, Pinnacle Studio 8, Ability Office 8	Microsoft Windows XP Home Edition
Standard warranty*	1yr on site	1yr C&R, 2yrs RTB labour only	2yrs on site, 1yr RTB	1yr on site, 1yr RTB
SCORES				
Features	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★
Overall score	★★★★★	★★★★★	★★★★★	★★★★★
*(RTB = return to base, C&R = collect and return, P&L = parts and labour)				

					
JAL	MESH	MULTIVISION	NETHIGHSTREET	POWERROID	SYSTEMAX
FX3000	MATRIX 3000+ MX CRT	IONIX 98 EX	PCW999	3203	INSPIRE 3157
£1,173.83 (£999)	£1,173 (£999)	£1,173.83 (£999)	£1,173.83 (£999)	£1,173.83 (£999)	£1,173.83 (£999)
01782 848 100	0870 046 4747	0870 066 0885	0870 777 5252	0870 220 0444	0870 729 7366
www.jal.co.uk	www.meshcomputers.com	www.multivision.co.uk	www.nethighstreet.com	www.poweroid.com	www.systemaxpc.co.uk
AMD Athlon XP 3000+ 2.17GHz	AMD Athlon XP 3000+ 2.17GHz	AMD Athlon XP 3200+ 2.2GHz	Intel Pentium 4 3.06GHz	Intel Pentium 4 2.8GHz	AMD Athlon XP 3000+ 2.17GHz
512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC3200	512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC2700	512MB DDR SD-Ram PC2100	512MB DDR SD-Ram PC2700
2/2	2/1	2/1	2/2	2/2	2/1
2.5GB	1.5GB	1GB	2.5GB	2.5GB	1GB
3GB	3GB	1.5GB	4GB	4GB	1.5GB
Maxtor 6Y120L0	Maxtor 6Y120P0	Samsung SP1203N	Maxtor 6Y120L0 7200 rpm	Seagate ST3120026AS	Samsung SP1614N
120GB UltraDMA133	120GB UltraDMA133	120GB UltraDMA100	120GB UltraDMA133	120GB Serial ATA/150	160GB UltraDMA100
Artec CD-RW WRR-52Z	Sony DVD-RW DW-U10A	NEC DVD-RW ND-1300A	Asus CD-RW CRW-5224A	NEC DVD-RW ND-1000A	Sony DVD-RW DW-U10A
52x 32x 52x	DVD+RW 2.4x/2.4x, DVD-RW 4x/2x, DVD-Rom 8x, CD 24x/10x/ 32x DVD+RW/DVD-RW/CD-RW	DVD+RW 4x/2.4x, DVD-RW 4x/2x, DVD-Rom 12x, CD 16x/10x/ 40x DVD+RW/DVD-RW/CD-RW	52x 24x 52x	CD 16x 10x 40x DVD 2.4x 2.4x 12x	DVD+RW 2.4x/2.4x, DVD-RW 4x/2x, DVD-Rom 8x, CD 24x/10x/ 32x DVD+RW/DVD-RW/CD-RW
Gigabyte GA-7N400 Pro	Asus A7N8X Deluxe	MSI MS-6729-IL	MSI 865PE Neo2-S	Abit IS7-E	MSI MS-6729-IL
Nvidia Nforce2	Nvidia Nforce2	Nvidia Nforce2	Intel Springdale I865PE	Intel Springdale I865PE	Nvidia Nforce2
4/4	4/3	4/4	7/4	6/4	4/4
2/2	2/1	2/2	5/2	4/2	2/2
5/0/0	5/0/0	5/0/0	5/0/0	5/0/0	5/0/0
2/0/0	3/0/0	3/0/0	4/0/0	2/0/0	4/0/0
0/6/2	0/6/2	0/4/1	0/8/0	0/8/3	0/4/1
2/1/2	1/1/2	1/1/2	1/1/2	1/1/2	1/1/2
Artec DVD-Rom DHM G48	Pioneer DVD-Rom DVD-116	MSI DVD-Rom 8216	Pioneer DVD-RW DVR-105	Sony DVD-Rom DDU1621	Liteon CD-Rom LTN526
16x	16x	16x	DVD 4x 2x 12x CD 16x 8x 32x	16x	52x
Integrated Nvidia Nforce2 MCP	Integrated Nvidia Nforce2 MCP	Integrated Nvidia Nforce2 MCP	Integrated C-Media 9739A	Integrated Realtek ALC650	Integrated Nvidia Nforce2 MCP
Creative 5.1 Inspire 5100	Creative Inspire 515300	Creative Inspire 515300	Creative Inspire 515300	Creative Inspire 6.1 6700	Videologic 71 ZXR750
Leadtek Winfast A310 Ultra	Sapphire Radeon 9800	ATI Radeon 9800 Pro	ATI Radeon 9800 Pro	Sapphire Radeon 9700 All-in-Wonder	MSI GeForce FX 5600 Personal Cinema
Nvidia GeForce FX 5600 Ultra	ATI Radeon 9800	ATI Radeon 9800 Pro	ATI Radeon 9800 Pro	ATI Radeon All-in-Wonder 9700	Nvidia GeForce FX 5600
128MB DDR	128 MB DDR	128MB DDR	128MB DDR	128MB DDR	128MB DDR
NEC-Mitsubishi Multisync LCD 1760NX	NEC-Mitsubishi Diamond Pro 930SB	NEC-Mitsubishi Diamond Pro 930SB	Samsung Syncmaster 957MB	Iiyama AS4611UT	CTX S700B
17in	18in	18in	18in	18in	17in
1,280 x 1,024	1,920 x 1,200	1,920 x 1,200	1,600 x 1,200	1,280 x 1,024	1,280 x 1,024
Intel V92 modem, Microsoft Wireless Multimedia keyboard and mouse	Dual Lan, SoftK56, Logitech Internet keyboard & mouse	Intel 536EP V.92 modem, Nvidia Nforce Lan, Logitech Internet keyboard & mouse	Intel 536EP V.92 modem, Intel Pro100 Lan, Microsoft Internet keyboard and mouse	CXT10B6 HCF modem, 3Com Gigabit Lan, Firewire card, Logitech cordless keyboard & mouse	Nforce MCP Lan, Nvidia Remote Cinema, Neto Dragon 56K voice modem, Logitech Internet keyboard & mouse
Microsoft Windows XP Home Edition, Winfast DVD, Microsoft Works V7, Ahead Nero Ulead Cool v3, Visual Studio 6, Norton Internet Security 2003	PowerDVD XP, Pinnacle Studio 8, Ahead Nero, Microsoft Works Suite 2003, Microsoft Windows XP Home Edition	Microsoft Windows XP Home Edition, Ahead Nero Express, PowerDVD XP	Microsoft Windows XP Home Edition, PowerDVD XP, Ahead Nero V5	Microsoft Windows XP Home Edition, Ability Office, Pinnacle Studio 8, Pinnacle Hollywood FX	Microsoft Windows XP Home Edition
2yrs on site P&L	3yrs on site P&L	1yr on site, 4yrs RTB labour only	1yr RTB P&L	2yrs RTB, 3yrs RTB labour only	3yrs on site
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

If you're not flowcharting with allCLEAR you're wasting your time.

- Are you responsible for documenting your company's procedures and processes?
- Does your job involve creating flowcharts?
- Would you like to save time creating and editing?

If so, you need an intelligent flowcharter, not drawing software that purports to be a flowcharter.

Using revolutionary technology, allCLEAR is the only flowcharter that automatically draws flowcharts for you - twice as fast as in any other software. This saves you hours, and pays for itself the first time you use this very affordable software.

Imagine importing existing procedures from your word processor - allCLEAR will instantly create your flowchart. When you need to make one of those frequent changes, you are probably five times more productive, as allCLEAR redraws and reconnects the boxes automatically. allCLEAR makes you incredibly productive.

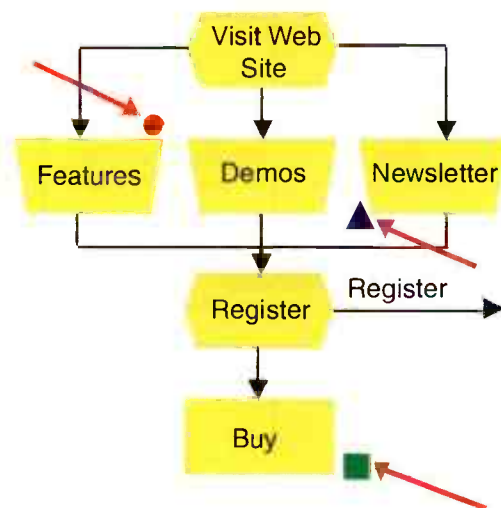
Drag & Drop Flow Structures

Perhaps the easiest way to use allCLEAR is to drag and drop process components. You will not believe how quickly you can create complex flowcharts / process maps using allCLEAR.

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Optional allCLEAR Analyzer is the simplest way to simulate and analyse your processes. Questions like "How long does the process take on average? What is the maximum cost? Which is the optimum work flow?" These are easy to answer with allCLEAR and, using built in spreadsheets, you can compare results of process changes.

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Editor's Choice

The £999 price point in this group test is significant for manufacturers and consumers alike. This is a popular budget for experienced PC users looking to replace their system, and one that gives manufacturers just enough leeway to pack some exciting features into their systems.

The PCs we've seen this month certainly bear this out. We set no minimum specification for manufacturers, just the £999 ex VAT price, and most chose to blow their build budgets on high-performance components rather than flashy add-on peripherals. We didn't receive a single PC with a hard disk drive smaller than 120GB or with less than 512MB of DDR SD-Ram system memory. The Intellect, Jal and Poweroid systems even featured motherboards that support dual-channel DDR memory, which should not only significantly boost system performance but also opens up the upgrading possibilities.

We were also impressed that a total of eight of the systems on test featured a DVD writer that supports both +RW and -RW formats, which is handy given that an industry-wide standard format for rewritable DVD media has yet to be decided upon.

'Most chose to blow their budget on high-performance components'

Most remarkable among the features of the PCs in this group, however, were the multimedia functions offered by both the CCL with its Pinnacle Systems PC TV Pro, and the Systemax, which featured an MSI Geforce FX 5600 Personal Cinema graphics card.

The winners

There are three PCs that really stand out from the crowd this month. The first is the **Systemax Inspire 3157**, which wins our **Editor's Choice** award. It looks great on paper, with a well-specified system core that features a speedy Athlon XP 3000+ processor coupled with 512MB of DDR SD-Ram memory and a 160GB hard disk – the largest we have seen this month. And, yes, it did well in our benchmarks. But the Systemax really comes into its own when you use it, with the graphics card providing

a wealth of multimedia functions including a TV tuner, personal video recorder and MP3 player.

This card even comes with a remote control, which will help to liberate you from your uncomfortable old swivel chair when you want to watch.

Systemax has also managed to pack into the system a CD-Rom drive and a DVD writer that supports multiple formats, which has good upgrade potential if you want to add to it at a later date. You also get USB2, Firewire, a set of 7.1-channel speakers so you can enjoy all those multimedia functions, and a 17in CTX flat-panel monitor, which is the icing on the cake.

The two recipients of our **Highly Commended** awards this month are built around very similar system cores that feature a 2.8GHz Pentium 4 processor, 512MB of DDR SD-Ram system memory and the same 120GB Seagate Barracuda hard disk.

The first is the **Intellect Q28C**. It offers some appealing features beyond the system core, with a Creative Soundblaster Audigy 2 sound card in one of the PCI slots and a four-in-one card reader that gives you fast access to information stored on media from digital cameras and other peripherals.

This system put in a good all-round performance in our benchmarks and should be more than up to whatever jobs you are likely to throw at it. It also offers a good range of connectivity options and, while it is a shame that there is no DVD writer included, you do get that 17in Sharp LCD panel, which is a great space saver.

Upgraders will be pleased with the expansion potential inside the system tower, with a motherboard that supports hyperthreading, dual-channel DDR memory and Gigabit Lan. There are spare slots for additional PCI cards, too, and four Dimm slots ready to house additional memory modules.

Our second **Highly Commended** award goes to the **Poweroid 3203**. This is a great all-round system that did very well in our benchmarks, achieving the second highest overall score of the entire group in Sysmark and clocking up some impressive scores in our graphics processing tests, making it a suitable system for the gamer. The inclusion of that large 18in LCD monitor is a bonus, as are the noise dampening pads that make this system a quieter choice for the home. Like the Intellect, this PC offers good upgrade potential with four Dimm slots on a motherboard that supports dual-channel DDR SD-Ram system memory.



Systemax Inspire 3157



Intellect Q28C



Poweroid 3203

CardScan Executive 600c/v6

AAAH0073 £234.99 inc (£199.99 exc)

www.cardscanuk.com

- Reads business cards with no typing!
- Syncs data with Outlook, ACT!, Notes, Palm or Pocket PC
- Updates your address book automatically with Accucard



CardScan

AudioVox RTM 8000 CompactFlash card phone

WAAH0100 £176.24 inc (£149.99 exc)

Slot in a SIM card and add a GSM/GPRS phone line to your Pocket PC



Super Optical Mini Mouse

AAAH0125 £24.99 inc (£21.27 exc)

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Tote Remote

AAAH0126 £49.98 inc (£42.51 exc)

Radio controlled remote for Powerpoint presentation



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Satellite Navigation without wires! Small, discreet Bluetooth GPS

AAAH0171 TomTom Bluetooth GPS hardware only £249.99 inc (£212.76 exc)

AAAH0177 TomTom Bluetooth GPS+GB maps and s/w £352.42 inc (£299.99 exc)



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PPAH0194	128MB SD memory card	£29.99 inc (£25.49 exc)
AAAH0136	256MB SD memory card	£69.99 inc (£59.53 exc)
AAAH0137	512Mb SD memory card	£169.99 inc (£144.67 exc)
AAAH0014	128Mb CompactFlash card	£23.49 inc (£19.99 exc)
AAAH0081	256MB CompactFlash card	£45.81 inc (£38.99 exc)
AAAH0132	512MB CompactFlash card	£85.76 inc (£72.99 exc)
WAAH0129	CompactFlash to SD card adapter	£19.99 inc (£17.01 exc)

Pocket PC and Palm OS PDAs

WCOH0169	HP iPAQ H2210	£351.16 inc (£297.86 exc)
WHPH0068	HP iPAQ H5550	£489.98 inc (£417.01 exc)
WCOH0149	HP iPAQ H5450 Pocket PC	£439.95 inc (£374.42 exc)
PPAH0211	Palm Tungsten T	£251.45 inc (£214.00 exc)
PPAH0228	Palm Tungsten C	£340.74 inc (£289.99 exc)

Bluetooth and Wi-Fi accessories

Bluetooth USB dongle

AAAH0130 £34.99 inc (£29.78 exc)

- Easy to install on PC or laptop
- Connect to email through your phone
- Sync wirelessly to Bluetooth PDA



Bluetooth headset

AAAH0134 £49.99 inc (£42.54 exc)

- Rechargeable - mains adaptor included
- "high quality connectivity and great value for money" What Cellphone



Prolink Wi-Fi 802.11 CF card

- Wireless LAN card supports 64/128 bit encryption, 11Mbps
- CF type I card
- Supports Windows 98/2000/XP/ME
- Pocket PC 2000/2002



Pocketop wireless PDA keyboard

"It's neat, and thin, and light. Pocketop may have a winner." Guy Kewney

"A must have for any serious PDA user." Earth Village. Rating: 5 out of 5

"Build quality of the keyboard is good. Data entry was faster than any Pocket PC or Palm 'on device' method." What Laptop

AAAH0129 Pocketop Wireless Keyboard £68.08 inc (£68.08 exc)

NEW! Now works with HP iPAQ 1910, 5400, Fujitsu-Siemens Pocket Loox Download the latest drivers from www.pocketop.net

Pocketop



TomTom Navigator 2 satellite navigation for Pocket PC



WAAHxxxx £281.99 inc (£239.99 exc)

The GPS of choice for Pocket PC. Voice instructions and high resolution maps. Includes GB mapping software which can be loaded on CF or SD. Including cable for your PDA.

Special offer:

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WayFinder mobile phone-based satellite navigation system

AAAH0214 £399.99 inc (£340.42 exc)

A complete wireless satellite navigation system for Symbian Series 60 mobile phones, including Nokia 7650, 3650 or 6600. Includes Bluetooth GPS unit and 1 year subscription to mapping service



Ziplinq retractable USB sync chargers



AAAH0175	Nokia/Ericsson Phone Charger	£24.99 inc (£21.27 exc)
WCOH0160	iPAQ 38/39/54xx	£19.96 inc (£16.99 exc)
PPAH0230	Palm m5xx/Tungsten/Zire	£19.96 inc (£16.99 exc)
PSAH0009	Sony Clie	£19.96 inc (£16.99 exc)

"a handy range of retractable cables for the mobile worker, from USB cables to laptop-mobile chargers and phone-charging cables. There are no dangling cables: you zip the slack back into a button-size container." The Times

The coolest way to recharge phones or hotsync PDAs. USB and Firewire extension cables, Car chargers also available.



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DTP software has to cater for the rise of digital design and publishing in both the professional and home/small business sectors. Read on to find out which package is best for you

Design & publish

WORDS & TESTING: KEN MCMAHON

Desktop publishing (DTP), once the digital upstart of the publishing world, has reached maturity. The professional page designer's world has been dominated for over a decade by Quark Xpress, but Quark's slow development cycle, combined with the publishing industry's reluctance to adopt non-established packages, means the tools and methods used to produce today's publications were developed in the mid-1990s.

While it's made some inroads, Adobe Indesign 2 has failed to impress the Quark publishing world with its superior feature set, pdf-based prepress workflow and tight integration with other Adobe products, but following the launch of Xpress 6, next year

will be a critical time for Quark and its customers. Will the project-based approach and new features keep Quark users onboard, or will its exorbitant price, and an Indesign upgrade later this year make them jump ship?

DTP applications for the home and small office market enable those on a limited budget to produce design-co-ordinated material for print and the web. Aside from ease of use, developers can improve these products with professionally designed templates and good-quality content, but the products that are most successful in this respect are also the most expensive.

This month we have rounded up the top contenders in both the professional and home/small business markets to help you choose the most suitable package for you.





Left: You can apply type drop shadows directly in InDesign

Below: InDesign's table tools are both versatile and easy to use

Adobe InDesign 2

The professional page layout software market is a duopoly. In the early days Quark Xpress slugged it out with Aldus Pagemaker and, for a long time, they were fairly evenly matched opponents who would leapfrog each other in terms of new tools and features with every upgrade.

By the late 1990s, Xpress was the clear winner, and Adobe retired Pagemaker to the quieter pastures of corporate publishing and introduced InDesign. It's still a two-horse race, but the market is very different, with Xpress firmly ensconced as the industry standard and InDesign still has everything to prove.

Xpress users are conservative (and Mac users have been waiting for the first OS X version of Xpress), so most are still working with Xpress 4.1. This has given Adobe a clear shot at goal and, since InDesign 2 was released in 2002, few would dispute it has a clear lead in terms of layout tools, graphics features and typographic control on both the PC and the Mac.

Another InDesign advantage is integration with other products from Adobe. Common interface elements and file formats mean if you know Photoshop you're halfway to knowing InDesign and can easily move graphic elements between applications.

InDesign feels much more like a graphics than a layout package. It has layers and supports transparency and all the blend modes in Photoshop, making images with Postscript clipping paths redundant. Photoshop, Illustrator or Acrobat files placed on an InDesign page maintain their transparency. For example, if you create a Photoshop image with a drop shadow and transparent background, you can place it on top of other graphics on the page, with InDesign using the Photoshop file's alpha channel to determine transparency.

Photoshop text with layer styles applied is no problem for InDesign, though drop shadows can be applied directly. Features like this mean it's much easier and quicker to create impactful graphics with the layout application rather than having to use Photoshop or Illustrator – it also makes editing these elements much more straightforward.

InDesign makes light work of tables. An entire menu is devoted to tabular functions, but the best way to create and edit tables is from the Table palette, which provides direct input for number of rows and columns, cell height and width, horizontal and vertical text alignment, insets and type orientation.

For further control, the table palette menu provides cell

splitting and merging functions, row and column distribution functions and access to the Table Options dialog box. This tabbed panel dialog controls appearance, allowing stroke and fill settings for rows and columns and options for alternating row or column styles.

One of the most arduous table tasks is importing data, which often has to be individually cut and pasted cell by cell. InDesign can import.xls files, but a more successful route is to export the data in tab delimited format and use InDesign's Text to Table command to put the data into row and column format prior to formatting the table.

InDesign offers the typographic control you'd expect from any professional layout package, and some features will appeal to both novice and expert typographers. The multi-line composer (called the paragraph composer in version 2) analyses an entire paragraph, rather than the line-at-a-time approach, to produce beautifully spaced text absent from bad breaks, gaps and rivers.

The character palette provides support for OpenType features such as discretionary ligatures, old-style numbers, fractions and ordinals, and several OpenType fonts are included.

Now that Xpress 6 has arrived, InDesign's prospects for market

leadership look less certain.

InDesign 3, due for release later this year, looks likely once again to outclass its competitor with features such as ebook authoring tools with video and audio support, contextual palettes, layer-based text wrapping and new pre-press preview options.

That the battle for feature supremacy was won when Adobe released InDesign 1.5 doesn't seem to have impressed the market and, despite the fact it has a superior product that is more competitively priced and better supported, Adobe hasn't yet been able to make an impression on Quark's stranglehold.

DETAILS

RRP £680.33 (£579 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Adobe 020 8606 4001

www.adobe.co.uk

SYSTEM REQUIREMENTS

Pentium II • Windows 98 onwards •

128MB of Ram • 105MB of disk space

PROS Typographic control;

graphics tools; XML features

CONS Lacks output bureau support

VERDICT

The best page layout software money can buy

FEATURES

★★★★★

EASE OF USE

★★★★★

VALUE FOR MONEY

★★★★★

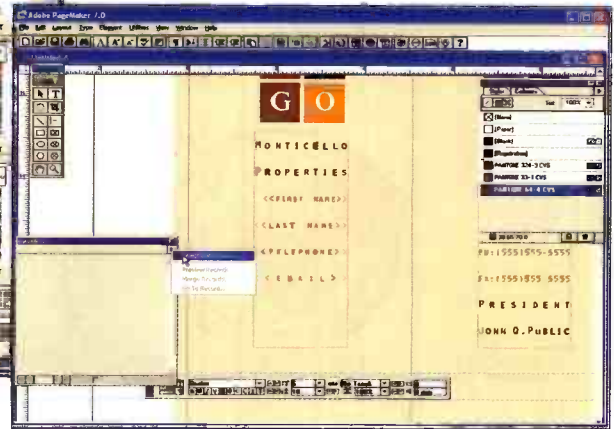
OVERALL

★★★★★



Left: An application of Pagemaker's calibre deserves better templates

Below: The Datamerge feature makes short work of business stationery



Adobe Pagemaker 7

Pagemaker is the killer app that saved the Mac and launched the DTP revolution in the mid-1980s. The intervening years have seen it develop from a contender for the heavyweight professional DTP crown into an office publishing application. Adobe recognised it had already lost to Quark Xpress, so re-entered that battle with Indesign and repositioned Pagemaker.

What this means is that, rather than extend and add professional publishing features, such as typographic control prepress tools and graphics features, emphasis has been placed on productivity, ease of use and integration.

Of course, where integration is concerned, the aim is to open up routes between Pagemaker and other Adobe packages, as well as to provide a convenient migration path from competitor products. The three most significant features in version 7, released in 2001, were support for native Photoshop files, enhanced pdf authoring tools and the addition of a conversion utility for Quark Xpress and Microsoft Publisher files.

Pagemaker's Xpress and Publisher conversion filters work well. Converting documents from one layout application to another is never simple and a certain

amount of pre- and post-processing is inevitable, but for those with a substantial archive of documents in either format, this conversion utility will be a real timesaver. Xpress files up to version 4.1 and Publisher 2000 are supported, and if you're working in a more recent version of either you can open and resave in an earlier version format.

Typically, those responsible for office-produced publications have to collect content from a wide range of sources, most of whom are oblivious to the need for specific file types. One common occurrence is for pdf files to be supplied, and Pagemaker's ability to import pdfs directly onto the page via drag and drop will score big points with anyone who has struggled to shoehorn ill-adapted content into a layout.

Often pdfs are the only remaining source of archived applications and being able to drop them into a Pagemaker layout, while offering limited opportunities for editing, is another productivity bonus.

Support for pdf output is as good as you're likely to get outside of buying Acrobat 6. Pagemaker includes Acrobat Distiller 5 and you can export directly to or from Pagemaker with access to all of the Distiller job options settings for

compression, font embedding, colour management and so on. In other words, the process is the same as using Distiller without the need to first print a Postscript file to disk.

At the time of writing Adobe has no plans to upgrade Pagemaker's Acrobat features to version 6 and, if you want to edit files to add extra links and other Acrobat features you'll need to factor in the cost of Acrobat 6 Standard or Pro. Nevertheless, the inclusion of Acrobat 5 and the ability to produced tagged pdfs that reformat to suit the viewing device, be it a desktop PC or a handheld, gives Pagemaker a strong hand where a publication is published to print and the web.

Like many of its lower-priced competitors, Pagemaker provides a raft of templates and clipart – all, with the exception of the 57 Type 1 Postscript fonts, of a similarly mediocre quality. More usefully, the Data Merge feature enables corporate publishing departments to produce repeat publications such as catalogues, directories, price lists and stationery painlessly and to a fixed corporate style template.

Data Merge uses comma delimited data in a .csv or text file to import personalised data – from an Excel spreadsheet, for example – into placeholders on a Pagemaker layout. Once the

template is set up you can produce updated business cards, price lists and so on, simply by exporting the revised data.

Version 7 can import native Photoshop files via drag and drop, so you no longer have to produce several versions of the same file, and updating images is that much easier.

In repositioning Pagemaker, Adobe redefined the in-house corporate publishing market and provided an alternative to cheap, limited applications designed for home use, and professional publishing tools with inappropriate feature sets and an Everest-style learning curve.

DETAILS

RRP £487.63 (£415 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Adobe 020 8606 4001

www.adobe.co.uk

SYSTEM REQUIREMENTS

Pentium • Windows 98 onwards •

32MB Ram • 175MB of disk space

PROS Acrobat integration; native

Illustrator, Photoshop and pdf import

CONS No XML support

VERDICT

It lacks little but XML support

and updated Acrobat features

FEATURES

EASE OF USE

VALUE FOR MONEY

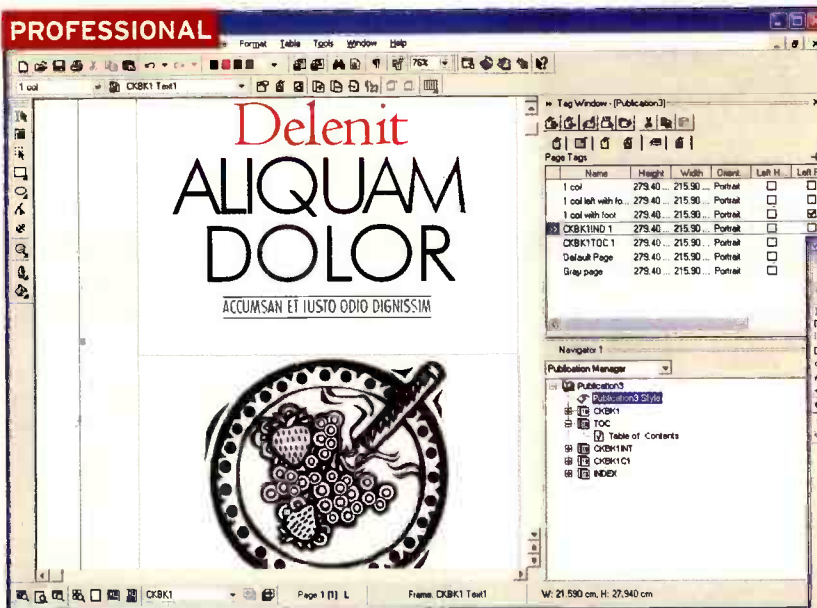
OVERALL

★★★★★

★★★★★

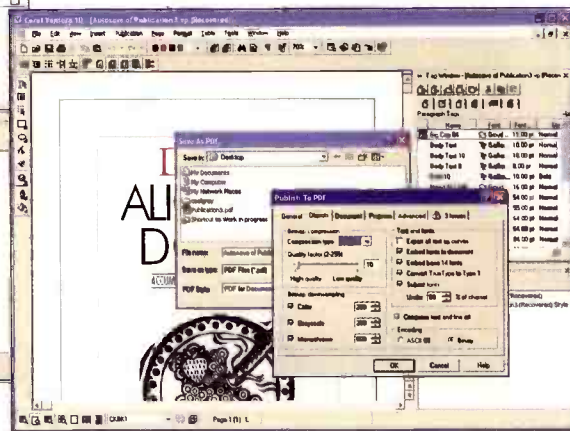
★★★★★

★★★★★



Left: Tags with everything. Ventura uses tags to define everything, from character styles to master pages

Below: Ventura 10's pdf export options



Corel Ventura 10

Long before Pagemaker and Xpress migrated from the Mac, Ventura Publisher was the PC DTP application. Rather than compete for the high-stakes professional publishing market, Corel has played to Ventura's strengths and enhanced its reputation in the sector geared toward complex multi-part long documents.

The once impenetrable interface has been rendered navigable, and brought into line with Corel's other products like Draw and Photo Paint. Features such as collaborative working, revision tracking, automatic indexing, referencing and Table of Contents compilation have also been improved.

Version 10 is a major rewrite offering improved performance and stability and hitching Ventura's wagon firmly to the XML trail. Like Adobe, Corel sees the future of DTP in the ability to publish content from a single source to a variety of media, including print and the web, with XML as the transport mechanism. It acquired Canadian software developer Softquad with its XML authoring application Xmetal 3 last year.

One drawback of the rewrite is that the application will now only run on Windows 2000 and XP. Also, you can't create, edit or export XML files from within

Ventura, just import and paginate them. The new Mapping Editor determines how DTP files are translated into Ventura tags, but to edit the source document you'll need to buy an XML editor, which is where Corel Xmetal 4 comes in. The map is stored as an XML file with a .vmf extension. When this is imported into a Ventura document a .vmf file is specified so Ventura knows how to format the content.

Everything in Ventura is tag-based; tags are style sheets that can be applied to virtually any object: characters, paragraphs, pages, line styles, frames and so on. This version has table tags. Table formatting tools aren't as versatile as Indesign's, but there are some interesting features, such as the Function Wizard that adds spreadsheet-style functions and formulas to table cells and includes financial, scientific, date and time, engineering and statistical functions.

The Navigator palette displays publication elements in a hierarchical structure, resulting in speedy location of specific chapters and so on, and allowing you to jump between documents and copy page elements with drag and drop. Tags are managed from a Tag palette where you can create and edit tags, apply them to selected objects and import them from other documents. The

tag window push-pin lets you toggle between context-sensitive and static states. In earlier versions the Tag window was permanently context sensitive. In static mode, rather than, say, displaying the character tag list when you select a block of text, the Tag window continues to display the tag list for the last selected tag type, which will suit many users' working methods.

Ventura's lack of credible prepress output options has been addressed by integral Acrobat pdf production tools. It's like having access to Distiller from within the application without the need to first print a Postscript file to disk.

A number of preset styles can be customised to suit workflows. Ventura's Publish to pdf feature includes support for bookmarks and thumbnails, job ticketing conforming to Adobe PJTF specifications and colour management using ICC profiles.

Ventura is one of the few applications that has imposition tools – for years Xpress users have relied on Xtensions to provide this functionality. Ventura 8's Signature layout and N-up Format capabilities have been combined into one feature for advanced customisable signature layouts and control overbinding options, page rotation, fold marks and gutters. A preflight option checks for common problems,

such as mixed RGB and CMYK mode images and a Prepare for Service Bureau Wizard.

You get a lot of application for your money with Ventura. Additional software includes Corel's Database Publisher, Barcode Wizard, and 1,500 TrueType and Type 1 fonts. It's not the most intuitive DTP application and we wouldn't recommend it for small publishing projects such as newsletters or publicity and marketing materials, but it is a mature, versatile, feature-rich program, ideal for handling complicated documents involving multiple authors.

DETAILS

RRP £648.60 (€552 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Corel www.corel.com

SYSTEM REQUIREMENTS

233MHz Pentium • Windows 2000/XP
• 128MB of Ram • 240MB of disk space

PROS Long document support;

XML import; pre-press features

CONS Can't edit or export XML files

VERDICT

Ventura's XML features are a step in the right direction, but we'd like to see this built on

FEATURES ★★★★★

EASE OF USE ★★★★★

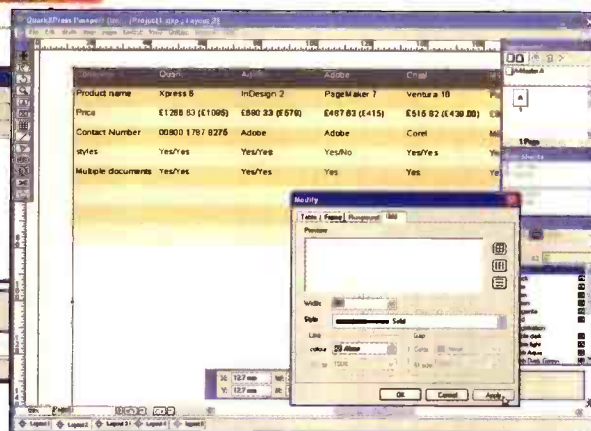
VALUE FOR MONEY ★★★★★

OVERALL ★★★★★



Left: Synchronised text automatically updates across multiple layouts

Below: Improved table controls including transparent cells and no grid



Quark Xpress 6

Xpress is the market leading, industry-standard page layout application, run predominantly by professional publishing houses on Macs.

Even though upgrades are few and far between, most Xpress users ignored v.5, preferring to forego its limited offerings and await the promise of more improvements and OS X compatibility in v.6. The wait was longer than anticipated and some believe this has resulted either in slowing sales of OS X, or an increase in Xpress users migrating to Adobe's Indesign.

Aside from OS features, there's little to distinguish Mac and Windows versions of Quark. Despite significant interface changes, new features and improvements, v.4.1 users will find this a familiar environment.

The most fundamental change is the move from document to project-based files containing multiple layouts. A project can contain up to 25 layouts of varying sizes and these are accessed via tabs at the bottom of the screen in the same way as you can navigate web pages in Dreamweaver, or Excel worksheets. As in version 5, they are initially defined as either print or web layouts, but now this can be changed from the Layout Properties panel.

Multiple layouts could be used to concurrently produce versions of the same document with different designs, formats, or content, or as a method for splitting a project into sections – for example, producing the same ad in various sizes.

A new synchronise text feature updates corrections across multiple layouts; you just mark synchronised text and the rest is done automatically. This will be a huge timesaver, but would have been more of a productivity boost if it had been extended to pictures as well as text.

Quark hasn't ignored images, though. Previous versions used the low-resolution bitmap preview to display eps images on screen, but you can now preview eps graphics at full resolution, making it easier to identify problems and produce accurate runarounds. Quark is using this feature as a carrot; it's actually a Quark Xtension that is not included on the installation CD; you have to register your copy of Xpress before you can download it from the Quark website.

Traditionally the preserve of image-editing and illustration software, Adobe introduced layers to DTP in the first version of Indesign. Quark was quick to appreciate the importance of such a feature and layers duly appeared in Xpress 5. Version 6

extends layer functionality, adding a new tab in the print dialogue which allows you to toggle layers for printing. You can also do this from the Layers palette but, unlike v.5, this doesn't alter visibility settings for individual elements on the layer, so you don't have to spend time putting everything back the way it was after printing.

Tables are another v5 feature that has been more fully implemented in v.6. Tables behave as a group of linked or, if you prefer, unlinked boxes. The link order, and whether cells are to contain text or pictures, is defined in the Table Properties panel. As well as converting a table to text you can break it apart into grouped components. You can apply a background colour of 'none' to cells, making them transparent, and vertical and horizontal grid lines can be independently stroked or removed altogether. Xpress tables aren't as versatile or easy to use as Indesign's, but they're still a big improvement.

You can export pdfs directly from the File menu. The pdf export uses a third-party translator, Jaws Library from Global Graphics, rather than Acrobat Distiller. All the important options are there, plus the ability to export lists and indexes as hyperlinks.

New web features include HTML preview, two-position rollovers, cascading menus, font family specification for CSS stylesheets and improved form handling and creation tools. Xpress will never be a web designer's program of choice, but these help users to quickly repurpose content for the Internet and intranets.

Numerous other additions and improvements, not least of which is a multiple undo, make this an attractive upgrade option for an industry still using v4.1. But the inability to save to versions prior to v5 will do little to smooth the upgrade path.

DETAILS

RRP £1,286.63 (£1,095 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION Quark 00800 1787 8275 www.quark.com

SYSTEM REQUIREMENTS

128MB of Ram • Windows 2000 or XP

• 190MB of free hard disk space

PROS Multiple layout; layer and

table features; full-resolution

preview; pdf export; web tools

CONS Price; not compatible with v4.1

VERDICT

This update may not be enough to maintain Quark's position

FEATURES

EASE OF USE

VALUE FOR MONEY

OVERALL

★★★★★

★★★★★

★★★★★

★★★★★

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cleared cheque / bankers draft or cash
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13



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0% APR

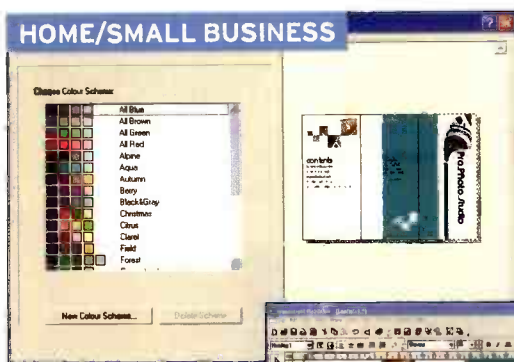
Example based on £999 ex VAT (£1173.82 inc VAT) Deposit 10%
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sixth and final payment of £842.59
Total amount payable £1173.82 (0% APR)

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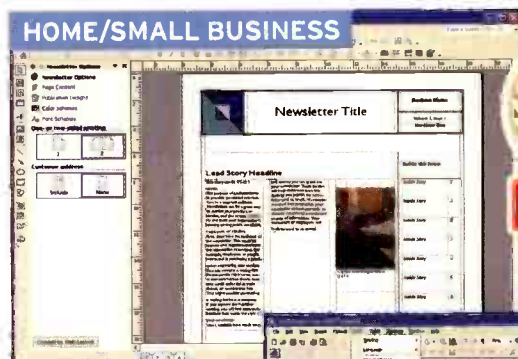
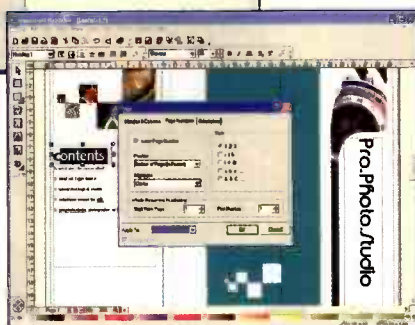
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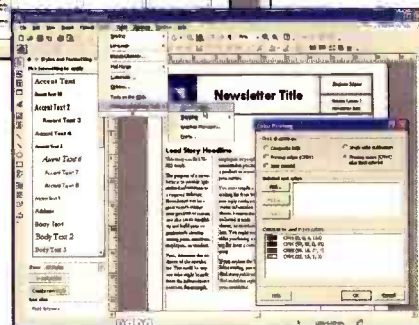
Left: Publisher's document wizard is limited – once it's done its task there's no going back

Right: Publisher has some sophisticated features like auto page numbering



Above: Publisher's templates can be customised for additional content and options like double-sided printing

Right: Publisher has good commercial printing features, but no pdf export or address book



GSP Power Publisher 2

The first of our home and small business packages, Power Publisher 2 suite includes DTP software Publisher 4, plus Draw 3, Powertext 3D, Foto FX, Font Manager, a screen capture utility, Snapshot, plus a picture browser and a clipart CD.

Publisher 4 is developed and marketed under the same name by Greenstreet Software, which shares an address with GSP. Greenstreet Publisher 4 Gold Edition is almost the same price as Power Publisher 2 but lacks many of the extra applications, so Power Publisher is better value.

There's quite a good selection of templates and a wizard helps you add personalised details and choose a colour scheme and style sheet. The style sheet list was missing in our review copy and all we could do was use a scale slider to adjust the size of the type up or down. This aside, Greenstreet Publisher is way behind Microsoft Publisher when it comes to customisation of template-based documents. Once the wizard has done its task there's no going back and changing choices other than by manually editing the page elements.

The clunky interface makes editing laborious. There are no modeless palettes, for example, so you often have to negotiate a series of dialogue boxes.

Changing type styles is

limited to word processor-style attributes on the Type toolbar. To change leading you select spacing from the Text menu which opens the override paragraph style tabbed panel.

Publisher 4 offers master pages with auto page numbering, style sheets, a tool for creating tables, a chart wizard and mail merge, though the latter only works with an internally compiled address book, limiting its usefulness. The biggest problem is not lack of features, but the clunky and antiquated interface and lack of support. Once the template wizard has done its job, with the exception of a hint box that pops up, you're on your own.

DETAILS

RRP £49.99 (£42.55 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

GSP www.gsp.cc

SYSTEM REQUIREMENTS

Pentium 166 • Windows 98 upwards
• 16MB of Ram • 160MB of disk space

PROS Inexpensive

CONS Interface; lack of

interactive help

VERDICT

Publisher 4 is a good buy, but would be improved by better template wizards

FEATURES

EASE OF USE

VALUE FOR MONEY

OVERALL



Microsoft Publisher 2002

Publisher 2002 has the XP look and feel and integrates well with other Office apps, particularly Word. Perhaps the fact that it no longer forms part of the Office suite is the reason behind the curious naming strategy.

The price tag reflects Publisher's position at the top end of home and small office publishing. It's simple to use, but has advanced features, so is suitable for all kinds of projects.

A strong selling point is the Task Pane, a side panel providing templates, design-related options and wizards. Initially, the Task Pane provides navigation for hundreds of templates which, though not cutting edge, are better than anything else on offer and provide superior customisation opportunities.

Font schemes – paired up font families that work well together – have been added to the existing publication designs and colour schemes, so you can choose a template, apply your choice of design style, colour scheme and typography in three mouse clicks.

The office integration feature includes a dedicated wizard for importing Word documents with layout and styling intact. Other Office features include Office Art drawing tools, smart tags and mail merge.

The web features let you create entire sites with a selection of

web templates. The process works the same as with print-based documents. You can also publish print documents to the web.

Publisher can reopen HTML files produced this way for editing, so you don't have to go back to the original to make changes. This is convenient, but it results in major additional code generation – a simple page with a few small graphics came in at just under 200KB for the HTML file, plus 90KB for the graphics.

The strengthening of prepress features to include print preview and support for mixed CMYK and spot colour publications are welcome, but the lack of a pdf export is a disappointment.

DETAILS

RRP £99.87 (£85 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Microsoft

www.microsoft.com/office/publisher

SYSTEM REQUIREMENTS

133MHz Pentium • Windows 98 upwards
• 32-136MB of Ram • 180MB disk space

PROS Easy to use; Office integration

CONS Bloated web output;

non-Postscript print output

VERDICT

Ideal for simple jobs, but for pro jobs Pagemaker is a safer option

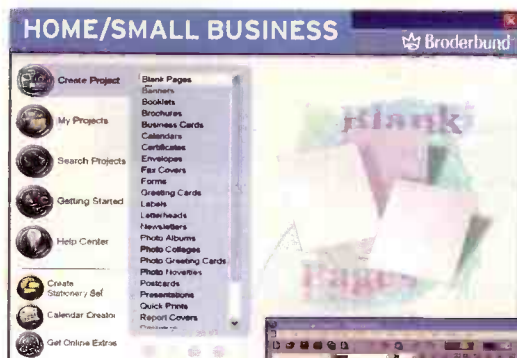
FEATURES

EASE OF USE

VALUE FOR MONEY

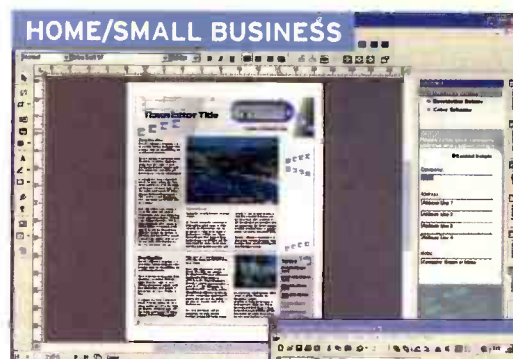
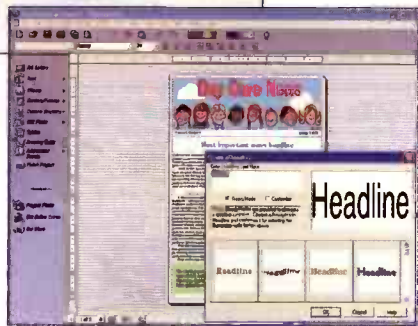
OVERALL





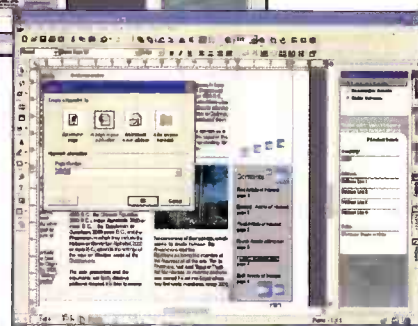
Left: Printshop gets off to a promising start with a well-designed project picker

Right: Beneath the swish looking interface lies counter-intuitive ugliness. With dialogue boxes for even the simplest of tasks like inserting a headline



Above: Pageplus has well-designed templates with some customisation potential

Right: You can easily insert bookmarks, hyperlinks and pageints for pdf export



Mindscape Printshop Deluxe 15

Printshop Deluxe is marketed by Mindscape, but developed by Broderbund Software. It's a four-CD package that contains lots of templates, clipart, fonts and other content including a video-editing application called Moviestop Express.

Printshop has the look of a 21st Century application, but this is only skin deep. The Project Picker is a template browser, but also the route to a couple of wizard-based projects, for producing calendars and stationery sets with a common design style. The standard of template design and content in budget DTP software is pretty poor, but Printshop Deluxe fails to measure up even to this low watermark. For the most part it's based on cheesy American cartoon clipart.

One of the better aspects of the Project Picker is a help centre with tutorials, video workshops and hints and tips on design and how to use the program.

Although opportunities for template customisation are minimal, the Project Picker is always available from the object toolbar. This contains clearly labelled tool buttons, so even first-timers will find their way round with ease.

Clicking on any of the tools displays a standard menu listing the available option and, while

this is fine for some tasks, it's not the most intuitive way to draw shaped objects or add keyline rules. There is, however, an advanced drawing option that launches a graphics applet with a range of more hands-on, but basic, drawing tools.

Printshop has lots of features you wouldn't necessarily expect to find in a DTP application – some useful, others not. The first category includes photo-editing tools, a slideshow creator and Media Manager browser. Features such as the sentiment gallery, the textual equivalent of the clipart collection, while good for a few laughs, add nothing but bulk.

DETAILS

RRP £29.99 (£25.52 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Mindscape 01293 651 335

www.mindscape.com

SYSTEM REQUIREMENTS

266MHz Pentium II • Windows 98-XP • 128MB of Ram • 100MB of disk space

PROS Interface; guidance; tutorials

CONS Poor content; trivial features

VERDICT

A good front end, but better templates and non-DTP features would improve it no end

FEATURES

EASE OF USE

VALUE FOR MONEY

OVERALL



Serif Pageplus 8 PDF Edition

Pageplus 8 has had three revisions since we last reviewed it in March 2000 and, on the face of it, little has changed. The interface looks similar, with its layout windows flanked by a toolbar on the left and office-style context-sensitive toolbar at the top.

There are quite a few new tools, many grouped on flyouts. The line tool now has freehand and curved variants, the rectangle tool hides 30-odd shapes, there's a shaped frame tool and an artistic text tool.

Also new is the Studio Bar on the right of the screen that houses tabbed panes for wizards, a page design (template) gallery, object portfolio, pages, colour schemes and test frame attributes.

Having chosen a page template, the wizard panel in the Studio Bar can be used to amend personal details and new colour schemes can be applied but, like Greenstreet Publisher 4, Pageplus falls behind Microsoft Publisher 2002 when it comes to versatility. Master pages are new and the pages tab in the Studio Bar makes navigating the document easy.

The most significant new feature is direct output to pdf. The pdf export options don't offer the versatility of Pagemaker or Indesign – it's not like an integrated copy of Distiller – but you can produce pdfs for electronic distribution

and as a prepress wrapper for commercial print jobs.

You can insert hyperlinks into the Pageplus document, which are converted when the pdf is exported. You can also insert bookmarks, which can be rearranged in the Bookmark manager by dragging and dropping, so producing a moderately-sized bookmarked document is straightforward.

There are no extra packages, but Pageplus includes the excellent Logoplus applet with which you can create and edit logos, banners and other graphics. Like Publisher 4, it has a mailmerge function, but this one can import .csv and .txt files.

DETAILS

RRP £79.99 (£68 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Serif 0800 376 7070 www.serif.co.uk

SYSTEM REQUIREMENTS

Pentium processor • Windows 95 onwards • 32MB of Ram • 160MB of disk space

PROS Pdf export; Logoplus graphics

CONS Limited pdf export options; limited user guidance

VERDICT

Slightly ahead of Publisher 4 on features and usability

FEATURES

EASE OF USE

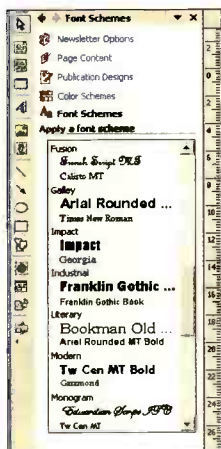
VALUE FOR MONEY

OVERALL



Design tips to personalise a newsletter template

This newsletter front page has been produced in Microsoft Publisher 2002 using the 'Pixel' template. The raw template is shown in the picture (right). Publisher 2002 templates are by far the best of any of the home/small office DTP packages, however, as we'll see, there's a lot that can be done to improve on them.



2 Font schemes

We've used 'font schemes' to determine the typographic style of this publication. This one's called Industrial and is based on two weights of Franklin Gothic to give a clean, businesslike look. As a rule of thumb, sans serif faces (like the one used here) look more modern, and combinations of a serif type face for body copy with a sans serif face for headlines also work well.

Publisher's stylesheets tend to use very small headline type, so we've edited the headline styles to beef them up a bit, and closed up the leading (space between the lines of text) on the multi-deck headlines.

3 Space and style sheets

Where you put the white space is as important as where you put words and pictures. Make sure you've set adequate master page margins and add a column grid with generous gutters (the space between the columns). Templates can be a bit messy, as they don't always conform strictly to a column grid, yet this is the framework on which your layout hangs and, unless you stick to it fairly rigidly, everything will fall apart.

Apart from repositioning and resizing the text boxes to fit the grid, everything else, including the drop cap first para on the main story, bold first paragraphs on other stories and paragraph spacing, has been done by editing the style sheets. Sticking with style sheets maintains consistency and makes document-wide style changes a single edit job.

1 Masthead

A few minor layout changes give the masthead more impact. We've expanded the style banner so it 'bleeds' or extends off the page. For in-house printing avoid bleeds unless you can print on oversized paper and trim it.

As well as repositioning the volume number and date we've made the title bigger and introduced a second weight of the masthead font. We've amended the placeholder for the business name to produce a snappy one-line intro.



4 Ugly text problems

Pay attention to detail. When your layout is nearly complete cast an eye over it for widows, orphans and other problems.

Edit the text to remove widows (a single word or short line at the bottom of a column) and orphans (a single word or short line at the top of a column).

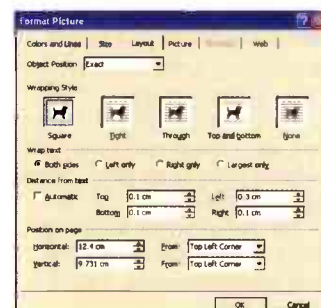
The misalignment at the bottom of these columns of text is due to paragraph spacing that is a fraction of body copy leading, or line spacing. Align text to a baseline grid, or use paragraph indents as an alternative to paragraph spacing – set up, of course, within paragraph style sheets.

Publisher 2002's template



5 Runarounds

The default spacing in Publisher for runarounds is 1mm – not nearly enough, so we've increased it to 3mm on the left to give plenty of space between the picture, the adjacent text column and the caption.



6 Tables

Using a table to provide a taster of what's in the newsletter makes formatting and editing the contents list simpler, and the Pixel template provides one ready-made. All we've done is resize it to the new column width.

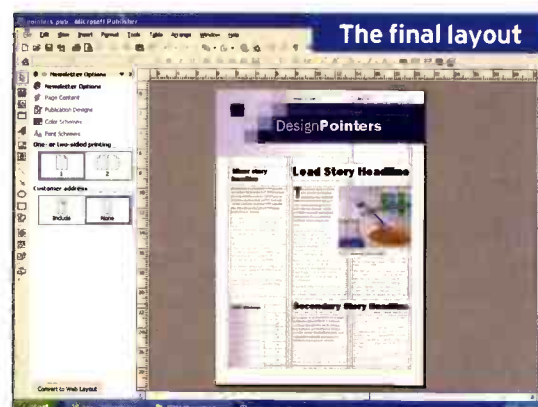


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Table of contents/index	✓/✓	✓/✓	✓/✓	✓/✓
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Alpha transparency	✓	x	x	x
In-line graphics	✓	✓	✓	✓
Conversion filters	Xpress, Pagemaker	Xpress, Microsoft Publisher	x	x
Multiple language support	✓	x	✓	✓ in Passport edition
Preflight check/collect	✓/✓	✓/✓	✓/✓	✓/✓
PDF export	✓	✓	✓	✓
HTML export	✓	✓	✓	✓
SCORES				
Features	★★★★★	★★★★★	★★★★★	★★★★★
Ease of use	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★

Table of features

	HOME/SMALL BUSINESS			
				
MANUFACTURER	GSP	MICROSOFT	MINDSCAPE	SERIF
PRODUCT NAME	POWER PUBLISHER 2	PUBLISHER 2002	PRINTSHOP DELUXE 15	PAGEPLUS 8
Price inc VAT (ex VAT)	£49.99 (£42.55)	£99.87 (£85)	£29.99 (£25.52)	£79.99 (£68)
Phone/URL	GSP www.gsp.cc	Microsoft www.microsoft.com/office/publisher	01293 651300 www.mindscape.com	0800 376 7070 www.serif.com
Para/character styles	✓/x	✓/x	✓/x	✓/✓
Multiple documents	✓	✓	✓	✓
Table of contents/index	x/x	x/x	x	✓/✓
CMYK/spot colour	✓/✓	✓/✓	x/x	✓/✓
Layers	x	x	x	x
Tables	✓	✓	✓	✓
Alpha transparency	x	x	x	x
In-line graphics	x	✓	x	✓
Conversion filters	x	x	x	x
Multiple language support	x	✓	x	x
Preflight check/collect	x/x	✓/✓	x	x
PDF export/HTML export	x/✓	x/✓	✓/✓	✓/✓
SCORES				
Features	★★★★★	★★★★★	★★★★★	★★★★★
Ease of use	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★



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Editor's Choice

You only need to look at the price tag to tell which market the products in our DTP group test are aimed at. All the home and small office DTP packages come in under the £100 barrier, but of the professional layout applications only one, Adobe Pagemaker, costs less than £500 including VAT.

For those on a budget and with limited time and experience, it's about more than just initial cost. In small companies, the person producing the product catalogues or restaurant menus would otherwise be engaged in revenue-earning activities, so time is money and ease of use is paramount.

Budget applications make life easy in two respects. First, they supply a range of templates and associated art that make it possible to achieve a virtually finished publication in no time. Second, interactive wizards, and a well-designed and easily navigable user interface provide the potential to turn one-style-fits-all material into something more individual.

The winners

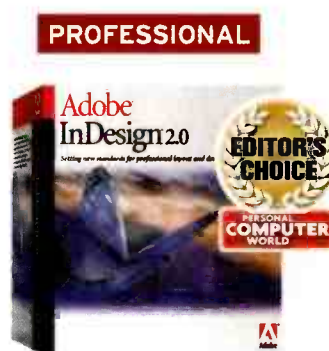
The application that achieves this most successfully and gets the **Editor's Choice** award is **Microsoft Publisher 2002**. To begin with, Publisher's templates are in a different class to the competition's, where quantity rather than quality often appears to

'On the big features, Indesign has stayed ahead of the game'

be the only criteria for inclusion. For those who lack the confidence to start with a blank canvas, templates are the foundation of good publication and Publisher's are head and shoulders above the rest.

Microsoft pioneered the use of wizards and its experience shows. Publisher's wizards have been imitated by just about every budget DTP application on the market, but few go further than allowing you to include personalised text and choosing a colour scheme.

Publisher, on the other hand, provides real opportunities for customisation with single or multi-page layouts, number of copies per sheet, single or double-sided printing and the option to include additional content such as order forms in brochures and logos on



Adobe Indesign 2



Quark Xpress 6

HOME/SMALL BUSINESS



Microsoft Publisher 2002



Serif Pageplus 8

advertisements. The addition of font schemes – co-ordinated pairs of font families that provide a ready-made typographic style – adds guidance for those with limited design skills.

The only thing Publisher lacks is support for pdf export, and the inclusion of this as the centrepiece of **Serif Pageplus 8 PDF Edition** earns it a **Highly Commended** Award. Like Publisher's Task Pane, the Pageplus Studio Bar provides flexible template customisation – both of these products prove the adage that you get what you pay for.

On the professional front, things are complicated by the history. If you're producing layouts professionally, the chances are you're using Xpress 4.1 or 5 on a Mac. Whether the upgrade decision is taken for you at corporate level or personally, the choice depends on various factors such as OS upgrade plans, bureau support, what customers and partner organisations are planning, and the size of your budget.

For those running Windows and for first-time buyers, things are more straightforward and, on a features-only basis, despite having made impressive progress, we don't believe that Quark has done enough with Xpress 6 to beat our **Editor's Choice** professional layout application **Adobe Indesign 2**.

Indesign's integration with Photoshop and Illustrator and unrivalled pdf support make it the obvious choice for anyone using these applications in the print production workflow. Indesign's paragraph composer, glyph palette, optical alignment controls, and support for Opentype features such as fractions and contextual alternates provide the most precise typographical control of any layout application on the market.

On the big features – layers, table editing, cross-media support, long document and group-authoring tools – Indesign has stayed ahead of the game in terms of power and usability. And in support for alpha channel transparency in imported bitmap files, the competition shows no sign of catching up.

For all that, the latest version of Quark Xpress is one that committed Xpress-philies will be very pleased with. The move to project-based multi-layout documents with synchronised text will change the way Xpress users work immeasurably for the better.

Quark Xpress 6 has also addressed many issues that have long been a cause of frustration to users, for example with the introduction of high-resolution previews, a multiple undo/history feature and improved tools for creating and editing tables. This is a substantial upgrade deserving of our second **Highly Commended** award.

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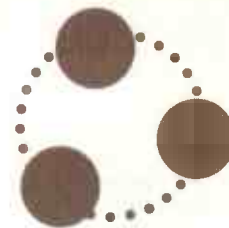
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WRITTEN BY ALAN STEVENS

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Sony ships Sait

Sony has begun shipment of its new Sait (Super Advanced Intelligent Tape) drive. Based on half-inch tape technology rather than the 8mm cartridges of existing AIT products, the drive can store up to 500GB (1.3TB with compression) per cartridge at a transfer rate of 30Mbytes/sec. It will compete with Quantum SDLT and LTO Ultrium drives which can match Sait for speed but not capacity.

The drive is about twice the price of an equivalent Ultrium product, but the cost per gigabyte of storage is much reduced, as Sony's drive can store almost twice as much data on each cartridge.

The first Sait products have gone to library vendors but standalone drives are expected shortly and we'll be testing the drive in the PCW labs as soon as that happens.



You can store up to 500GB of uncompressed data on Sony's half-inch Sait tape cartridge

Business broadband Internet access is the subject of this month's group test, so read on to find out which device is best for you

Itanium 2 machines challenge Risc

Servers and workstations based on the latest generation of Intel's Itanium 2 processor (Madison), announced in June, are challenging the dominance of Risc-based products in the enterprise market. According to Intel, the new 1.5GHz processor with up to 6MB of Level 3 cache is up to 50 per cent quicker than previous 64bit chips. We'll be checking out these claims as soon as we can in the PCW labs, but multiprocessing systems based on Itanium 2 have already been shown to outperform Risc equivalents, at a much lower cost.

There's strong industry support for the new chip. Leading vendors, including Dell, Fujitsu-Siemens and HP, have all announced Madison-based products and the number of Itanium 2 server and workstation products is predicted to double this year. Those released so far have been mostly two-way and

four-way, but the race is on to go higher, with a 64-processor Superdome expected from HP this year, along with a 128-way-plus solution from SGI.

A perceived lack of software for Intel's 64bit Epic (Explicitly

Parallel Instruction Computing) architecture has tended to hold back widespread adoption of Itanium. However, a critical mass of applications now appears to have been ported, enabling Itanium 2 servers and workstations to run most mainstream commercial and scientific applications natively.

Itanium 2 is also fully supported by the leading operating systems and, interestingly, many customers are looking to switch software as well as hardware platforms when upgrading.

The scalability of Itanium 2 servers provides good scope for consolidation, with the ability to run multiple virtual servers, each with its own operating system, on the one hardware platform.

HP Superdome servers based on the new Itanium 2 processor will be quicker and cheaper than Risc-based versions



PCI Express spec arrives

Waiting for new bus and interconnect architectures is a bit like waiting for paint to dry, but there have been some advances in this field recently. The specification for PCI Express, for example, the much faster serial successor to the parallel PCI bus (previously known as 3GIO) is agreed, and products are being actively developed.

PCI Express is particularly relevant when it comes to enterprise servers, where the parallel bus is increasingly seen as a bottleneck. However, it could be a couple of years before anything tangible appears, with

PCI-X 2.0 products likely to fill the gap in the interim.

PCI Express is also being used as the basis of a technology called Advanced Switching, which could become a standard for high-speed fabrics and backplanes. The idea here is that switch vendors will use common Advanced Switching components rather than proprietary solutions of their own. At least that's what Intel is hoping, having put its weight firmly behind Advanced Switching, with plans to roll out building block components and development tools in the first half of 2005.

Secure meetings

Neoteris has announced a new application for its SSL-based Instant Virtual Extranet (IVE) appliance. The Neoteris Meeting Series uses the same platform to support online meetings, doing away with the need to use external hosted services. Users can collaborate using an ordinary browser, with SSL encryption and application level security provided via the appliance.

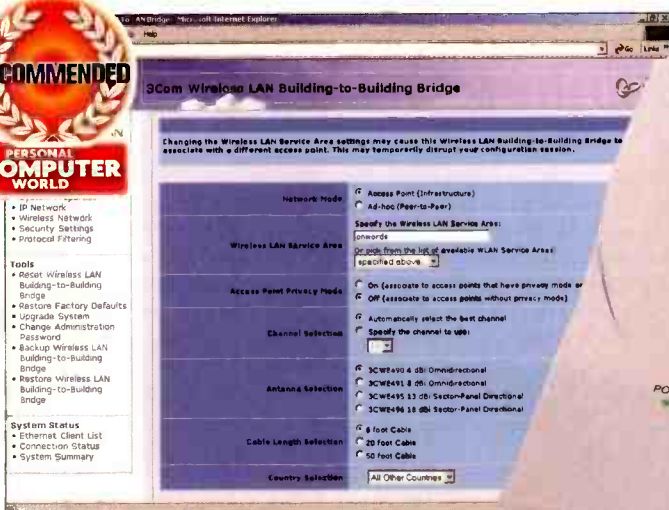


The Neoteris IVE appliance now supports secure online meetings

WIRELESS LAN

3Com Wireless Lan Building-to-Building Bridge

Affordable connectivity without cables or leased lines



A simple browser interface is used to configure the 3Com Wireless Lan Building-to-Building Bridge, with a choice of ad-hoc or infrastructure wireless operation

Extending the reach of a network to other buildings can be time consuming and expensive. If you own the whole site it's possible to lay cables of your own but, over long distances and in metropolitan areas, you'll need a leased line. Unless you opt for the 3Com Wireless Lan Building-to-Building Bridge, which enables networks in separate buildings to be linked at low cost over claimed distances of up to 10 miles.

The 3Com bridge is a Wifi certified 802.11b device that can be used to support both point-to-point and multipoint configurations. In other words you can link two buildings directly by installing a bridge at each location, or use several to connect satellite buildings to a central office. Either way the bridge is simply plugged into the local fixed Ethernet Lan and a suitable antenna attached to enable it to communicate wirelessly with other 3Com bridges. It can even be used to communicate with third-party 802.11b access points, although you're limited to two miles.

The antennae need to be bought separately, with sector panel antennae for satellite

offices and point-to-point use or omni-directional antennae for central site locations. There's also a choice of power ratings, the 4dBi omni-direction antenna we were supplied with costing around £70 ex VAT.

Physical installation is the trickiest bit of the deployment and you may have to call in a professional installer, as the antennae need to be mounted high up to clear obstructions and give maximum signal strength. Clear line of sight is what's needed, but on the plus side antenna cables can be up to 50ft long, while the bridge itself is 802.3af compatible, allowing it to draw its power remotely over the Lan. That enables the unit to be used in locations where power isn't normally available, such as on a roof, with power fed to it over the network from either an 802.3af Power over Ethernet switch or via the small single port adaptor provided.

Once installed, setup and management is achieved by first running a Windows-based utility. This locates and identifies any bridges on the network, then launches a browser session to access

and manage each one in turn. A password is used to protect the management interface and for extra security the session can be SSL encrypted.

By default the 3Com bridge gets an IP address using DHCP, but a static address can be assigned while, on the wireless side, you get the usual options for ad-hoc (point-to-point) networking and infrastructure (multipoint) use. There's support too for WEP data encryption with a choice of 40 and 128bit keys. However, for extra security customers are advised to use additional VPN (Virtual Private Network) encryption, with VPN pass-through built in as standard.

We had few problems with the 3Com bridge apart from an incompatibility with the network interface on our management PC. By switching to another, we were quickly able to configure the bridge to connect to a standard 802.11b access point and join two network segments.

Checking out the range claims is clearly difficult with a product like this, and for maximum distance you need two bridges and sector panel antennae. However, we tested transmission over a distance of 400m where,

even using the 4dBi omni-directional aerial, we got full signal strength. Using an ordinary wireless adaptor we were unable to connect to the remote access point.

In terms of bandwidth, at full signal strength we got rates of just over 5Mbps/sec which is about all you can expect of an 802.11b product. That's a lot less than the 100-1,000Mbps/sec possible with fixed Ethernet, but then you don't have to lay any cables, and it's a lot better than a leased line link which, typically, only offers 2Mbps/sec. Nor do you have to pay to use the connection once it's been set up, as you do with a T1/E1 line.

One last consideration has to be interference, especially as wireless devices proliferate. This could limit both throughput and range in a crowded city location. Still, it's a simple enough solution to a common problem and the flexible mounting options should allow this device to give acceptable results in most situations.

DETAILS

PRICE £561.64 (£477.99 ex VAT), antennae priced separately
CONTACT 3Com 01442 438 000
www.3com.com

SPECIFICATIONS

Fixed to wireless Ethernet bridge • 10/100 fixed Ethernet port • 802.11b wireless interface • 2.4GHz with choice of 13 channels • Wifi certified • Ad-hoc and infrastructure modes • Optional 40/128bit Wep encryption • VPN pass-through • Protocol filtering • 802.3af Power over Ethernet compliant • choice of external antennae

PROS Price; Power over Ethernet; Wifi compatible; web-based management

CONS 802.11b only; may require professional installation of antenna; interference a potential problem in metropolitan areas

VERDICT

An innovative implementation of well established technology

PERFORMANCE ★★★★★
FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★

TAPE LIBRARY

Quantum ATL Superloader

Automated backup for distributed enterprise



The ATL Superloader is a 2U rackmount library aimed at departmental or remote office backup, with performance and capacity to spare. For companies with modest requirements, the Superloader can be bought with the smaller DLT1 drive. Native capacity then falls to 640GB but the backwards compatibility of the SDLT320 ensures data isn't lost when upgrading. For enterprises standardising on Linear Tape Open (LTO) there's a choice of Ultrium 1 and 2 drives to fit into the chassis.

Regardless of technology there's just one drive in the Superloader, with up to two cartridge magazines to load tapes. Each can accommodate eight cartridges, with a barcode reader and a separate front slot to import and export tapes.

The library can be managed via an LCD panel or remotely via the built-in web based console and Ethernet. There's no need

for intervention or software, as most backup programs support single drive libraries. An Ultra2 LVD SCSI interface connects the library to the host server, which affects performance, as does the type of data being copied and its location.

We tested the Superloader with its SDLT320 drive and compared it with our reference standalone Quantum SDLT22. The SDLT320 achieved just under 95Gbytes/hour backing up mixed data on a local server – not up to the maximum but good nonetheless (see graphs below). In selective restore tests it achieved 32.2Gbytes/hour compared to our reference machine's 17.75Gbytes/hour.

DETAILS

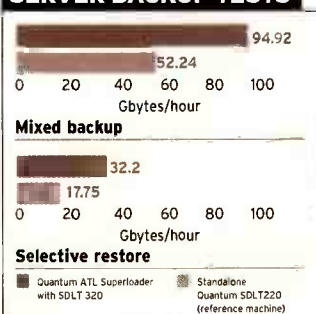
PRICE £9,635 (£8,200 ex VAT)
CONTACT Quantum
 01256 818 300 www.quantum.com

SPECIFICATIONS

2U rackmount tape library • Single Quantum SDLT320 tape drive • 16-cartridge capacity • Two bulk-feed magazines • Barcode reader • Wide Ultra2 LVD SCSI interface • 10Mbps/sec Ethernet port • Integrated web-based management interface
PROS Low profile; drive upgradable; high capacity and throughput
CONS Single drive; no Fibre Channel
VERDICT
 Flexible and configurable

PERFORMANCE ★★★★★
FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★

SERVER BACKUP TESTS



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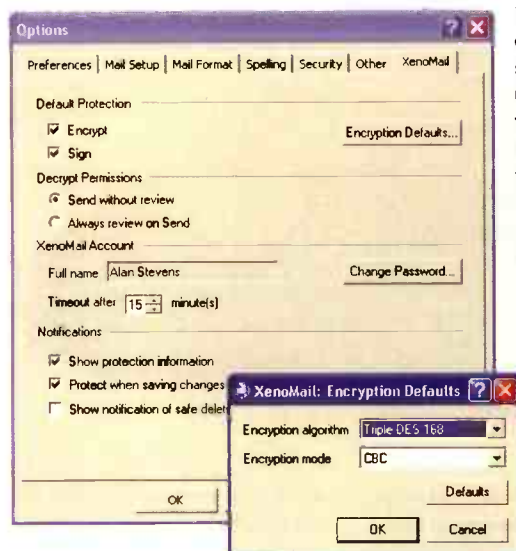


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EMAIL ENCRYPTION

Indicii Salus Xenomail

Secure email without having to set up PKI



Xenomail securely encrypts and signs email using public key technologies, but integrates transparently into Microsoft Outlook and Lotus Notes clients

Public Key Infrastructures can be complicated and expensive to set up. However, if all you want to do is encrypt and digitally sign email it's possible to securely outsource much of the work using a new service called Xenomail.

Xenomail is made up of two components: client software for use with Microsoft Outlook or Lotus Notes and separate servers to authenticate users and generate the public/private key pairs to encrypt messages and sign digital certificates. The Xenomail servers are hosted by Indicii Salus and are accessible with an Internet connection and valid subscription.

Using Xenomail is very simple. Register as a user and you're assigned an ID and password giving access to your private encryption key and the public keys of other subscribers. The keys are generated and held on the Xenomail servers, but that's the only information ever transferred, as the encryption itself is done locally by the client.

When sending a message the Xenomail client retrieves the public key of each recipient and uses it to scramble the message and attachments. Likewise, each recipient client will retrieve their private key and use it to decrypt the message and verify the sender.

If you're not a subscriber you can't do this, although it is possible to create a read-only guest account. Non-registered users can then read incoming messages, but to encrypt emails of their own they have to subscribe to the full service.

Xenomail is mostly transparent in operation and we found it quick, and it also enables large companies to manage their accounts themselves. The service works well and will appeal to large enterprises that want secure email communications.

DETAILS

PRICE £72.85 (£62 ex VAT) per user per year

CONTACT Indicii Salus
020 7836 0123

www.indiciisalus.com

SPECIFICATIONS

600MHz Pentium III • 64MB of Ram • 20MB of free hard disk space • Microsoft Outlook 2000/2002 or Lotus Notes version 5 or 6

PROS Secure public key encryption; transparent client; guest accounts

CONS Needs built-in Outlook editor

VERDICT

A simple way of outsourcing the PKI component needed to encrypt and digitally sign email

FEATURES

ENTERPRISE VALUE ★★★★★

EASE OF USE ★★★★★

OVERALL ★★★★★

RACKMOUNTED SERVER

Gigabyte SR114RE

Low-cost web server platform for rack environments

The SR114RE is a well-specified front-end web server platform, but it's limited by lack of expansion and management capabilities



Once only available from vendors such as Dell, HP and IBM, rackmount servers are offered by lots of companies at increasingly low prices. Gigabyte has a range of competitively priced products, including the entry-level SR114RE with an LCD display for easy setup and diagnostics in the rack environment.

Designed to host front-end web applications rather than as a general-purpose file and print server, the SR114RE is a 1U server sporting a single 2.4GHz Pentium 4 processor. Support for HTT (Hyperthreading Technology) comes as standard with this CPU and there's a 533MHz front-side bus (FSB), plus room for up to 2GB of ECC-protected DDR-266 memory. Not that you need all that for most web applications. The review system shipped with a good 1GB of Ram for our tests.

As you might expect from a long-established motherboard company, most of the peripheral controllers are integrated on the Gigabyte server. For example, there are onboard graphics and storage controllers and network connectivity, courtesy of a pair of Intel 82550, 10/100Mbps/sec, Ethernet interfaces. As with all Intel Lan controllers, these offer support for Wake-on-Lan (WOL) remote management, plus you get Windows and other operating system drivers for failover and load balancing across the two network ports.

Storage is all ATA-based, with room for two 3.5in drives inside the slimline casing; our review system was supplied with a pair of 120GB Western Digital disks. On the test system these were hooked up to a plug-in Adaptec ATA Raid controller, with the contents of the drives mirrored for extra reliability. You can only have two drives, however, limiting the Raid choices, and you can't hot swap the drives. You also have to pull the system out of the rack to gain access, and the Adaptec controller takes up one PCI slot, leaving just one low-profile bay free.

The Western Digital disks only have ATA 100 interfaces and 7,200rpm spin rates, but benefit from 8MB of onboard

cache. The SR114RE is no slouch, turning in some good results compared to our rackmount reference system, the Poweredge 1650 from Dell (see graph). However, that was to be expected as, although the PE1650 has faster SCSI storage, it features a slower Pentium III.

You're limited to one CPU on the SR114RE. The HTT support boosts performance, fooling the OS into thinking it has a pair of virtual CPUs, but companies looking for extra headroom would be better off with a true dual-processor solution. That said, for many front-end web server applications the single Pentium 4 will be enough.

On the management front, the LCD did seem at first to be a

gimmick. However, it has its uses, displaying power-on diagnostics at boot-up then, with the supporting Windows driver installed, it can be used to configure things like host name and LAN IP addresses without using a monitor and keyboard. It can continually scroll diagnostic data, such as CPU temperature and fan speed, providing at-a-glance status information.

For remote management the server ships with the Gigabyte Management Tools, accessed via a Microsoft Management Console (MMC) snap-in. These are not as comprehensive as similar tools provided with Dell, HP and IBM systems. Nor do you get facilities for lights-out or out-of-band remote management.

Such concerns aside, the SR114RE is good value for the smaller company looking for a low-cost rackmount solution. For the more demanding, though, it lacks many expansion, reliability and management features commonplace on the big-name products. It's not that much cheaper than the competition from tier 1 vendors, so is unlikely to appeal to the larger enterprise.

DETAILS

PRICE £1,032.83 (£879 ex VAT) – operating system not included
CONTACT Scan Computers
0870 755 4747 www.scan.co.uk

SPECIFICATIONS

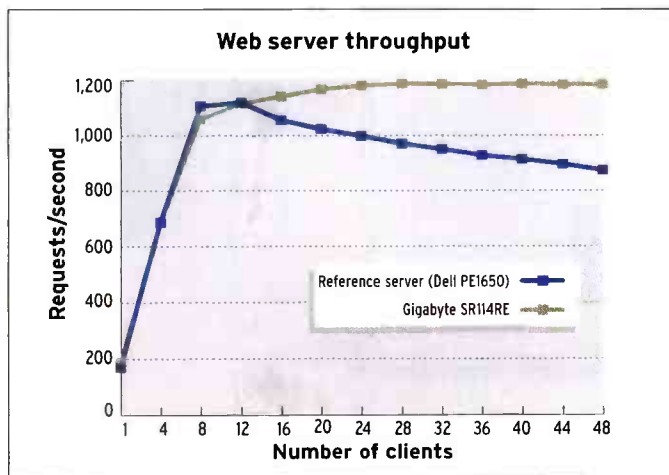
1U rackmount chassis • 2.4GHz Pentium 4, 533MHz FSB • 1GB DDR-266 memory • Adaptec ATA Raid controller • Two 120GB ATA/100 hard disks • Dual integrated 10/100 Ethernet interfaces • One free PCI slot

PROS Low cost; good performance, hardware-based disk mirroring
CONS Single processor; fixed ATA hard disks; limited expansion; poor management software

VERDICT

Performs well but lacks some of the attributes required of a true enterprise system

PERFORMANCE ★★★★★
FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★



The SR114RE with its ATA storage outperformed our SCSI-based Dell reference system at higher client loads. But with just one processor and room for just two drives, there is little scope for improvement to performance or capacity

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huh...?

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aaaaarrrrrgggghhh!!!!!!

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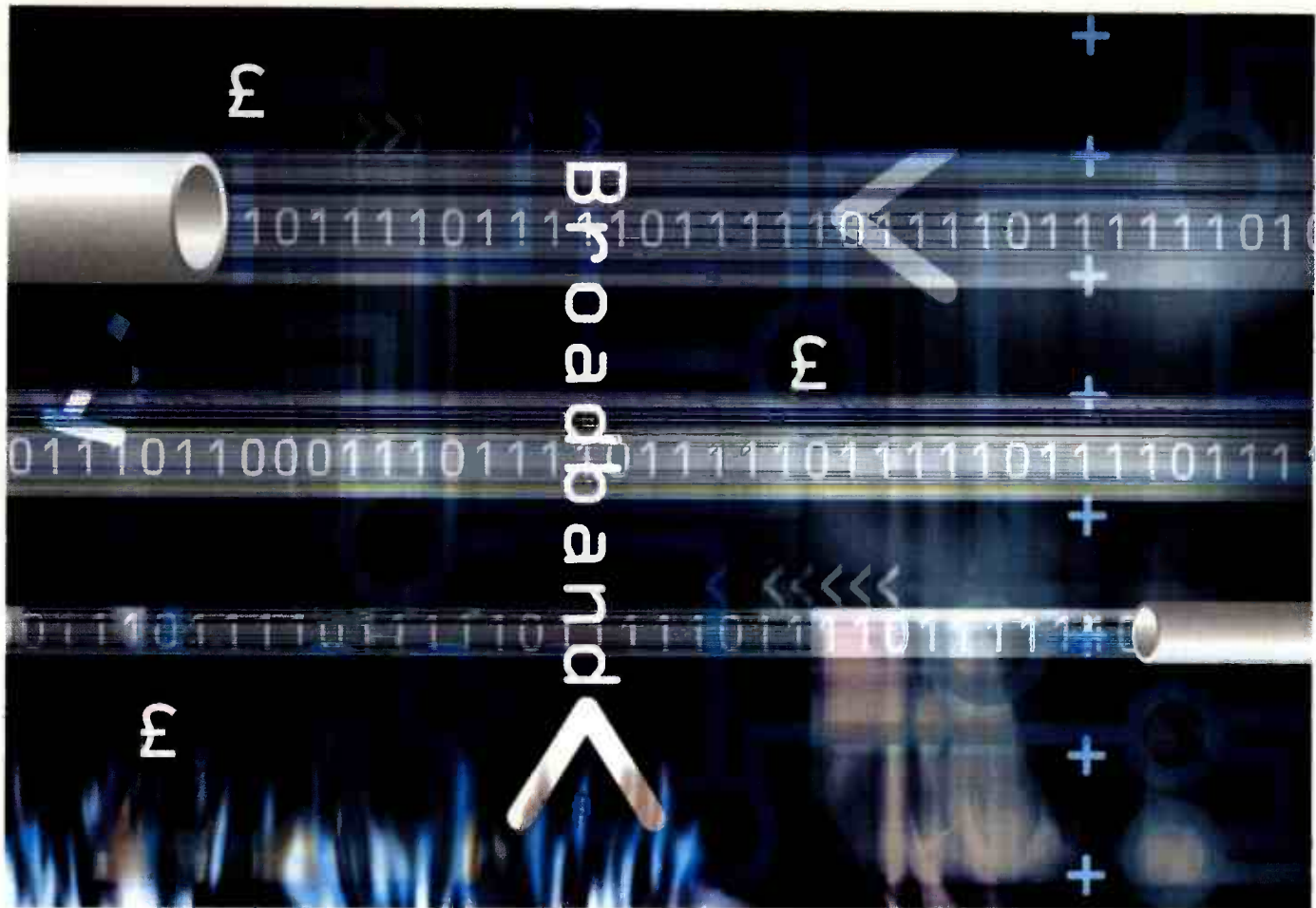
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Jigsaw

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Using broadband as a business tool means you need routers that offer the right protection and functions. We look at seven products that could fit your organisation's requirements

Broadband in business

WORDS: ALAN STEVENS PHOTOS: BRUCE MACKIE

Forget the ads with the many-headed dragons – broadband is as much a business tool as it is a way for consumers to access online gaming sites or

download video on demand. The advantages for business are clear, starting with leased line bandwidth for a fraction of the price. You also get the same always-on facility as on a leased line, to host your own email and web servers. Equally, broadband acts as an enabler for what is rapidly becoming a must-have business application – VPN (Virtual Private Network), providing cheap and secure remote access over the Internet for branch offices and mobile users.

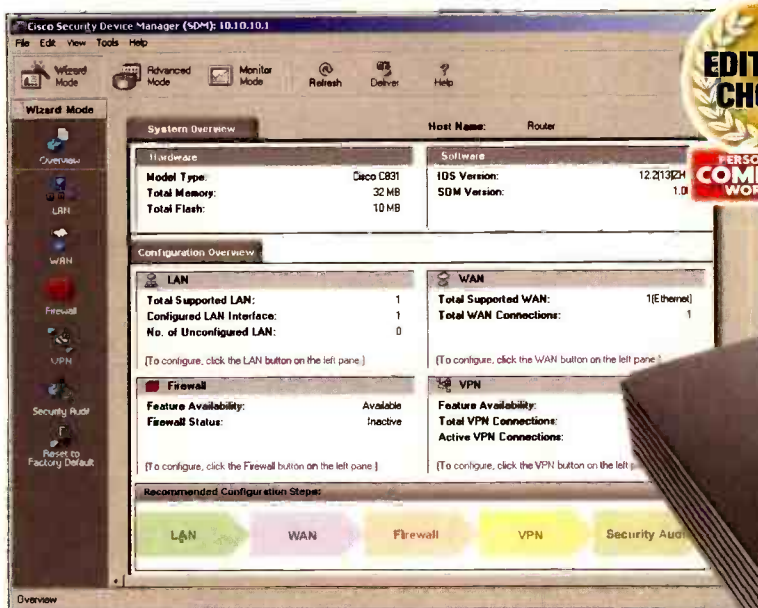
Broadband is very easy to share on the Lan using an ADSL or cable router/gateway,

with lots of low-cost products to choose from. However, some care is needed here as, if you're going to use it for business, you'll want a lot more than the basic routing capabilities of the cheapest home routers.

You need a proper firewall that can be customised to protect the network and its resources the way you want, while still allowing remote access to your mail and web servers. You might also want to implement anti-virus and content filtering facilities at the gateway. If you want VPN access it makes sense to have the router handle encryption processing, rather than having to dedicate expensive server resources to the task.

The business-class routers in this test cost more than some, but the extras you get are worth paying for.





As well as a basic web interface, the Cisco 831 router can be configured with Security Device Manager, which is just as intuitive but gives more precise control over the security options



Cisco 831 Router

No router group test would be complete without a product from Cisco, the company that invented the network router as we know it. If you've not looked at Cisco products for a while you might be surprised at how much easier they are to set up and manage. The Cisco 831 comes with colour-coded cables and a choice of two browser interfaces in addition to the traditional CLI (command-line interface). It's a very affordable, well-specified solution that, as well as the expected router functionality, has a stateful inspection firewall, IPsec-based VPN facilities and a unique security audit feature.

The Cisco 831 is marketed as a broadband router for distributed office environments, although it doesn't have an ADSL interface built in. Instead there's an Ethernet port for Wan connectivity that can be used with cable, SDSL (Symmetric DSL) and other services, not just ADSL. On the downside, ADSL users will need a separate external modem with a suitable Ethernet uplink. Alternatively, the similarly priced Cisco 837 has an ADSL interface built in, and both models feature a four-port Ethernet switch for Lan connectivity plus a console port for local management, plus all the required cables.

As with all Cisco routers, the 831 runs the company's IOS (Internetwork Operating System) software, which is good news for organisations with technical staff versed in the language. You can use other IOS management tools with the 831. However, for those less comfortable with CLIs the browser options make life easier.

To install you just plug in the router and point a browser at the default IP address specified in the quick-start guide. This gives access to CRWS, the basic Cisco Router Web Setup interface where you can change the Lan and Wan settings to, say, use DHCP to obtain an address.

You can also set the level of firewall protection and allow traffic through to email and web servers on Network Address Translation (Nat) protected networks. The VPN option can be configured here, with options to use either conventional IPsec tunnelling or Cisco Easy VPN. This uses the same encryption and tunnelling protocols but simplifies tunnel setup and management, the only caveat being the need for an Easy VPN server at the other end of the link. The 831 only supports site-to-site tunnelling, although support for mobile VPN clients is available on other Cisco routers.

The tools provided by CRWS are easy to understand and use, and will be adequate for most situations. However, if you are looking for greater control without having to resort to the IOS command line, you can have SDM (Security Device Manager), another web-based interface, at no extra cost.

We were very impressed by what SDM has to offer. It's fairly new and wasn't loaded on our test router, so we did have to do some work at the command line to install it but, that done, it proved no harder to use than CRWS. It has a very intuitive graphical interface that starts out in wizard mode, with each wizard implemented using a Java applet to help guide you through tasks such as setting up the firewall and VPN options. Switching to the advanced mode then reveals the inner workings in even greater detail, providing scope for further customisation, with a third monitoring mode to show you exactly what's going on.

Useful online help is available throughout and there's an option to run a security audit from the SDM console. This performs a series of checks on the way the router has been configured, the end result being a list of recommended actions which can be applied as

required by clicking with the mouse, to tighten security. Alternatively you can opt for a one-step lockdown where the SDM software will apply all the recommended settings in one go for maximum protection.

One last important feature of the Cisco 831 is support for Quality of Service (QoS), enabling it to fit well into Voice over IP (VoIP) networks based around Cisco hardware. However, you don't have to be a Cisco customer to appreciate what the Cisco 831 Router has to offer. This robust and well-specified device is made even better by the addition of the new SDM software.

DETAILS

PRICE £512.30 (£436 ex VAT)

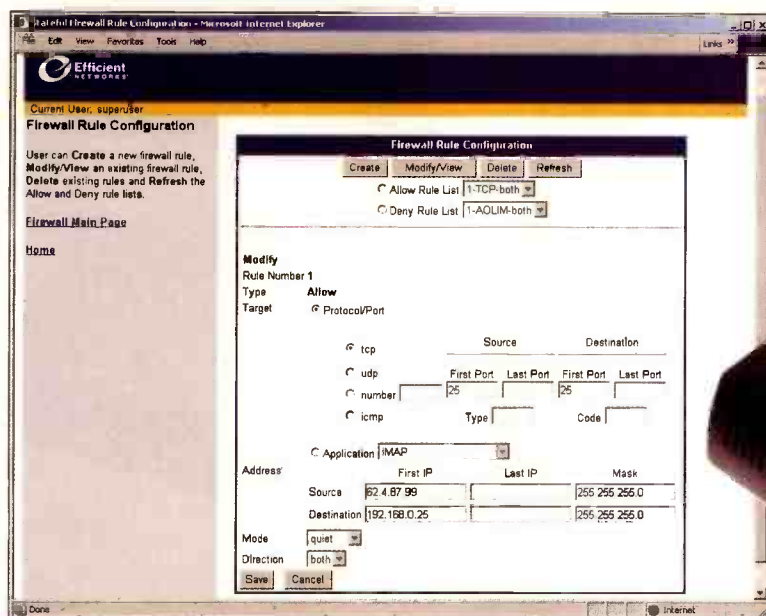
CONTACT Cisco Systems

020 8824 1000 www.cisco.com

PROS Choice of management interface; stateful inspection firewall; Cisco Easy VPN; security audit facility; good QoS facilities
CONS Site-to-site VPN only; no ADSL or cable modem interface
VERDICT

A solid and well-specified router made easy to manage by the Security Device Manager software

FEATURES ★★★★★
EASE OF USE ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★



The Efficient Networks 5930 features an ICSA-certified stateful inspection firewall which can be programmed directly from the browser management interface



Efficient Networks 5930 ADSL Business Gateway

Part of the Siemens group, Efficient Networks is also the name behind many of the ADSL routers supplied by BT, with the telecoms giant putting its badge on the older 5861 product. However, the 5930 ADSL Business Gateway is far more sophisticated than the BT supplied routers. As well as the DSL interface, it has a built-in 56K modem to provide an automatic backup service in the event of a DSL failure. You also get a fully customisable stateful inspection firewall, together with comprehensive VPN facilities and QoS support.

The 5930 is fairly large; it has to be, to accommodate the ADSL and dial backup interfaces along with an eight-port 10/100 Ethernet switch for Lan connectivity. There's also a local console port to which an external backup modem can be attached, while power is fed from a similarly big external AC adaptor. Still, the robust size of the 5930 inspires confidence, and it runs a lot cooler than the older 5861 which could get very hot indeed.

The Efficient Networks router is likely to be included with some ADSL business services (check with the ISP), and may even be set up and managed remotely for you. However, it's not a difficult device to get to grips with and is

well suited to companies looking to go it alone. There's a choice of setup mechanisms, including the local console port and the ability to Telnet into the 5930 and manage it via a CLI. There's also SNMP (Simple Network Management Protocol) support and a Secure Shell (SSH) server, although most users will opt for a browser for remote management.

Security is taken seriously by the 5930, so the first time you point the browser at it you're required to change the default administrator password. You're also asked to set a basic level of firewall protection by running one of several possible scripts to set either minimum, medium or maximum security. The default firewall works by filtering packets, but you can also turn on the separate ICSA-certified stateful inspection firewall to further protect local resources, with useful facilities to configure your own access rules. That's quite easy to do, with options to allow or deny packets based on a combination of protocol and port number or by application to quickly allow, for example, SMTP, POP3 and IMAP packets through.

A degree of technical expertise is needed to configure the 5930, although there is an easy setup wizard to take you through the more important steps. That

includes things like configuring the ADSL interface for the PPP over ATM (PPPoA) service used in the UK, telling the router what logon name and password to use and whether to bridge or route Ethernet protocols, or both. You're asked if you want to use the built-in DHCP server although, if such a server has been detected elsewhere on the network, the one in the 5930 is automatically disabled.

Things get a little more complicated when it comes to Nat. The 5930 is well equipped here with a useful pass-through setting to allow inbound traffic to, for example, email and web servers. Setting up these rules can take time, as can those for VPNs, with options to support both site-to-site links and individual remote clients, although VPN client software isn't included in the box.

On the plus side the Nat setup isn't that complex and Internet Key Exchange (IKE) can be used to simplify the creation of IPsec VPN tunnels. There's a choice of both easy and advanced VPN setup via the browser interface, so there's little need to ever touch the CLI, plus you get a comprehensive manual which explains how Nat, VPN and other options work and how best to configure them to suit different networks.

On the performance front, Efficient doesn't put a limit on the number of VPN tunnels that can be supported by the 5930, but for heavy use you'll want the optional VPN accelerator. This supports a throughput of 8Mbps/sec, enough to cope with 20 or more simultaneous tunnels. The 5930 is a good choice for satellite offices, and the QoS support brings an advantage to companies looking to route voice traffic over their IP Wan links. It's also possible to delegate management of the router, making the 5930 ADSL Business Gateway a very flexible as well as functional business broadband solution.

DETAILS

PRICE £398.33 (£339 ex VAT)

CONTACT Efficient Networks
+31 20 655 6060

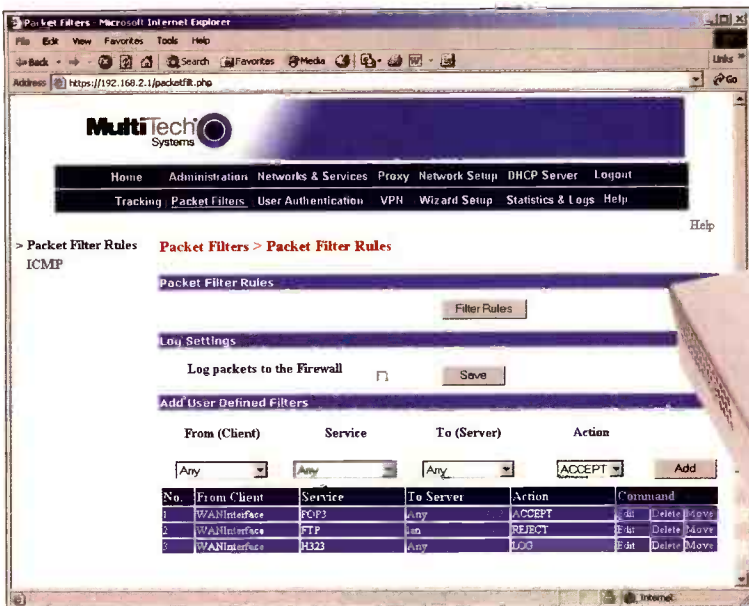
www.efficient.com

PROS Integrated dial backup; stateful inspection firewall; QoS; integrated eight-port switch
CONS No UPnP support; high level of functionality makes setup a little complex

VERDICT

All the right security and management options in a very capable business-class router

FEATURES	★★★★★
EASE OF USE	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★



Not as intuitive as some, the web interface used to manage the Routefinder 600 allows rules to be defined to allow traffic through to protected email and web servers



Multitech Systems Routefinder 600 VPN

The most expensive product in this group, the Routefinder 600 VPN features extra functionality, such as anti-virus scanning and content filtering, not available on the others. It can cache web traffic and is more of a gateway server than a router, although it can share a broadband Internet connection with multiple users on a Lan. You get Nat support, plus a stateful inspection firewall and comprehensive IPsec VPN facilities, all with remote management via SSH or a web based interface.

There's no built-in ADSL or cable modem, but there are three separate 10/100 Ethernet ports on the back panel. The first is used to attach the device to the local network and the second to the Internet via an external DSL or cable modem. The third is for connecting to public-facing email and web servers which require less stringent protection in a DMZ (demilitarized zone).

The Routefinder is a small appliance server rather than a solid-state router. The hardware is housed in a large metal case that can be rackmounted and runs an operating system from a 10GB internal hard disk. The disk can be changed and upgraded, with a backup CD-Rom provided to rebuild the

contents in such instances and you can plug in a screen and keyboard to gain direct access to the software. However, you get little or no information about doing this as it's not how the Routefinder is supposed to be managed, with a web interface the preferred mechanism, just as with the other products.

A large and comprehensive quick-start guide explains how best to deploy the Routefinder 600. The basics are simple and much the same regardless of how the product is used. Once plugged in and switched on (power comes from an external adaptor), all you need to do is set up a network PC on the default subnet initially used, then point a browser at the Routefinder using a secure (SSL) session for security. You're then asked to log on to gain access to a fairly standard menu-driven GUI.

The tools are straightforward, although not always what you'd expect. For example, click the button marked Wizard Setup and you get an on-screen form to complete rather than the more usual step-by-step wizard. Still, this is quite easy to do and all that's required are basic Lan and Wan settings with the option on the Wan side of having the ISP assign an address using DHCP, with a static address or PPP over Ethernet

(PPPoE). You can configure a dial backup facility here, too, but you will need an external modem for this to work.

The only firewall rule configured when taking the wizard approach allows all traffic through, with customisation done elsewhere. Confusingly, the tools required aren't listed under firewall but packet filters, even though the Routefinder 600 has a full stateful inspection engine, application proxies for HTTP, SMTP, DNS and Socks, plus a built-in intrusion detection facility. This provides a high level of protection against common Internet threats, while the packet filter rules are primarily used to allow access through these defences to email and web servers on the protected network.

Caching of web traffic can be turned on if required, and you get a year's subscription to the Surfcontrol URL filter list. Anti-virus protection for all email traffic passing through the box is an optional extra at £349 ex VAT. So is client VPN software, with the Routefinder able to support client VPN tunnelling as well as site-to-site operation. Tunnels can be configured manually or using IKE (Internet Key Exchange), with support for up to 50 simultaneous tunnels with 168bit 3DES encryption performed on the gateway. That makes the

Routefinder well suited to business use, possibly at a central location supporting smaller offices or teleworkers, which could each be equipped with a smaller Router, such as the Soho Routefinder VPN at £199 ex VAT.

There's a built-in DHCP server and facilities to define users allowed to access the Routefinder. You can also access traffic monitoring and reporting tools via the web interface, and there's support for SNMP management.

This is a comprehensive product, but you have to decide whether the extra functionality is worth it compared to the others which are cheaper and just as good, if not better, at the basics.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT Multitech 0118 959 7774
www.multitech.com

PROS Anti-virus scanning and content filtering; web caching; stateful inspection firewall

CONS Relatively expensive; hard disk is a potential point of failure; no QoS services

VERDICT

A lot more security options in what's effectively a security appliance, reflected in the relatively high price

FEATURES

EASE OF USE

ENTERPRISE VALUE

OVERALL



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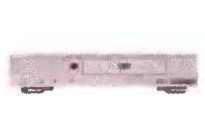
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26978	512MB DDR PC2100 266MHz RAM	£44.80 £54.99
20094	256MB PC133 SDRAM	£21.03 £24.72
22918	512MB PC133 SDRAM	£33.31 £39.14
34005	PC2700 512MB 333MHz DDR DIMM	£45.59 £53.57
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Asus A7N266-VM-SE Skt A MATX Sound Lan



£36.18 **£42.52**
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QuickFind Code: 29730

Code	ex VAT	inc VAT
31299	AMD ATHLON XP2000+ 266MHz FSB	£39.53 £46.45
29003	AMD ATHLON XP1800+ 266MHz FSB	£33.25 £39.07
32320	AMD DURON 1.3GHz	£22.50 £26.44
39529	AMD ATHLON XP2000+ 266MHz FSB - OEM	£44.46 £52.25
43066	AMD ATHLON XP2400+ 266MHz FSB OEM	£50.71 £59.59
43756	AMD ATHLON XP2600+ 333MHz FSB	£62.46 £73.40

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QuickFind Code	ex VAT	inc VAT
48179	Asonic 6 Channel C-media 8738 Chipset 3D	£3.49 £4.11
48180	Asonic 6 Channel C-media 8738 Chipset 3D	£3.99 £4.69
48434	SoundBlaster Mp3+ External Ubb	£30.56 £35.91
43053	Creative Labs Sound Blaster 4.1 OEM	£11.06 £12.98
32449	SoundBlaster Extigy- External USB 24Bit	£112.81 £132.56
46114	Maudio Sonic Theatre	£64.61 £75.92

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42089	Sapphire Radeon 9000PRO 128MB DDR	£61.38 £72.13
47911	Leadtek Winfast A310 Td Ultra FX5600U	£140.00 £164.50
33760	Inno3D Tornado TnT2 M64 AGP 32Mb	£13.34 £15.68
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49385	Sapphire Radeon 9200 64MB DDR 8xAGP	£44.61 £52.42

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46761 LG Electronics L1710S 17ins TFT 1280x1024	£274.04	£322.00
45230 Sharp LL-T17A3-H 17.1 TFT 1280x1024	£271.38	£318.88
46762 LG Electronics L1815 18ins TFT Flatron	£329.93	£397.67
45658 GNR 19M1 19ins TFT Black & Silver	£394.90	£464.01
48543 AE Neoova F17B 17ins TFT 1280x1024 Black	£229.50	£269.67

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43341 Creative Muvo Mp3 Player	£53.02	£62.30
43342 Creative Jukebox 2 Mp3 Player 10g Storage	£131.26	£154.24
49486 Freecom Beatman Flash 256mb Mp3 Player	£144.00	£169.20
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44497 Palm M550 Tungsten T - 16mb Os5.0	£303.02	£358.05
36213 Compaq Ipaq H3950 Pocket PC 64MB	£231.42	£271.92
45637 Palm Zire Handheld	£62.35	£73.27
44874 Sony Clie NX70V Handheld 16Mb/8Mb Flash	£284.86	£334.72

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PC2100 128mb DDR 184pin DIMM



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QuickFind Code	ex VAT	inc VAT
42146 PC2100 512mb ECC DDR 184pin DIMM	£47.99	£56.39
42144 PC2100 512mb DDR 184pin DIMM	£43.99	£51.49
42151 PC2700 256mb DDR CL 2.5 184pin DIMM	£26.05	£30.61
42152 PC2700 128mb DDR 184pin DIMM	£14.99	£17.62
42154 PC133 128mb SODIMM 144pin DIMM	£27.99	£32.89
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Maxtor Hard Disk Drive 5000DV 200GB USB 2.0 & Firewire External 7200rpm



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QuickFind Code: **46055**

QuickFind Code	ex VAT	inc VAT
45046 Maxtor Hard Disk Drive 5000e 80gb Usb2.0	£112.03	£131.64
44009 Maxtor 250gb External Storage 5000xt	£197.27	£221.80
49299 Hard Disk Drive 5000dy 160gb	£166.71	£195.89
45046 Maxtor Hard Disk Drive 5000e 80gb	£112.03	£131.64
46055 Maxtor Hard Disk Drive 5000DV 200GB	£179.42	£210.82
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31629 Plextor 80x24 Bumpstop USB 2.0	£78.01	£91.67
46390 Plextor 24x10x24 USB2.0 EXTERNAL	£115.98	£136.28
29735 Yamaha 24x10x40 Safelburn USB 2.0	£75.67	£88.92

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QuickFind Code	ex VAT	inc VAT
33324 Labtec Wireless Mouse - 3 Buttons PS2	£10.01	£11.77
40435 Microsoft Wireless Optical Desktop	£52.01	£61.12
29707 Memorex MX4350RF Wireless Mouse White	£10.95	£12.87
40571 Harry Porter Optical Mouse + Pad	£3.99	£4.69
45809 Creative Mouse Lite - Optical Wheel Mouse	£9.50	£11.17
26384 Chic 130 2 Button PS/2 Mouse - Retail Box	£0.83	£0.98

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43092 Sunbeam EL Cable Red	£5.99	£7.04
43099 LED 8cm Case Fan Red/Green/Blue LEDs	£1.49	£1.76
48746 Case Window Applique Kit 20cm Biohazard	£2.40	£2.82
44659 Sunbeam Sound EL Cable Blue	£7.99	£9.39
43089 Sunbeam EL Cable Blue	£5.99	£7.04

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QuickFind Code: **46799**

QuickFind Code	ex VAT	inc VAT
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49373 Mirror DVD-R 4x Speed 4.7GB 25 Discs	£17.99	£21.14
48468 Infiniti DVD-R 4x speed 4.7GB 25 Discs	£32.70	£38.43
44668 Memorex CD-R 48x Speed 700MB 10 Discs	£2.49	£2.93
46130 Ritek G64 Dye 4x Speed Single DVD-R 4.7GB	£2.49	£2.93
40284 Panasonic 4.7 DVD-R Media Single Disk	£3.99	£4.69

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Mustek Gsmart Mini 2 2.1 Mega Pixel



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inc VAT

QuickFind Code: **36149**

QuickFind Code	ex VAT	inc VAT
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44295 Nisis Pocket Dv2 Digital Video Camera	£64.30	£75.56
43102 Kodak Cx220 Zoom 2mpix 16mb Memory	£121.50	£142.77
42985 Kodak DX4330 Easyshare - 3.1MPix	£162.12	£190.50

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Canon CanoScan N640PEX 600 X 1200Dpi A4 Parallel



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QuickFind Code: **32015**

QuickFind Code	ex VAT	inc VAT
36148 Mustek Bearpaw 1200CS 600x1200 dpi USB	£31.63	£37.17
42975 Canon Lide 20 Flatbed Scanner - 600dpi	£38.84	£45.64
36145 Mustek ScanExpress 1200 UB Plus 600x1200	£24.40	£28.67
41377 Epson Perfection 1260 Scanner True 1200dpi	£44.22	£51.96
42099 Lide 30 Scanner - 1200dpi Ultra Slim UK	£57.47	£67.53

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42324 Hewlett Packard Deskjet 3255C Inkjet Printer	£29.99	£35.24
36952 Hp Deskjet 3620C 10ppm 1200dpi A4	£38.34	£45.05
36959 Hp Deskjet 3820C 12ppm 2mb A4	£53.57	£62.95

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32620 USB 2.0 A Port PCI Card	£7.96	£9.36
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QuickFind Code	ex VAT	inc VAT
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48442 Ebuyer Bluetooth USB Dongle	£21.36	£25.10
48444 Ebuyer Wireless 11Mbps USB Adapter	£21.99	£25.84
31095 Ebuyer 10/100 Network Card with	£3.25	£3.82
45023 Linksys 54Mbps Broadband Router	£85.47	£100.43

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Ebuyer ADSL 11Mbps Wireless Router with Built in ADSL Modem



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QuickFind Code: **48452**

QuickFind Code	ex VAT	inc VAT
26147 DLink ADSL Router with 4-port Switch	£73.68	£86.58
20266 Ebuyer 56K V.90 Hardware Fax/Modem	£5.99	£7.04
43072 Dynamode V.92 Fast - Internal PCI Modem	£8.20	£9.64
48409 Ebuyer ADSL USB Modem	£24.99	£29.37
48448 Ebuyer 1 Port ADSL Router	£37.99	£44.64
48551 Linksys Adsl Gateway + Firewall 4Pt Switch	£124.51	£146.30

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Memorex Wireless Keyboard, Mouse Bundle - MX5500 RF Keyboard + RF Scroll Mouse in White



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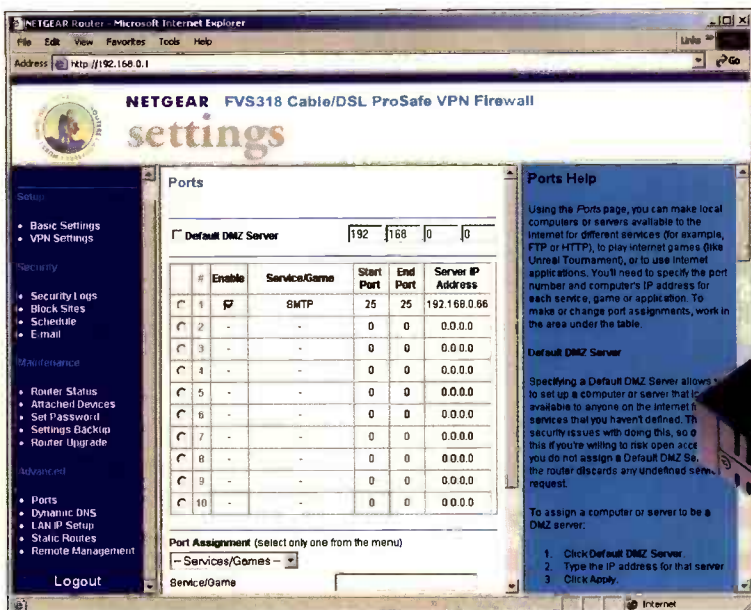
QuickFind Code: **27578**

QuickFind Code	ex VAT	inc VAT
20038 PS/2 Keyboard for Windows UK Version	£1.40	£1.65
41456 Logitech Cordless Desktop Keyboard & Mouse	£36.56	£42.96
43077 Microsoft Wireless Optical Desktop Bluetooth	£81.94	£96.28
40437 Microsoft Internet Keyboard 105 Keys Ps2	£10.90	£12.81
34495 Memorex MX5300 105 Key PS/2 Keyboard	£5.70	£6.70

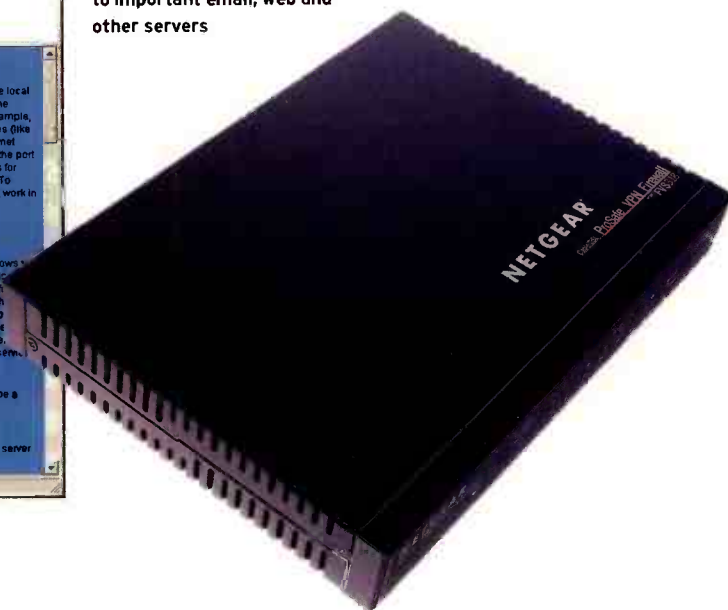
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It's not possible to configure custom rules for the stateful inspection firewall in the Netgear FVS318, but it can punch holes through to important email, web and other servers



Netgear FVS318

The FVS318 is part of Netgear's ProSafe range of Cable/DSL routers. Its larger brother, the FVL328 (£265 ex VAT), can support up to 100 simultaneous VPN tunnels and the cheaper, smaller FVS318, can handle eight tunnels and is aimed at satellite rather than central site deployment. There is little difference between the two products beyond performance and tunnel capacity, with the same stateful inspection firewall, content filtering and VPN facilities on both models.

The FVS318 router is housed in the standard blue metal casing used for nearly all Netgear business products, with an external AC adaptor for power. An eight-port 10/100 Ethernet switch is provided for Lan connectivity, but there's no ADSL or cable modem interface, just a single, separate, Ethernet port labelled Internet. That means connecting to an external modem which also needs an Ethernet port, adding to both cost and complexity. However, the advantage of this approach is that the Netgear router can be used with cable and SDSL services, not just ADSL.

A single Ethernet cable is the only other component you get, apart from a CD-Rom and installation manual. There's no port for local console manage-

ment or support for SNMP on either of the two Netgear routers, which could be an issue for companies that have standardised on this protocol for network management.

To configure and manage the FVS318 you point a browser at the default IP address assigned, using a network PC on the same subnet. Log on with the supplied username and password and you're prompted to run the built-in setup wizard to configure the Wan port. This starts by offering to detect the settings automatically or you can choose to enter the details manually, with a useful test button to check that you've supplied the correct addressing and logon information.

You can then change the router IP address and configure a DHCP server, set up static routes and restrict remote management to certain addresses on the Lan. There are tools to change the management password, check on router status, view the logs maintained by the hardware, take backups of the router settings and check for firmware upgrades. By default the router won't respond to pings on the Wan port, but this can be enabled.

The browser interface is very straightforward but, as you might expect on a product in this price bracket, you don't get

many tools to manage the firewall. That's not to say it isn't a secure implementation; it has stateful inspection firewall technology that can protect against most common Internet threats. That includes Denial of Service (DoS) attacks and IP spoofing with extra intrusion detection functionality built in, plus the ability to specifically block ActiveX and Java applets on the larger FVL328. Added to that, there's a facility to block access to websites based on address or content, as determined by user-entered keywords, with facilities to schedule days and times when restrictions should apply.

The lack of any ability to define custom firewall rules could be a drawback. Most businesses end up with a general rule blocking all externally generated traffic with just a couple of exceptions to allow access to protected email and web servers. A menu on the FVS318 enables internal address and port combinations to be accessed from the Wan port. Or you can pass all such traffic onto a designated DMZ server on the Lan.

There's more flexibility when it comes to VPN setup, with the Netgear router supporting both manual and IKE (Internet Key Exchange) key association. The

router can also support VPN client access although, like the Cisco 831, the FVS318 is designed for use in remote branch offices using site-to-site or gateway VPN to connect to the central location. If you want to support multiple mobile users the faster FVL328 with its 100 channel capabilities is a better bet, and it also offers PKI integration.

As an enterprise solution the FVS318 lacks some of the bells and whistles of some of the others, including QoS support. Nonetheless, it's a robust and easy-to-use product well worth considering, especially when deployed alongside the bigger, central site, model.

DETAILS

PRICE £135.12 (£115 ex VAT)

CONTACT Netgear UK
01344 397 021

www.netgear.co.uk

PROS Stateful inspection firewall; IPsec-based VPN support
CONS No integrated ADSL interface; limited control of firewall rules; no SNMP

VERDICT

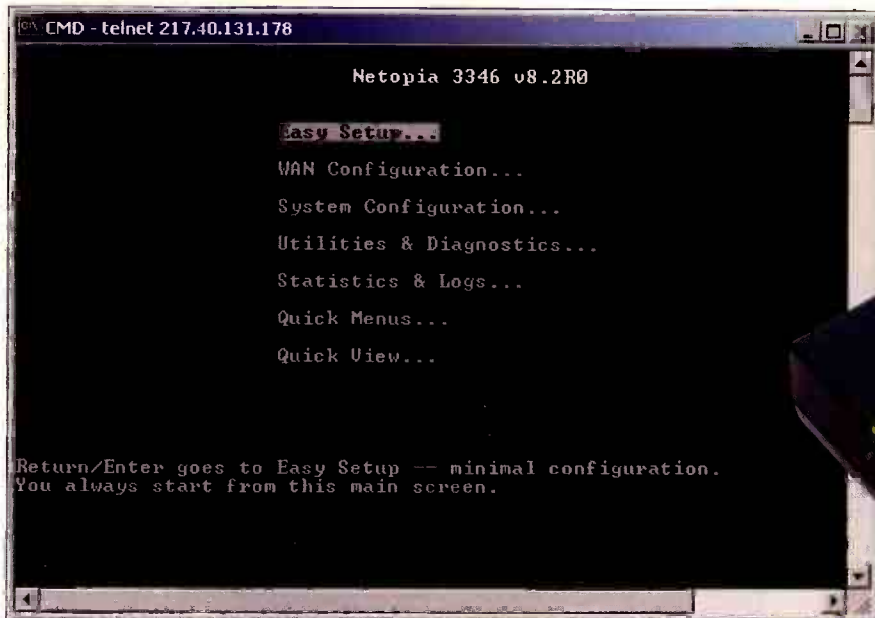
Cheap and cheerful, but this offering gets the core job done, and the company's FVL328 is even more capable

FEATURES

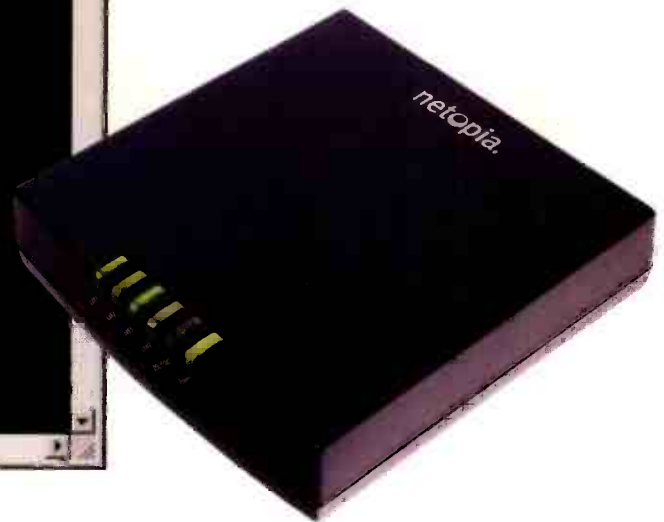
EASE OF USE ★★★★★

ENTERPRISE VALUE ★★★★★

OVERALL ★★★★★



When it comes to managing the Cayman 3346-ENT there's no graphical browser interface, just Telnet and command-line menus



Netopia Cayman 3346-ENT

There are a number of different products in the Cayman 3300 series of broadband routers and some care is needed in differentiating between them. With just a few interface differences, the same basic hardware platform is used in each case, with different firmware to suit the needs of either the home user or remote office and teleworker. With the latter the emphasis is very much on security, with firewall and VPN functionality built in as standard. It's assumed business users are OK with CLIs, with a browser GUI only provided for setup of residential models.

The Cayman 3300 routers can come without a DSL interface, to enable them to be used with Cable and SDSL as well as ADSL services. For our tests, though, we were sent a Cayman 3346-ENT which has an integrated DSL modem that can be used with both PPPoA and PPPoE services. A version with a USB interface is available, but most businesses will opt for the built-in four-port 10/100 Ethernet switch for wider Lan connectivity. Power is supplied via an external AC adaptor and cables for DSL and Ethernet attachment are included as standard.

There's no local console port on the 3346-ENT, even though setup and management is all

done from a CLI. Rather, you have to use Telnet to connect to the line interface remotely, using the default IP address assigned to it when the router first boots.

By default the CLI presents the remote administrator with a set of menus rather than waiting for commands, as with most CLIs. Whether you consider these user friendly or not will depend largely on your level of expertise, although in essence they shouldn't be any harder to get to grips with than a browser front end. However, for those more used to graphical interfaces it can be a bit of a shock, and there's a lot of jargon to wade through, which doesn't help. Indeed some of it had us baffled to begin with, and we certainly found the Cayman the most difficult of the routers we looked at to configure.

On the plus side there is an Easy Setup menu to step you through the basics – primarily setting up the ADSL Wan and Ethernet Lan interfaces and turning on Nat. The quick-start guide also contains a lot of UK-specific help, which we found of particular use when it came to configuring the ADSL interface.

Other functions, such as the firewall, aren't so straightforward for instance. There's

no stateful inspection firewall as on most of the other routers we looked at – just a fast but very basic packet filter. To manage this you need to configure a series of filter sets with rules that are applied to either incoming or outgoing packets based on address and port information. A basic firewall filter set is provided, but this blocks most incoming traffic so you have to add rules of your own to allow access to email, web and other servers on the Lan. It's not a particularly difficult task but you'll need to know your port numbers for more advanced configuration.

Similarly, we didn't find the VPN interface particularly easy, although we had no complaints when it came to functionality, with support for IPsec-based site-to-site, client and gateway tunnelling and both manual key and IKE setup. Moreover, the router can handle up to 15 simultaneous tunnels and the user guide provides a lot of information both about VPN deployment and using the firewall, all of which we found helpful.

Other plus points with the Cayman 3346-ENT include the ability to authenticate users, either locally or via an external Radius server, and

set two levels of management access. You can also take a backup of the configuration, run diagnostics, and log alerts to an external Syslog server. There's basic QoS support too, enabling the router to prioritise voice over data when deployed as part of an IP telephony solution.

The Cayman 3346-ENT has the makings of a good business solution, but the archaic CLI and lack of a stateful inspection firewall are real drawbacks, which is surprising given that there are other routers available from Netopia which don't suffer such disadvantages.

DETAILS

PRICE £233.83 (£199 ex VAT)

CONTACT Netopia
+33 1 4529 9100

www.netopia.com

PROS Integrated DSL modem and four-port Ethernet switch; QoS

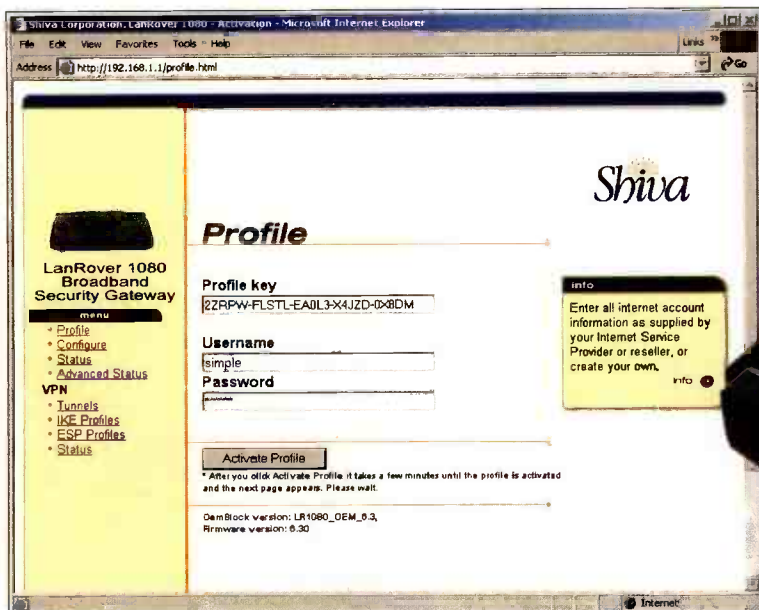
CONS No browser interface for management; packet filtering firewall only

VERDICT

Provides all the router, firewall and VPN basics but the primitive CLI for management is a real drawback

FEATURES

EASE OF USE ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★



The Shiva Lanrover 1080 can be configured quickly and easily just by typing in a profile key generated by an ADSL supplier or ISP



Shiva Lanrover 1080 Broadband Security Router

Shiva Corporation has had something of a chequered history over the past few years. Originally a remote Lan access specialist, the company was first acquired by Intel then Simple Access which, as of October last year, reverted to using the Shiva name. Lanrover is the brand name for its security router family and the Lanrover 1080 is the latest addition, offering built-in DSL connectivity together with an ICSA-certified firewall plus VPN functionality and a unique profile key technology to simplify deployment and setup.

Although very much a business product the Lanrover 1080 is little bigger than most home networking routers. The ADSL modem is built in and, unlike most routers in this class, there's no internal Ethernet switch, just a single 10/100 port for Lan attachment. Fortunately that's more than adequate, with a port for local console access on the back panel along with a socket for attachment of a telephone handset (an ADSL microfilter is built in) and the jack for the external power supply.

Colour-coded cables are supplied for the DSL and Ethernet connections as well as to connect to the serial port on a local PC for command-line management. Telnet access is

another option, but there are no SNMP or SSH facilities as with some of the other products featured here.

In order to differentiate itself from similar products, a key selling point is the ability to configure the Lanrover 1080 automatically using profile keys. A separate Profile Deployment Tool is available to generate the keys, which can be used by ADSL suppliers and ISPs to define the settings they want their customers to use. All the customer then has to do is point a browser at the Lanrover and type in the profile key, along with its associated user name and password. The key is decrypted by the router and used to configure the hardware automatically in a process that takes just a couple of minutes to complete, with no further user input required.

The profile key approach simplifies deployment and is ideally suited to service providers wanting to include the Lanrover as part of a managed solution. That's the main route to market for the Lanrover, via UK distributor Tekdata which has agreements with a number of leading service providers.

For companies that want to manage the Lanrover themselves, it's still possible to make changes via the web browser, although the

options here aren't as comprehensive as on some of the products we tested. For instance there are only three settings for the ICSA-certified stateful inspection firewall. In each case the firewall will always provide protection against DoS and other common threats, but with a choice of enabling all TCP/UDP traffic, only allowing known protocols through or just common protocols such as HTTP, FTP and POP3.

More detailed customisation of firewall rules is possible, but only by using the CLI, which isn't recommended to non-experts. Still, the settings provided do afford a good level of protection while enabling email, web and other servers to be hosted. And if you want more precise controls the service provider should be able to oblige.

There's more scope for end-user setup when it comes to VPNs, with facilities to support up to 10 tunnels on the Lanrover using DES, 3DES or AES encryption. There's support too for IKE and the Shiva router can be used to support both site-to-site and client-based VPN access. A VPN software client is included in the package, with a licence for unlimited use.

The web interface allows for basic diagnostics to be run and status information displayed,

but that's about it as far as management is concerned. The unit we looked at only supported the PPPoA deployment of ADSL. This worked fine on our UK connection, but you'll need different hardware for offices in countries using PPPoE.

Although it's got all the basics, the Lanrover is deficient in a couple of important areas. There's no QoS support, for example, and the logging and reporting facilities are also pretty basic which, added to the lack of SNMP support, marks it down. Bundled as part of a managed service it's fine, but as a standalone enterprise solution it doesn't come up to scratch.

DETAILS

PRICE £540.50 (£460 ex VAT)
CONTACT Tekdata 01782 254 777
www.shiva.com

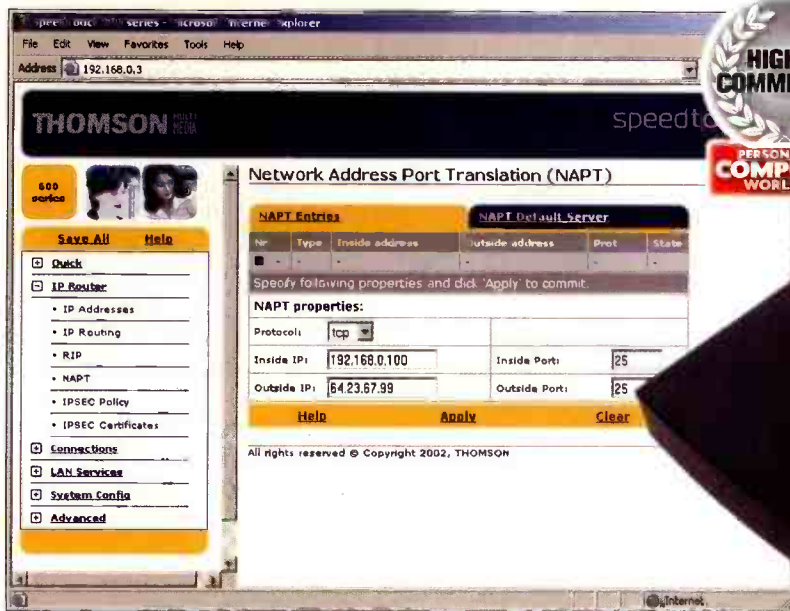
PROS Fast profile key setup; stateful inspection firewall; unlimited licence VPN client included

CONS Single Ethernet port; no SNMP; no QoS

VERDICT

Profile key setup makes for simple deployment, but it's beaten by the competition as an enterprise product

FEATURES ★★★★★
EASE OF USE ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★



You have to use the CLI to get full access to the embedded firewall in the Speedtouch 610, although it's quite easy to punch holes in the protection to allow remote access to particular applications



Speedtouch 610 Router

Originally developed by Alcatel but now sold through Thomson Multimedia, the Speedtouch 610 is a business-class ADSL router designed primarily with the distributed, branch office network in mind. It is supplied as part of the deal with some ADSL services or can be purchased independently for use on wires-only DIY DSL services. The built-in ADSL modem can handle PPPoA and PPPoE, using customisable preset profiles for fast initial setup.

When it comes to security a packet filtering firewall comes as standard on the Speedtouch router, together with support for IPSec-based VPN tunnelling. There's also an SDSL model available for those able to get such services, better able to support central VPN sites. The Speedtouch router can also be configured to act as a mini VoIP PBX, enabling users with SIP (Session Initiation Protocol) handsets to call each other and, via a separate IP telephony gateway, connect to the public switched telephone network.

Initial hardware installation is very straightforward. All the connectors are at the back of the small desktop case, including an RJ-11 port for direct attachment to the phone line, for which a pair of microfilters and cable are

provided. There's a nine-pin console port for local configuration, plus remote Telnet access to the same CLI. For Lan connectivity you get a built-in four-port 10/100 Ethernet switch (a single straight-through UTP cable is provided), while power comes from an external AC adaptor.

Once the various cables have been attached, just switch the router on. The Speedtouch 610 automatically obtained an IP address using DHCP on our test network, although for those without there's a built-in DHCP server, which is automatically disabled if an existing service is detected. There's also a useful DHCP relay facility for larger, multi-segment, networks.

Then you load the CD-Rom supplied into a networked PC and run the setup wizard. This finds the Speedtouch hardware and prompts you to select a connection profile to match the type of DSL service being used. Typically this profile will be customised by the service provider, or you can configure the router manually with a choice of always-on or a dial-on-demand setup.

The vendor claims its profile-based setup system is failproof, the default profile for PPPoA with Nat working fine in our case. You can then tweak the

configuration via the browser interface or CLI to further fine tune operation. Some of the options aren't up for much customisation, especially if you're using the browser. The embedded firewall, for example, is really only configurable from the command line. There is a CLI option in the browser front end which makes this interface a lot more intuitive, adding online help for the various commands, but for anyone not used to this approach it's a daunting task. The firewall is of the basic packet filtering type and as yet isn't ICSA certified.

On the plus side, it's easy to configure the most commonly required firewall changes to enable remote access to email, HTTP and other services. This you do from the Network Address and Port Translation (Napt) menu, creating rules to map external IP addresses and port numbers to protected local address/port combinations. The Speedtouch 610 also supports the Universal Plug and Play (UPnP) standard allowing compatible applications (such as Windows Messenger and Remote Assistance in XP) to setup their own mappings dynamically on Nat-protected networks.

There's comprehensive VPN support with a built in IPSec client that can be used for site-to-

site and site-to-client tunnelling, although client software is not included. The Speedtouch can be configured to link tunnels into existing IPSec VPN gateways with encryption handled by the router, which can cope with up to 20 tunnels. It's suitable for satellite offices, the bandwidth of the DSL line being the principal brake on VPN performance.

Lastly there's the unique SIP (Session Initiation Protocol) option which, for £99 ex VAT, enables the Speedtouch 610 to be used as a mini in-house PBX. You need SIP-compatible IP handsets and a separate IP telephony gateway as the 610 doesn't support external PSTN calls.

DETAILS

PRICE £339.58 (£289 ex VAT)

CONTACT Speedtouch
01295 222 170

www.speedtouch.com


PROS Fast profile-based deployment; integrated four-port Ethernet switch; mini-PBX option; comprehensive VPN support; UPnP
CONS Packet filtering firewall only; CLI required for advanced setup

VERDICT

Deceptively simple router with good basic security plus extra features of value to businesses

FEATURES	★★★★★
EASE OF USE	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★

Table of features

							
MANUFACTURER	CISCO	EFFICIENT	MULTITECH	NETGEAR	NETOPIA	SHIVA	SPEEDTOUCH
MODEL	831 ROUTER	5930 ADSL GATEWAY	ROUTEFINDER 600 VPN	FVS318 DSL	CAYMAN 3346-ENT	LANROVER 1080	610 ROUTER
Price inc VAT (ex VAT)	£512.30 (£436)	£398.33 (£339)	£1,173.83 (£999)	£135.12 (£115)	£233.83 (£199)	£540.50 (£460)	£339.58 (£289)
Phone	020 8824 1000	+31 20 655 6060	0118 959 7774	01344 397 021	+33 1 45 29 9100	01782 254 777	01295 222 170
URL	www.cisco.com	www.efficient.com	www.multitech.com	www.netgear.co.uk	www.netopia.com	www.shiva.com	www.speedtouch.com
PHYSICAL							
Integrated ADSL modem	X	✓	X	X	✓	✓	✓
Integrated telephone splitter	N/A	X	N/A	N/A	X	✓	X
Integrated Ethernet switch	✓	✓	X	✓	✓	X	✓
Number of Ethernet ports	4 + Wan	8	1 + Wan + DMZ	8	4	1	4
Local console port	✓	✓	✓	X	X	✓	✓
Backup Wan port	✓ (external modem)	✓ (internal modem)	✓ (external modem)	X	X	X	X
LAN SERVICES							
DHCP server	✓	✓	✓	✓	✓	✓	✓
DHCP relay	✓	X	✓	X	✓	✓	✓
Network Address Translation (Nat)	✓	✓	✓	✓	✓	✓	✓
Port address translation (Pat)	✓	✓	✓	✓	✓	✓	✓
UPnP support	X	X	X	X	X	X	✓
QoS	✓	✓	X	X	✓	X	✓
FIREWALL							
Stateful inspection	✓	✓	✓	✓	X	✓	X
Custom firewall rules	✓	✓	✓	✓	✓	✓ (via CLI*)	✓ (via CLI*)
Anti-virus scanning	X	X	Optional	X	X	X	X
Content filtering	X	X	✓	✓	X	X	X
Alert logging	✓	✓	✓	✓	✓	✓	✓
Email alerting	X	X	✓	✓	X	X	X
VPN							
IPsec tunnelling	✓	✓	✓	✓	✓	✓	✓
Gateway-to-gateway	✓	✓	✓	✓	✓	✓	✓
Gateway-to-client	X	✓	✓	✓	✓	✓	✓
Maximum tunnels	10	N/A	50	8	15	10	20
Internet Key Exchange (IKE)	✓	X	✓	✓	✓	✓	✓
DES encryption	✓	✓	X	✓	✓	✓	✓
3DES encryption	✓	✓	✓	✓	✓	✓	✓
AES encryption	X	X	X	X	X	✓	✓
VPN client software	X	X	Optional	X	X	✓ (unlimited licence)	X
Other options	Security audit	VPN accelerator	Caching server, intrusion detection				SIP PBX
MANAGEMENT							
Command-line interface	✓	✓	✓	X	✓	✓	✓
Telnet access	✓	✓	X	X	✓	✓	✓
SSH access	✓	✓	✓	X	X	X	X
Browser interface	✓	✓	✓	✓	X	✓	✓
Multi-level management	X	✓	✓	X	✓	X	X
SNMP support	✓	✓	✓	X	✓	X	✓
SCORES							
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Ease of use	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Enterprise value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

* Command line interface

Editor's Choice

Before discussing the routers in this group test, or recommending any particular product, let's recap on the sort of product we're talking about. In essence there's little difference between many of the routers here and the cheaper devices you might use to share a broadband connection on a home network. However, whereas a router for a home network will be used mainly to support web browsing, sending the odd email and playing games, a business router has to work a lot harder.

To begin with a business-class router needs to be able to provide rock-solid protection for resources on the Lan while, at the same time, allowing access to public-facing email, web and other servers. Increasingly too, a business router needs to be able to support VPN tunnelling and encryption to allow distributed offices to communicate securely with each other and for teleworkers and mobile users to access Lan resources remotely.

A number of features, such as support for Nat and a firewall, for example, become essential. And these options have to be flexible enough to cope with a variety of business needs, from allowing public server hosting to coping with the access requirements of complex ebusiness applications. Facilities to terminate VPN tunnels on the router itself are also important, as is the ability to handle the encryption overheads of several VPN tunnels at a time.

That said, the routers we looked at are primarily designed for satellite rather than central site deployment. The one exception is the Routefinder 600 VPN from Multitech, which is capable of handling up to 50 simultaneous tunnels at a central office location. Indeed the Routefinder 600 turned out to be more of a custom security appliance than a modified router, with optional anti-virus and content filtering facilities and a relatively high price tag.

It's worth noting too that the Routefinder was the only product with a disk-based operating system, the others all being solid-state devices. And, of these, three stand out, albeit for quite different reasons.

The winners

The first to catch our eye was the **Speedtouch 610 Business DSL** router which, although it only offered a basic



Cisco 831 Router

'The Cisco 831 Router is a true business product with all the right features'



Speedtouch 610 Business DSL

packet filtering firewall, was well equipped in other areas. In particular the Speedtouch features good QoS support and the ability to configure the router as a mini-PBX capable of being linked into a larger IP telephony network. The 610 also has good VPN

facilities, enabling it to handle up to 20 site-to-site, site-to-client or gateway-hosted tunnels. An ability to manage firewall rules via the browser interface would be useful. However, the command-line interface provides all the flexibility needed so we've given the Speedtouch 610 Business DSL router a **Highly Commended** award.

We were impressed also by the Efficient Networks 5930 ADSL Business Gateway which, uniquely, features an integrated backup dial-up modem. The 5930 is also strong when it comes to firewall and VPN functions and very straightforward to set up and manage.

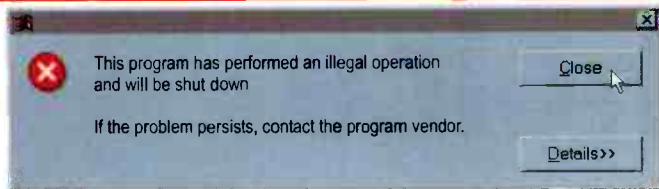
But we were even more impressed by the **Cisco 831 Router**, something which shouldn't come as a surprise, given that Cisco has been in the router business longer than most.

The Cisco hardware itself isn't that remarkable and you do need an external DSL or cable modem to go with it, but you get comprehensive firewall and VPN facilities with support for Easy VPN, the Cisco solution to the complexities of tunnel setup. The 831 also excels when it comes to QoS, as you'd expect from a company as heavily committed to IP telephony as Cisco.

That said, what finally convinced us to give our **Editor's Choice** award to the Cisco 831 Router was the management software. Not only do you get the IOS command line and SNMP support, but a choice of either a simple web interface or the new Security Device Manager (SDM), which combines the power of IOS with the ease of use of a GUI. SDM can be used to configure in detail just about everything that would otherwise be done from the command line. Wizards make it all very simple, with lots of online help plus a security audit facility to highlight any potential flaws in the configuration.

In our opinion the Cisco 831 Router is a true business product with all the right features required for a branch office and teleworker solution. Moreover, it's part of a larger family that's widely available and well supported worldwide. What more could you want?

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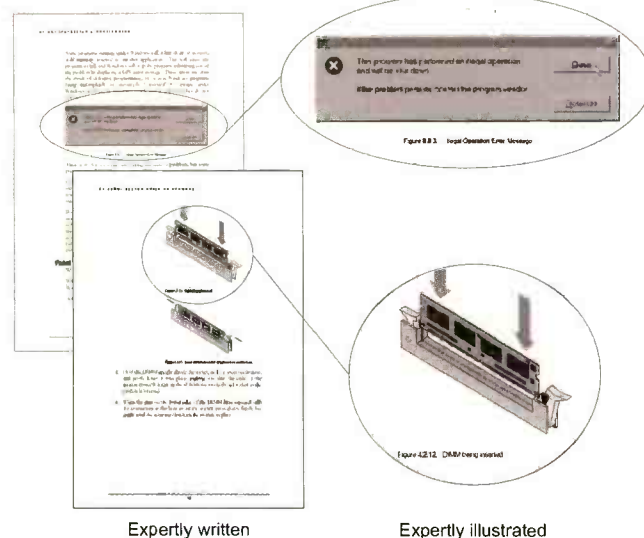
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Hands on



EDITED BY NIGEL WHITFIELD

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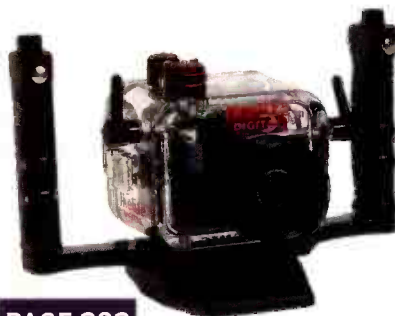
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This month's Hardware puts a Mini-ITX motherboard through its paces



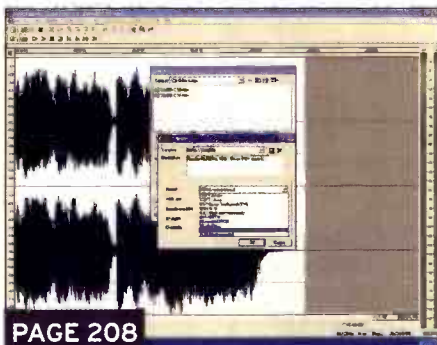
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We offer you a guiding hand through the vast array of graphic file formats available under Windows



PAGE 202

Digital imaging & video has some useful advice on making the most of underwater photography



PAGE 208

Converting between different audio formats can create problems – here's how to tackle them

Small is beautiful, and Gordon Laing is certainly smitten with compact PCs. In this month's Hands on Hardware, he takes a look at the Epia-



M10000 motherboard, which provides more performance than some of Via's previous miniature systems, to see if it will help you put together the sort of computer that will be useful – as well as silent – in your living room.

Outside the house, Ken McMahon has been underwater this month, and brings us tips on how you can take the best pictures when you're snorkelling, as well as a look at how to add captions to your digital movies with the minimum of fuss. And if you're wondering how to pay for the swimming trip or the digital camcorder, take a look at Databases, where Mark Whitehorn shows how you can use your PC to make checking up on lottery tickets much easier. Along the way, he also points out some of the flaws that lie in wait for unwary users of Microsoft Access.

In the world of Windows 2000, you can find out everything you ever wanted to know about Service Pack 4, but were too afraid to ask Terence Green, while XP users can find out how to stop annoying spam pop-ups and remap their keyboards.

Tim Nott also provides a useful overview of the key graphics formats in Windows, and has more fun with inf files, while over in Sound Niall Magennis looks at converting samples and sounds from one format to another.

For the business-minded, take a look at Stephen Wells' Spreadsheet column to see how to work out stock levels, and in Web development we ponder how you can ask for feedback from site visitors without creating spam problems. There's also a look at creating lists in the Word processing column and information on setting up office email from Alan Stevens in Networks. Barry Shilliday explains the ins and outs of installing software under Linux, while Tim Anderson looks at changes in Jbuilder and .Net, and Guy Kewney looks at turning your PDA into a remote control in Mobile computing.

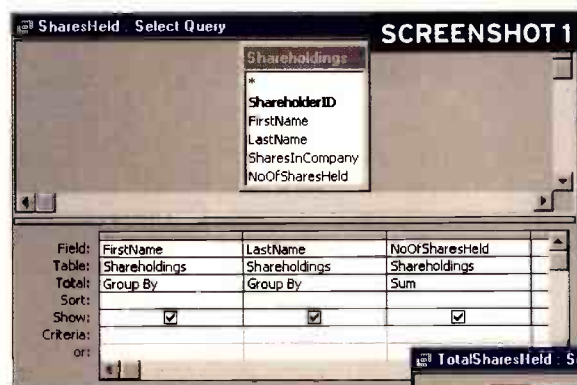
And, as ever, in Question time you'll find the answers to problems and queries that you've sent to our Hands on experts. All the team welcome feedback, and you'll find the addresses for each section at the end of Question time. So whether it's a suggestion for something to cover, a problem that needs solving or a comment about what you've already read, do get in touch.

Nigel Whitfield



Advice from our experts

Our Hands on experts answer your questions and solve your problems



Databases

Q I have an Access 2000 database storing shareholders and their shareholdings. I want to produce a list of shareholders and the number of shares held. I'd also like a total of all shares held by all shareholders.

Andrew Jolly

A For this, you'd use a Group By query. Given a table like the one below (which is hardly a model of relational purity – but assume it's an answer table generated by a query to pull together details from shareholder and company tables), you can build a Group By query upon it, as shown in screenshot 1 above. This will tell you that Ms van Dahl holds 880 shares.

The fields incorporated into a Group By query are vital to the result it gives. Here, if you include the SharesInCompany field, you'd get each shareholder's stockholding for each company in which they held stock, which would show that Gertie holds shares in two companies.

To produce a grand total of shares held, you'd base another Group By query upon the one shown above, which sums the NoOfSharesHeld field (see screenshot 2).

Hardware

Q I would like to burn audio CDs without gaps between the

tracks, but my Nero burning software tells me the feature is not supported by my CD drive. If I buy a new CD writer, what feature should I be looking for?

Carl Hesketh

A The feature you're looking for is called Disc at Once (DAO), and can normally be found under writing modes in the recorder's specifications. If you want to check

the capabilities of a drive that's already connected, download the excellent Nero Infotool from

www.nero.com (choose to download Nero and you'll find Infotool under utilities from the pulldown download menu). If your drive supports DAO or variable gaps in Track at Once (TAO), you can modify the gap length between audio tracks in Nero by simply

double-clicking them in a Nero audio compilation, then entering the desired pause length.

Q I can't make the decision whether to buy a notebook or a desktop PC. I like the idea of portability, but am determined to have decent 3D graphics capabilities. One thing is for certain: whatever I buy must be able to run Half Life 2.

Andy

A We're afraid you're caught in a bit of a catch-22. While notebooks offer the ultimate in portability and the unique ability to operate on the move, their 3D gaming potential is far below that of a desktop PC. That said, mobile 3D chipsets are steadily improving, and a notebook equipped with a top-of-the-range ATI Radeon Mobility 9600 or Nvidia Geforce FX Go should easily run Half Life 2. Your satisfaction depends on personal

expectations. If you demand to see the maximum detail and effects at both the highest resolutions and frame rates, stick to a desktop PC and equip it with the fastest 3D card you can afford. If you're after portability, a system based on a Shuttle XPC can easily be lugged between locations, albeit not operated on the move – check out Alienware's Area-51 small form factor systems (along with gaming notebooks) at www.alienware.co.uk. And remember, unlike a notebook, the graphics on a desktop with an AGP slot can always be upgraded. The choice is yours.

Q I have an old dual-processor PIII 800 system and am looking to upgrade. I need to choose between Intel and AMD processors and whether I can truly justify another dual-processor system. Will a single P4 with hyperthreading match the performance of a proper dual-CPU system?

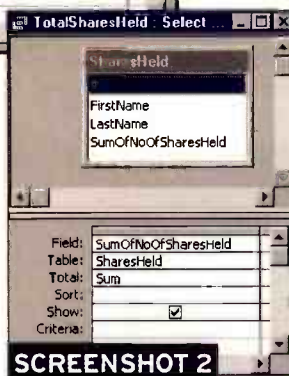
Jeff Knight

A In a word no. A genuine dual-CPU system will still deliver superior performance on tough scientific or graphical tasks designed for a multi-threaded platform. That said, hyperthreading, which allows one Pentium 4 to appear as a pair to supporting operating systems, will deliver around 25 per cent better performance than one without hyperthreading, so it's not to be sniffed at. As crucially, a single hyperthreading P4 is much cheaper than buying two processors, and considerably easier for a case to accommodate, not to mention power and keep cool too.

Q My digital camera manual claims that after downloading pictures they should not be saved frequently, as every time they lose quality. Is this because they are in jpeg format? What format do you recommend saving them in for the best quality?

Rick Holt

A The jpeg file format employs lossy compression, which means every time it's applied, some data is forever lost. The problem therefore comes when you modify a jpeg image and wish to save the changes. If you press Save, it will be recompressed



Above left: In the SharesHeld query, shareholders are grouped by name, and their shareholdings are counted up to give a total for each

Above: This query is based on the SharesHeld query and gives a grand total of all shares held by shareholders

TABLE 1

ShareholderID	FirstName	LastName	SharesInCompany	NoOfSharesHeld
1	Keith	Chest	Wilsons Inc	4500
2	Booth	Hall	S T Hall & Co	24500
3	Gertrude	van Dahl	Wilsons Inc	550
4	Booth	Hall	Argoblast	4000
5	Gertrude	van Dahl	Argoblast	330



with a further loss in quality. To preserve quality during resaves, an image must be saved in a format which employs lossless compression or none at all. The most popular and compatible option is the tiff, where the optional LZW compression is lossless. The downside is file size, as 3 and 5 megapixel images saved as uncompressed tiffs measure 9 and 15MB respectively. Consequently we recommend all digital camera owners to simply back up their original jpegs, and only use tiffs to resave images which have been modified.

Spreadsheets

Q I want to record swimming race times in seconds, including one-hundredths and for Excel to convert to minutes where applicable. Also, how do I sort the results with the winner at the top?

Nikki Jinks

A Make an entry like 0:80.001 and you can display it as 80.001 with the custom format [ss].000 or as 1:20.001 with the format m:ss.000. To sort, click in the list, choose Sort on the Data menu, and then Ascending.

Q Using Excel, I have in column A a list of locations, while in column B are the ages of individuals. I want to obtain a count of all those people in a particular area of a certain age. I have tried the COUNTIF function but I'm having no luck.

Gary McLaughlin

A Enter the labels Place in A1 and Age in B1. List your place names in the range A2 to, say A50. List the ages in the range B2 to B50. Highlight the range A1 to A50 and press Ctrl & F3. This is the keyboard shortcut to create a Name. Click Add to create the Name 'Place' for the range. Highlight the range B1 to B50 and press Ctrl & F3 again. Click Add to create the Name 'Age' for the range. In cell C2 enter =SUM(IF(Place="London",IF(Age=10,1,0))) and press Ctrl & Shift & Enter instead of Enter (see screenshot 3). Excel will add curly brackets to acknowledge it knows you want an array formula. An array formula runs up and down the columns looking for what you have specified. If it finds you have entered four instances of children aged 10 in London, the answer will be four. In Excel, creating Names for ranges, and using array formulas, are the most efficient ways of using memory.

Q I have been plagued by continued references to

'automatic links to information in other workbooks' and asking if I wish to update. I respond with a yes to each one, but am then harangued again next time I load any of the files. Is there anything that can be done to stop this happening each time I load any of my files in Excel?

Cedric Roberts

A On the Tools menu, click Options, and then click the Edit tab. Look for Settings. Clear the Ask to update automatic links check box. If the box is cleared, the links are automatically updated, and no alert is displayed.

Q How can I have a label which reads, Days late at – with the current date?

Peter Moxey

A Enter in the cell, =TODAY(). Give the cell the Custom format, "Days late at" d/m/yy (see screenshot 4).

Windows 2000

Q My Windows 2000 Professional CD is dated early 2000 and does not include any service packs. I have read it's possible to 'slipstream' the service packs and create a bootable CD from which Windows 2000 can be installed with service packs applied. Could you explain how this is done or send me a link to a site which is in relatively plain English?

Jay Malde

A Slipstreaming works as you have described and is very easy to accomplish. The Windows 2000 Service Pack Installation and Deployment Guide explains the procedure, which is designed for creating shared distribution folders on a network. Microsoft calls it the 'Integrated Installation'. You can create an integrated installation and burn it onto a CD from which you can install the integrated Windows 2000 with service pack, but you will not be able to boot from the CD. To make the CD bootable you need the boot block from a Windows 2000 CD. With the boot block and your integrated install folder you can use your favourite CD burning software to create a bootable, slipstreamed Windows 2000 CD. Because Service Packs are finalised months ahead of their release to allow for extended beta testing, the slipstreamed CD can't install a Windows 2000 version that is up-to-date in terms of critical updates. But there is a procedure that enables security updates and other hotfixes to be included in the slipstreamed CD.

SCREENSHOT 3

	A	B	C	D
1	Place	Age		
2	London	10	4	
3	Brighton	11		
4	Norwich	12		
5	Cardiff	13		
6	London	14		
7	Brighton	10		
8	Norwich	11		
9	Cardiff	12		
10	London	10		

How to count instances of two conditions

SCREENSHOT 4

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Making a Bootable Windows 2000 CD with Service Pack Integrated - Opera

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Windows 2000 Service Pack 4

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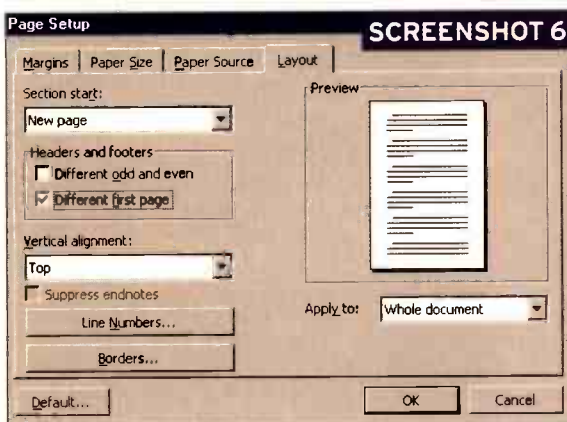
Making a Bootable Windows 2000 CD with Service Pack Integrated

Service Packs in Windows 2000 have a new feature to integrate the service pack in the original installation folder (i386). So when you install a Computer with a fresh copy of Windows 2000 it will be directly at the Service Pack level.

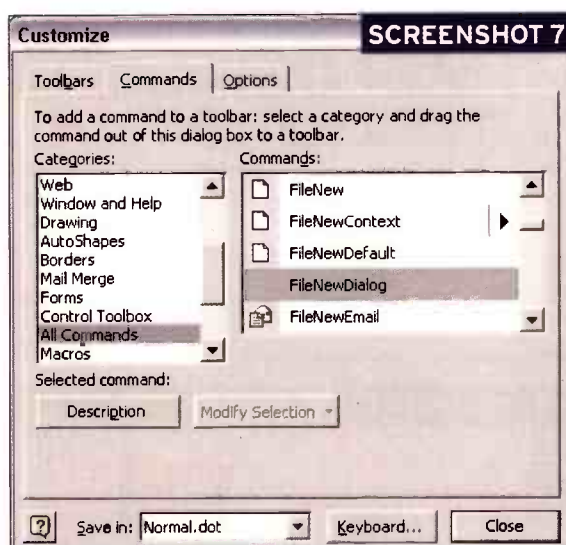
This feature is called slipstream. The Recovery Console isn't updated after installing a SP, when installing the Recovery Console from the slipstreamed i386 folder it will be updated.

Wow, that's great if you have an installation folder shared on the network, but what if you don't have a network?

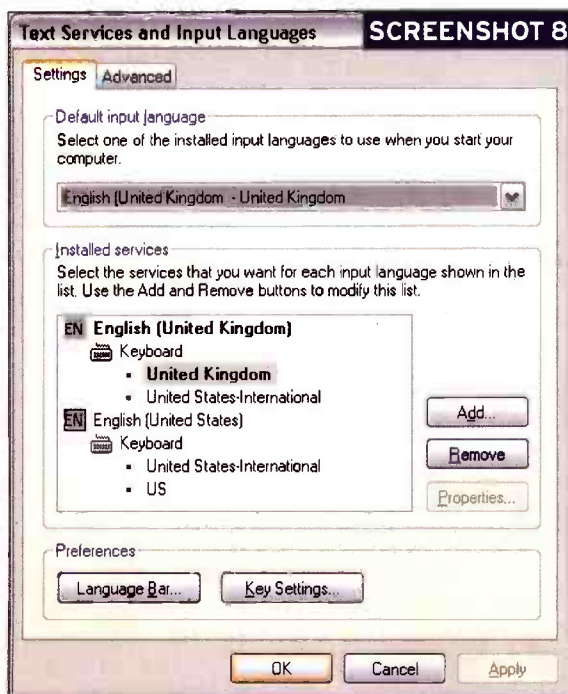
Slipstreaming Windows 2000 and Service Pack 4 onto a bootable CD



One way of getting a heading just on the first page



Re-enable the old-style dialogue in Word XP



Setting the keyboard layout in XP

The most extensive guide to creating a slipstreamed Windows 2000 CD is Steve Bink's guide at www.bink.nu/Bootcd (see screenshot 5). Steve provides a boot block, a guide to adding hotfixes and detailed guidance on creating a slipstreamed CD with the Nero burning program. For guidance on burning with CDRWin refer to www.broomeman.com/support/wsbootcd.html and for burning with Roxio Easy CD Creator 5 see www.netsonic.fi/~osiltane/tech/bootablewindowscd.shtml.

Word processing

Q I have a letterhead in Word XP in which I have a header with all the address details but, frustratingly, the header also appears on the second and subsequent pages. Is there any way this can be overcome so the continuation sheets are blank?

David Morley

A There are two ways of doing this. The first is to open the relevant template (.dot file) and go to File, Page Setup, Layout. Under headers and footers, check 'Different First Page' (see screenshot 6). This will probably mean your first page will now have no header, so you will have to cut that from the second page header and paste into the first. An easier way is to put the letterhead in the page body of the template, rather than the header. Then it will only appear at the start of each document.

Q When I create a new document in Word XP using a template I am offered a choice from General Templates, Templates on my websites, Templates on www.microsoft.com or the two most recently used templates. How can I increase the number of recently used templates which are displayed? These is room on the menu for at least another 10.

Syd Johnson

A The recent templates list on the 'New' Task Pane seems to be limited to two by design – despite fiddling around in the Windows Registry, we couldn't get it to display any more. However, it is possible to go straight to the old-style File New dialogue without using the Task Pane. In Tools, Customize, click on the Commands tab and choose 'All Commands' from the list on the left. In the list on the right, scroll down to the entry entitled FileNewDialog, (see screenshot 7) and drag this onto an existing toolbar or menu (you need to open the menu first and it will stay open while the Customize dialogue is

active). What you'll get is a button or menu item rather unhelpfully labelled 'Other...'. Right-click on it to change the name to something more logical – you can also assign an icon if you want. Close the Customize dialogue, and the Word 97/2000 style dialogue will appear when you click on your customised command.

Windows

Q I have two PCs running Windows 98 (second edition). If one is 'improperly' shut down Scandisk is launched automatically when I reboot; with the other PC this does not happen. A manual launch of Scandisk can be performed but I tend to forget to do it. 'Improperly' in this context means, for example, turning the power off when everything appears to have locked up. Is there something I should edit in the Registry to correct this?

John Goff

A In Windows 98 and later versions of Windows 95, the behaviour of Scandisk is set in the msdos.sys file, which resides in the root of the boot partition – normally C:\. This is a hidden, system, read-only file, so first you need to go to Folder Options in Explorer's View menu and go to the 'View' tab. Make sure 'Show all files' is checked and that 'Hide file extensions...' is unchecked. Next right-click on the msdos.sys file, click on 'Properties' and uncheck the Read-only attribute. Open the file in Notepad, and in the [Options] section you should see an entry 'AutoScan = n'. If n is 0, (or the entry is missing) then Scandisk will not launch after an improper shut down. If it is 1, then Scandisk runs, after prompting you, and a value of 2 runs Scandisk without the prompt.

Q I run XP Home edition with four accounts. When working on my account several of the keyboard characters are wrongly addressed, so for example to get an @ I have to type a double quote and vice versa; (the £ has disappeared altogether). How can I correct this keyboard character addressing error?

Jeremy Dyer

A This sounds as if your account is using the US keyboard layout. Go to Control Panel, Regional and Language, then turn to the Languages tab. Press the Details button, then check that English (United Kingdom) is selected as the default input language and that United Kingdom is set as the default (bold) keyboard (see screenshot 8).



Q I'm using Windows 98 SE and have been trying to get a Desktop shortcut to Notepad to default to a specific folder for File/Open and Save, but no matter what I type in to the 'Start In' box, it always opens in 'My Documents'. I'm sure this used to work properly – have you idea what could be causing the problem?

Jed Mitchell

A It did work properly in Windows 95, but the introduction of the 'My Documents' folder in Windows 98 scuppered this. There's no solution that we know of, short of disabling the 'My Documents' feature, but you could create shortcuts to the relevant folders so you can launch Notepad from the files themselves (see screenshot 9).

Digital imaging

Q What do I need to burn photos to CD that will play on a DVD player? I want to send a photo CD to my family and they do not have a computer, but they have a DVD player. I would be grateful for any help – I'm a geriatric user and not very technical!

Liz Stephens

A First you need software, both to produce the slideshow, then to record it to CD. Two of the easiest to use and least expensive applications available for this are Pinnacle Expression and Ulead DVD Picture Show. Alternatively, the CD copying and burning application Nero Burning Rom can create slideshows, but its interface is not so user-friendly.

Slideshows are recorded to the CD in VCD (Video CD) format. Domestic

DVD players may have difficulty playing VCDs – either because they don't support the format, or because they can't read the CD-R discs. The older the DVD player, the less likely it is that it will play VCDs. One solution is to buy a DVD burner and, using the same software, create DVDs instead.

The choice of which DVD burner to buy is complicated because there are currently several recordable DVD formats on the market and no single one yet looks like gaining dominance.

In terms of compatibility, DVD-R/RW is still the safest bet and in this case the drive to go for is the Pioneer DVR-A05 which retails for around £160 including VAT.

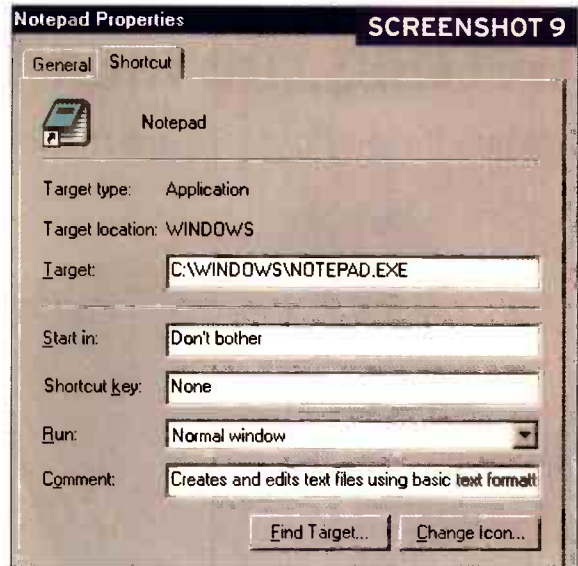
Alternatively, you could hedge your bets by opting for the Sony DRU-510A which supports both DVD-R and DVD+R (and the rewritable DVD-RW and DVD+RW variants) and sells for around £270.

Q I have drawn and scanned in a number of A4 size map sheets (bmp files) which is quite useful as I can share them with friends, but I would really like to be able to stitch the files together so that the map could be seen as one large sheet.

I have been looking around for some software that will do this – but so far without success. Have you any ideas?

Bill Leeson

A You can do it manually in any image-editing package. For software that includes special stitching tools, usually for producing panoramic images, try Photoshop Elements 2, Roxio Photosuite or Corel Photo Paint 11.



The Start In box doesn't work in 98 and ME

CONTACTS

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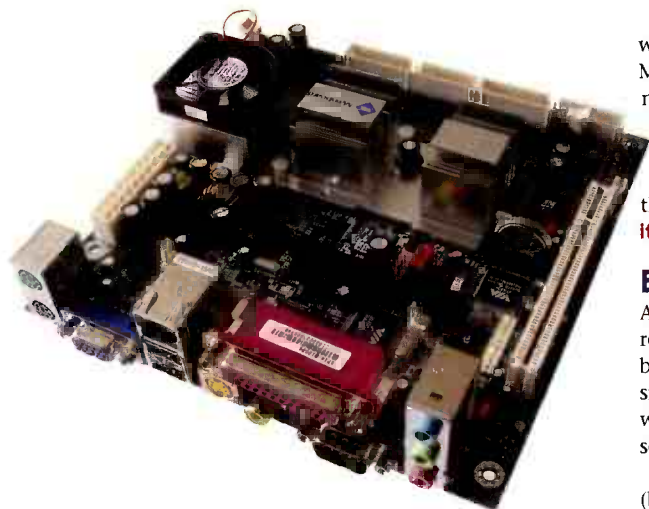
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CELEBRATING 10 YEARS



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

Getting the max from a mini motherboard

We test the performance and multimedia capabilities of a Mini-ITX board



Mini-ITX is one of the most interesting PC platforms around. These tiny motherboards are quiet and affordable, have modest power requirements, and as such are turning up in everything from hi-fi media players to student systems and mini servers. Their small size and low cost has also encouraged a new breed of enthusiasts who are fitting them in all manner of shells – amusing favourites include modified *Star Wars* toys and classic home computers of the 1980s – see www.mini-itx.com for more details.

The Mini-ITX platform was developed by Via and, while several other manufacturers have begun producing their own motherboards, Via remains the dominant player. Its range of Mini-ITX motherboards is called Epia, and all have one thing in common: an embedded Via C3 or Eden processor.

By soldering the CPU on the surface, there's no need for a large Zif socket, which helps achieve the motherboard's dimensions of just 170 x 170mm. The disadvantage of an embedded CPU is the inability to upgrade. Via's Eden and C3 processors are also much lower powered than current Athlons and Pentiums, but Via argues they're sufficiently fast for basic applications. Recognising the popularity of DVD movies though, Via has built hardware decoding into the chipset of its latest Epia-M models, allowing smooth playback despite the main CPU's modest clock speed.

In previous Hands on Hardware columns we've tested Via's Epia-800 and Epia-M9000 models. This month

Via's latest Epia-M10000 Mini-ITX motherboard, measuring just 170mm square, has improved embedded CPU performance

we've got our hands on the new M10000 model (pictured left), which not only sports an embedded 1GHz

C3 processor, but is also the first to feature Via's latest Nehemiah core. This model costs £105 ex VAT from the Mini-ITX store at www.mini-itx.com/store.

Epia-M10000

At first glance, the Epia-M10000 resembles previous models, the biggest visual difference being a single large passive heatsink which spans both the north and southbridge chipset components.

As before, there's a single PCI slot (but no AGP), one DDR memory slot (for a single PC2100 module up to 1GB), two IDE connectors supporting UltraDMA133 drives and, surprisingly for a forward-thinking platform that's short on real estate, a traditional floppy disk connector.

Round the back is a multitude of ports including 10/100 Ethernet, two USB2, S-Video and a single RCA jack that's switchable between outputting composite video or S/PDIF digital audio. On the surface are additional headers for two more USB2 ports, two Firewire, front-mounted audio, infrared and a traditional Com port – the latter being handy for connecting LCD or VFD status displays internally.

As before, the graphics are integrated, so any upgrading possibilities demand a PCI 3D card, which are few and far between. The Mini-ITX store does sell a Gainward Geforce4 MX440 64MB PCI card at £69 ex VAT, for those who want superior gaming potential.

The main difference between the M10000 and earlier Epias is its C3 processor, which runs at 1GHz. There are two versions of this board in circulation though: early models used a C3 processor produced using the

older Ezra-T core, while the newer one uses the Nehemiah core. We've tested the superior Nehemiah version and if you're buying an M10000, you should go for this one too.

While 1GHz was the fastest clock for older Ezra-T processors, this is the speed at which Nehemiah CPUs begin. As with Intel and AMD processors, Nehemiah achieves higher clock speeds thanks to a finer manufacturing process – in this case the same 0.13micron used by mainstream Athlons and Pentium 4s, although Intel is in the process of moving to 0.09micron (90nanometre). Beyond enabling faster clock speeds, these finer manufacturing processes also produce chips that run on lower voltages, requiring less power and cooling.

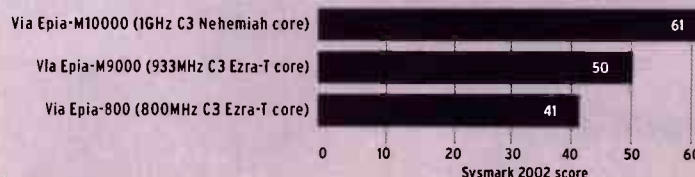
Nehemiah also brings SSE multimedia instructions to the C3, along with a full-speed floating point unit which runs twice as fast as before. New embedded security features include a hardware random number generator, and support for dual-CPU configurations in the future.

Tests and results

To put the Epia-M10000 through its paces we built a system using 256MB of PC2100 memory, an 80GB Seagate Barracuda IV hard disk and Windows XP Professional. This is the same configuration we've used for testing other Epias (and recent Shuttles) in Hands on Hardware, so any differences in results are down to the chipset and main processor.

Earlier Epias failed to complete the Internet content creation half of Sysmark 2002, preventing us from publishing a complete score. The Epia-M10000, however, became our first Epia to complete these tests, scoring 57 in Internet content creation and 61 in office productivity,

Sysmark 2002 office productivity scores for Via Epia boards using integrated graphics, 256MB of PC2100 memory, 80GB Seagate Barracuda IV, Windows XP Professional





with an overall result of 59. The earlier Epia-M9000 and Epia-800 only completed the office productivity portion of Sysmark 2002, scoring 50 and 41 respectively. Considering the new M10000 is only clocked seven per cent faster than the Epia-M9000, yet scored 22 per cent higher in office productivity, the Nehemiah core is performing well.

To put these scores into perspective, the Shuttle SB51G system we built last month using a 2GHz Celeron and the same memory and disk, scored 156 in Sysmark 2002 (205 for Internet and 119 for office).

With general applications, the M10000 definitely felt a little slower than traditional Intel or AMD platforms, but it was certainly usable. Of course, such tasks only represent one half of what modern PCs are used for, so how did the M10000 perform on the traditionally tougher tasks of gaming and multimedia playback?

The integrated graphics of the M10000 were pretty slow, scoring just 22.6 frames per second (fps) on Quake III Arena in 16bit XGA mode. Dropping to 16bit VGA mode increased the frame rate to 38.9 which, while much more playable, remains slow compared to many other integrated solutions. The bottom line here is that none of the Epias make great 3D gaming platforms unless you're happy with low resolutions or fancy inserting a (rare) PCI graphics card.

Media playing

With relatively modest clock speeds, you'd be forgiven for assuming the Epias wouldn't be great with multimedia either, but here Via plays a trump card. By equipping the chipset on all M-series Epias with hardware mpeg-2 decoding, smooth DVD playback presents no challenge.

To put DVD playback to the test, we watched the fast-paced chapter 43 of the *Star Wars Episode II* DVD, using Cyberlink's PowerDVD XP in full-screen mode with hardware acceleration enabled. The display was set to 1,280 x 1,024 in 32bit colour and we kept our eye on CPU utilisation using Windows Task Manager.

Here the M10000 delivered perfectly smooth playback, with an average 33 per cent CPU utilisation (see screenshot 1). In comparison, the 2GHz Celeron system using the Shuttle SB51G's integrated graphics occupied around 20 per cent of its CPU resources when playing the DVD. Switching to a 2.6GHz Pentium 4 system with a high-end Radeon 9700 Pro graphics card saw this fall further to 10 per cent utilisation. So



while DVD playback required lower resources on the Intel platforms, it certainly posed no challenge to the M10000.

The mpeg-2 format of DVD movies is just one of many popular video formats in use by PCs today, though. The mpeg-4-based DivX format is incredibly popular, with a vast wealth of content available to download. As a compressor/decompressor (codec), DivX is capable of delivering excellent quality with quite modest bit rates compared to mpeg-2. The only downside is that it represents a tougher challenge for your PC to decode.

To put DivX performance to the test, we used a 53-minute file with 16:9 video encoded at 624 x 352 pixels and 29fps. The file was viewed using Windows Media Player 9 with the latest DivX codec, which can be downloaded from www.divx.com/divx. Again we set our display to 1,280 x 1,024 in 32bit colour and selected full-screen playback.

Here our M10000 system was almost perfect, playing the file smoothly with just one or two slight jitters over the entire 53-minute period. Checking Task Manager, however, revealed the M10000 was operating at 100 per cent CPU utilisation during playback, leaving no room for error (see screenshot 2). This DivX file also presented an increased challenge to our two Intel systems, utilising 70 per cent and 40 per cent of the CPU resources of the 2GHz Celeron and 2.6GHz P4 respectively.

Finally, out of curiosity, we tried the three test platforms with high-definition Windows Media 9 content downloaded from Microsoft's showcase at www.microsoft.com/windows/windowsmedia/content_provider/film/HDVideo.aspx.

Most of these high-definition video files use non-interlaced frames of 1,280 x 720 pixels (also known to the video world as 720P), and are usually encoded at high rates of around

The M10000's CPU utilisation while playing a DVD movie, full-screen at 1,280 x 1,024 in 32bit colour. At around 33 per cent utilisation, DVD playback presents no problems

7Mbps/sec. Consequently you're looking at around an 80MB download for three minutes of footage.

While authored as a demonstration of what Windows Media 9 is capable of, they also represent a tough benchmark for PCs. Microsoft recommends 2.5GHz processors for 720P, and 3GHz for the higher resolution 1080P formats. In either case, a decent AGP 4x graphics card is mandatory, and for 1080P, Microsoft even goes as far as saying an AGP 8x 128MB card is required.

With such high specifications in mind, we weren't surprised to find the M10000 failed to play the 720P video smoothly – indeed our system achieved around 1fps at 100 per cent CPU utilisation.

We only achieved smooth playback of this 720P file on our 2.6GHz Pentium 4, with it greedily occupying 80 per cent of the CPU resources and requiring a decent graphics card. Interestingly when we tried playing the clip with a 64MB Geforce3 card, we experienced several dropped frames. It was only when we fitted a 128MB Radeon 9700 card that playback was completely jitter- and artefact-free. Clearly, high-definition WM9 playback is reserved for top-end PCs only, but is a great demonstration of Microsoft's codec, not to mention a real application for ultra-fast hardware which has nothing to do with gaming. If you're interested in high-definition WM9, check out Microsoft's downloads and our tests with a new version of *Terminator 2* later in this Hardware column.

Returning to the Via Epia-M10000, it fared well as a media-playing platform, handling DVDs with ease, while only breaking the slightest sweat with broadcast-quality DivX files. Its overall application performance, while higher than previous models, won't give mainstream Athlons and Pentiums anything to worry about, but that's not the point of the Epia platform.

The M10000's CPU utilisation while playing a 624 x 352 pixel 29fps DivX video, full-screen at 1,280 x 1,024 in 32bit colour. Playback required 100 per cent of the processor's resources, although the 53-minute file only stuttered occasionally





You should choose an Epia if you're after a tiny, cool-running and relatively cheap PC that offers sufficient performance for basic tasks and playback of certain media formats. Here the Epia range scores highly and the M10000, as the fastest model, comes recommended. For more information, go to Via www.viavpsd.com or Mini-ITX www.mini-itx.com

Minicube-M

To exploit the tiny dimensions of a Mini-ITX motherboard, you'll need an equally small case. We've tested several Mini-ITX cases before, but all have been designed for the rear port layout of non-M series Epia boards.

Unlike ATX cases which take pop-out port frames, most Mini-ITX cases have holes drilled directly into their shells. Since Epia-M motherboards have a slightly different rear port arrangement to plain Epia boards, you'll either need a specially designed case or you'll have to get out the pliers.

Fortunately Chyang Fun, manufacturer of the popular Minicube case reviewed in February 2003's Hardware column, now offers an updated version for Epia-M motherboards which features more than just a redesigned set of holes at the back and an extended range of front-mounted ports.

Measuring 190 x 160 x 270mm, the Minicube-M (pictured above) is around an inch smaller than a Shuttle XPC in every dimension. While it may be the same size as the earlier Minicube, Chyang Fun has taken many criticisms on board and significantly redesigned the innards.

First, the power supply is now at the front of the case, although the mains plug remains at the back. This frees up space at the rear to accommodate a 3.5in hard disk mounted above the board. This in turn makes the old 3.5in bay available to other drives, and there's now a removable front

Chyang Fun's Minicube-M is an ideal case for housing Epia-M motherboards, complete with front-mounted USB2, Firewire and audio ports. It's also a little smaller than the popular Shuttle XPCs, although the insides are not as slickly designed

panel to accommodate them. There's also more room behind the 5.25in optical drive, which was previously too tight for longer models.

While these are all worthy benefits, the innards of the Minicube-M have subsequently become a little messy and confused. In our model, the power supply also pressed against the front-mounted port block, causing it to bend slightly. All in all, it's not nearly as slick as a Shuttle XPC, but it still represents a good option for owners of Epia-M boards at £75 ex VAT. Chyang Fun also offers its trendier-looking E-Note case for Epia-Ms for £109 ex VAT. Both are available from www.mini-itx.com or Chyang Fun www.chyangfun.com

High-definition movies

Earlier we mentioned the high-definition video content that's available to download from Microsoft's website in WM9 format. Right now, there's only a handful of short trailers, but it's an interesting technology demonstration for owners of high-end PCs who are also into quality video formats – especially as in the UK we currently have no high-definition broadcasts or pre-recorded content available.

Interestingly, the high-definition WM9 content on Microsoft's website is encoded at 7Mbps/sec, which is approximately the same as a higher-end DVD movie. So you could fit a whole high-definition movie encoded with WM9 on a standard DVD-Rom disc. This is clearly where it starts to get interesting, as WM9 could potentially be a competitor to other high-definition formats such as imported D-Theatre encrypted D-VHS tapes and future HD-DVD technologies including Blu-ray.

It's a sufficiently interesting prospect for Hollywood studio Artisan Entertainment to release two DVD

movies where the second disc in each set features the content authored in high-definition WM9 format (see screenshot 3). One is *Standing in the Shadows of Motown*, a documentary about a group of musicians, and the second is *Terminator 2 Extreme Edition*. Both are available as imports from Play USA.com (www.playusa.com) for £17.99 including delivery.

One important point for potential UK customers is the high-definition content on both titles is only licensed for viewing in the US and Canada. Before you think this is just an easily solved regional encoding problem, Artisan has been infuriatingly strict about licence enforcement.

Before Media Player 9 will show the content, it goes online to retrieve a licence from Artisan – but if you're using a UK-based IP address, you'll be turned away. The solution is to use a US or Canadian proxy server to give the illusion of a North American location, but annoyingly Artisan is one step ahead and won't dish out licences to those using anonymous proxy servers. Instead you'll have to find a North American proxy server that's not anonymous, and yet open to public use.

Various websites offer huge lists of proxy servers, but it's a case of trial and error. After trying about 50 proxy servers we finally found one that tricked Artisan's digital rights management into delivering the licence and allowing us to play the entire *Terminator 2* movie in WM9 format. Despite the hassle, it looked fantastic, thrashing the mpeg-2 standard definition version. That said, we also needed the combination of a fast Pentium 4 and a 128MB graphics card to play it smoothly.

The last laugh was had by Artisan though: the T2 licence expires every five days and needs renewing online, and our proxy server was no longer playing ball. Consequently we can't recommend the WM9 content of these imported titles to anyone outside North America but the most dedicated of enthusiasts.

It's a shame there are no plans to license titles like these in the UK, as they demonstrate well both what modern codecs and PCs are capable of, not to mention delivering high-definition content to a country which looks like being stuck with standard definition for years to come.

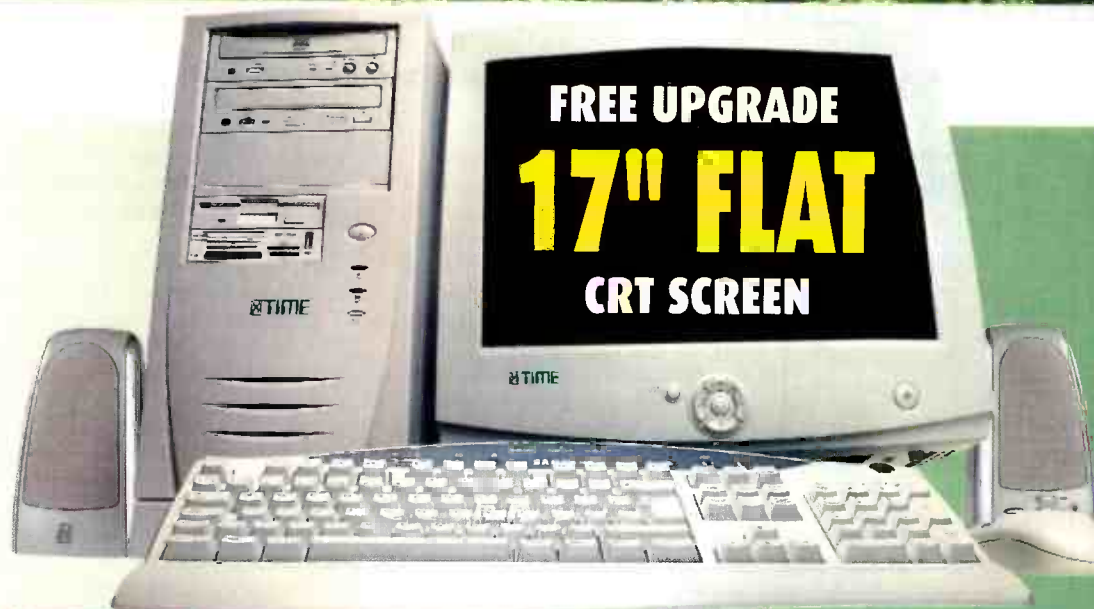
CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Email him at: hardware@pcw.co.uk. Please do not send unsolicited file attachments.

The rear cover of the *Terminator 2 Extreme Edition* DVD, imported from America. Disc two features the entire movie in high-definition format, encoded using Windows Media 9. Playback requires serious hardware though. Licensing issues also make it difficult to play outside North America



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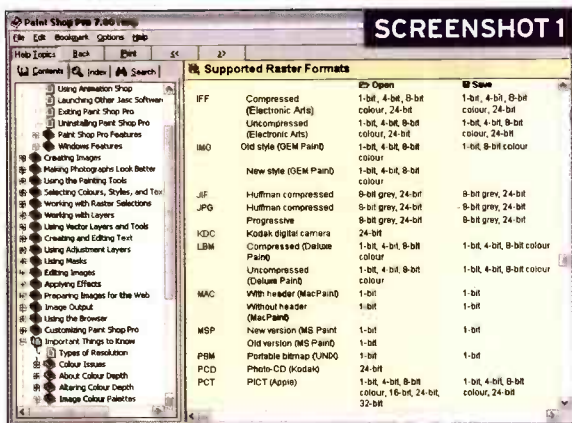
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**Tim Nott**

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

Pick a picture format

A bluffer's guide to bitmaps, problems with inf files and an obscure Tree.com tip



**A selection of
bitmap formats
from Paint Shop's
help file**

You've probably noticed that there is a bewildering variety of graphic file formats encountered under Windows. If you look in the Paint Shop Pro help file, for example, you'll find that it lists 35 different file types, many of which come in several different sub-flavours (see screenshot 1). So here's a simplified bluffer's guide to bitmaps.

First – why the proliferation of file types? One reason is history. There are many proprietary and platform-specific formats, such as the iff and lbm types, originally developed for the Amiga platform but subsequently ported to the PC. Fortunately you are unlikely to come across these in your daily Windows business, but there are still many application-specific formats, such as Adobe Photoshop's psd or Paint Shop's psp.

The other factor is the size of image files. The famous edict of the 1920s advertising man, Frederick Barnard that a picture is worth 10,000 words, is something of an understatement. Ten thousand words of plain text weigh in at about 60KB, and would fill around 11 Hands on pages. The screenshot of the Paint Shop help file (see above) in an uncompressed state, is over 1.3MB, which works out at around 200,000 words.

In its most basic form, a bitmap image file consists of some header information (such as the size of the image), followed by a stream of bytes specifying the colour of each pixel in the image. Typically this will consist of 24bits or three bytes per pixel: this gives 256 steps for each of the red, green and blue values. This, if my calculator is working correctly, forms a total of 16,777,216 colours, ranging

from 0,0,0 (black) to 255,255,255 (white). This is generally regarded as more than the human eye can discern, but there are formats that use 36 or even 48bits per pixel. So, in 24bit colour, a modest 640 x 480 pixel image will occupy nearly a megabyte. In the days of 40MB hard disks and 2,400bits/sec modems, this was a challenge in terms of both storage and transmission. But as technology improves, so do the demands placed on it: a shot from a high-end digital camera or a high-resolution scan will weigh in at tens of megabytes.

There are several ways of making image file sizes smaller. One is by reducing the number of colours. Instead of describing each pixel in terms of its red, green and blue values, a palette – typically of 256 colours – is defined. This can either be a standard selection of colours or, more usefully, a set based on the contents of the image. A picture of a face, for example, will have a palette rich in flesh tones, while one of trees will be rich in greens (see Screenshot 2). Palletised images are just about good enough for small photographic images, as long as you don't look too closely, but are an excellent way of displaying images with few colours, such as logos, cartoons or most screenshots. They are particularly bad

at depicting colour gradients – there are usually just not enough shades, so these come out as bands of colour.

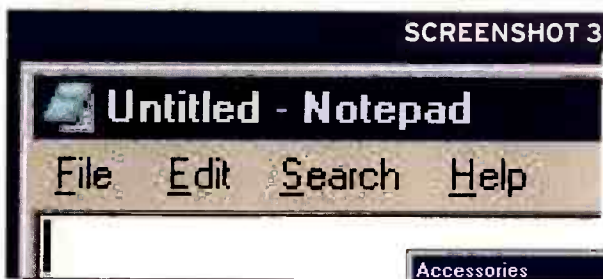
Compression

Another way of making a file smaller is by applying a compression algorithm. These come in two flavours: lossless and lossy. Lossless compression uses similar algorithms to those used in zip software. First, run-length encoding detects runs of the same colour pixels: instead of enumerating 54 yellow pixels individually, the code specifies the colour once, followed by the number of instances before a different colour appears. For example, if you consider a picture of *The Simpsons*, this results in a huge saving. Second, algorithms such as LZW look for repeated patterns, and replace these by a shorter token. This is very effective in compressing text, for example where you could replace all instances of 'the' with a token of just a few bits, but can also apply to images such as screenshots where window elements like frames or scroll bars repeat.

In a photographic image, lossless compression seldom achieves much, as there is little redundant or repeated information and you will rarely see a saving of over 20 per cent. Lossy compression achieves higher savings – typically 80 per cent or greater – by discarding information that the eye of the beholder does not need. The most common technique, developed by the Joint Pictures Expert Group, relies on the eye being less sensitive to small changes in colour than it is to small changes in luminance. The maths is complex but basically the steps are as follows. First, the image is split into 8 x 8 pixel blocks, then the luminance/chrominance data is sampled for each block and a Discrete Cosine Transformation applied to obtain a frequency map of 64 components. Each component is then divided by a separate quantisation coefficient, then rounded to an integer. This is where the data is 'lost' – it relies on the fact there will be few abrupt colour changes in the sample. The resulting numbers – which will contain a lot of zeros – are then compressed using conventional lossless compression. Other techniques involve fractals and even more eye-watering maths. Although all image-processing programs will convert between lossless and lossy

**A palletised image
of 256 colours**





Left: Jpegs make a poor job of screenshots

formats, and vice versa, in terms of actual data it's a one-way process – the discarded pixel information cannot be reinstated.

So, that's the basis of the techniques – now to the formats themselves.

Gif

The Graphics Interchange Format was originally developed for Compuserve in the 1980s. Although fairly old, the format does support transparency and animation. It's still widely used for small web graphics, logos and practically all the screenshots you see in this column.

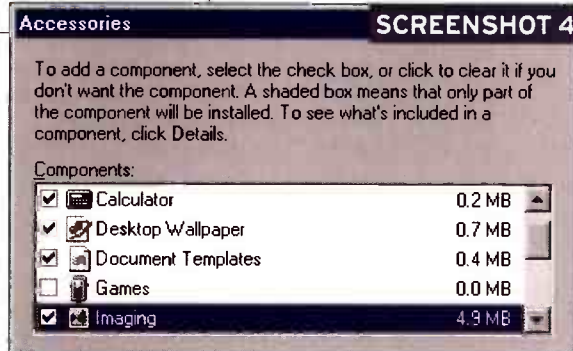
Although widely regarded as an open standard, in 1995 Unisys decided it held a patent on part of the gif standard – specifically the LZW compression algorithm – and proposed charging royalties to developers using the format. In 1999 the company extended this to website owners. This led to widespread outcry in the Internet community. Some activists mounted a 'Burn all gifs' campaign (<http://burnallgifs.org>) advocating the use of the png format instead, and the whole issue gave journalists plenty of scope to paraphrase Virgil and crack the 'beware of Geeks bearing gifs' joke. Although the LZW patent expired in the US in June this year, it is still effective in some other countries, including the UK. Despite the conflict, gifs continue to be widely used on websites, and it's uncertain how much revenue Unisys is collecting.

Tiff

The Tagged Image File Format was introduced by Aldus in 1986, and soon became the principal choice for imaging professionals and the publishing industry. It's a highly versatile format, offering CMYK as well as RGB colour models, and exists in colour depths from 24bit down to one bit (used for fax images). A tiff file can include multiple layers and mask information. Although rarely seen on websites, it's still widespread in image processing.

Jpeg

The use of the jpeg compression algorithms makes this the most popular choice for compressing



Below: Installing Windows Imaging

photographic images – both for web pages and local storage. However, it's a poor choice for images containing abrupt or 'high-frequency' colour changes. Screenshots, for example, show blurring and bleeding of text into the background (see screenshot 3).

BMP

Also known as a device-independent bitmap (dib), this is a standard developed for Windows (and OS/2) supporting colour depths from one to 24bits. It's still used in Windows for images, however, it lacks the versatility of the tiff format as it doesn't support CMYK, masks or layers, so is little used in image processing.

RLE

A run-length encoded version of the bmp format. Rarely used since its last job as the Windows 3.x splash screen.

Raw

As the name suggests, this is unencoded binary data, usually the output of a digital camera – the digital equivalent of an unprocessed film. The format details vary between camera manufacturers.

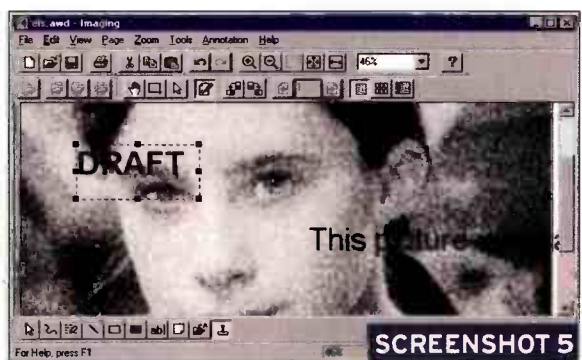
PNG

The Portable Network Graphics format is a recent contender. This was developed as an open-standard competitor to gif as, apart from the Unisys patent issue, the gif format was starting to show its age. PNG supports up to 48bit colour, variable transparency and gamma correction. It uses lossless compression, so in terms of quality-to-size isn't a practical alternative to jpeg for web pages. Despite these advantages the sheer inertia of the gif standard means it hasn't had the take-up that it merits.

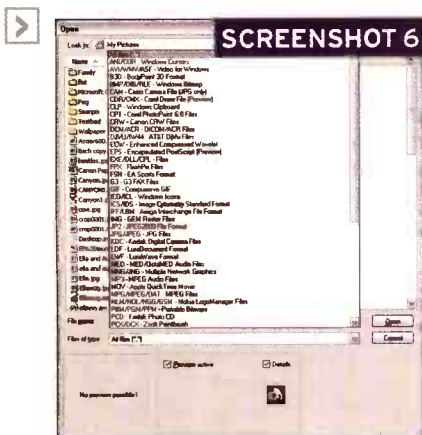
There are various ways of viewing graphics in Windows, and much depends on the version you are using. The Windows Paint program supports a very limited range of file formats, although if you have Microsoft Office installed, this adds a few more. In addition, there's not much you can do in Paint – it hasn't really changed since Windows 3.0. The Imaging program, developed by Kodak and included in Windows 98 and ME is somewhat better. You may not have this installed – if not, go to Control Panel, Add/Remove Programs, Windows Setup. Select the Accessories category, and then click the Details button. Check the box next to Imaging and OK out of both dialogues; you may be prompted for the Windows setup CD (see screenshot 4).

Although Imaging doesn't have any painting or retouching tools, it does have some fairly sophisticated features. For a start, it supports colour profiles – a subject we discussed in August's column. It will also open a greater range of files, including awd, wiff and xif, but these three black-and-white formats are chiefly intended for fax. When it comes to saving, things are more limited: you can't, for example, convert a tiff to a jpeg. The rather interesting toolbar at the bottom of the window contains drawing and annotation tools. These are primarily designed for adding notes and drawings to faxes, and though they can be used on colour tiffs or bmps they are greyed out when a jpeg is loaded (see screenshot 5). At the top of the window are some fairly self-evident tools: you can rotate an image through 90 degrees if you need to, zoom in and out of it, and there's a set of tools to access Twain-compatible scanners. There's also a Send command that will fire up your email client and attach the current image to the message. You may be as puzzled as I was by the thumbnail view option. Contrary to what you might expect, this does not let you browse images in folders. Instead it lets you view multiple-page image files. Again, this is mainly useful for

You can only add annotations to tiffs, bmps or faxes



SCREENSHOT 5



SCREENSHOT 6

An impressive repertoire of formats is handled by Irfanview

faxes, and you'll find you can insert new pages – either from a file or from a scanner – into an existing file.

If you want something better that will convert between exotic file formats, get a copy of Irfan Skiljan's Irfanview. Not only will this deal with a huge range of still image files (see screenshot 6) but with suitable plug-ins it will play movies and sound files. It includes basic image-processing tools for resizing, sharpening and colour enhancement. You can download the latest version – 3.80 at the time of writing – from www.irfanview.com, where you will also find the latest plug-ins. It's free, and available in 34 languages.

More inf

Last month we looked at Jim Carless's problem of a surfeit of oem*.inf files stopping hardware installations. This month it's the turn of another set of inf files. Thomas Wingrove found that the Windows Setup tab in Control Panel, Add/Remove programs, had died. After the usual rotating hourglass performance, a message appeared that 'RunDll32 has caused an error in Setupx.dll'. Thomas replaced Rundll32.exe, Appwiz and Setupx.dll from the ME installation disc, but to no avail. He then checked the Registry keys at HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Active Setup\Installed Components with another machine running Windows ME, and everything appeared to be correct. I checked the MS Support Knowledgebase and drew a blank, but did find a clue on the www.experts-exchange.com forum. Another user, going by the unusual name of Laxatif, had had a similar problem 'on more than one machine running Windows ME'. He found (though he didn't tell us how) that 'one or more layout*.inf files in C:\Windows\Inf were corrupted'. Renaming them and rebooting cured the problem. Although I haven't experienced the

problem personally, this solution also worked for Thomas, thus earning itself a place in the 'worth a try' file.

Turning to another problem, several readers have complained that Internet Explorer (IE) stopped opening links in web pages, though the same URL typed into the address bar worked as normal. This can happen as a result of an IE upgrade in which the DLL responsible for trapping URL clicks has become 'unregistered'. The solution is to go to Start, Run and type 'regsvr32 urlmon.dll' (without the quotes), then press Enter. This will re-register the DLL and the problem should be solved.

Here's a neat trick you can perform either from a shortcut or the Start, Run box. This will take you to any of the Windows Help files and search for a specified keyword. For example, `winhlp32.exe -k security`

`ieexplore.hlp` (Key: ✓ code string continues) takes you directly to the IE help file and searches for 'security'.

Tree.com command

Just to show that we don't neglect Windows 95 (and earlier) users, here's a wonderfully obscure tip, concerning the old problem of saving a directory listing to file. The MS-Dos Tree.com command produces a graphical listing of all the folders (and optionally files) in the current (or specified) folder (see screenshot 7). First you need to install it. You'll find it in the Other\Oldmsdos folder on the CD, but you can't just copy it over as you'll get a 'wrong MS-Dos version' error message when you try to use it. So, open an MS-Dos window and navigate to the Other\Oldmsdos folder on the CD. Type:

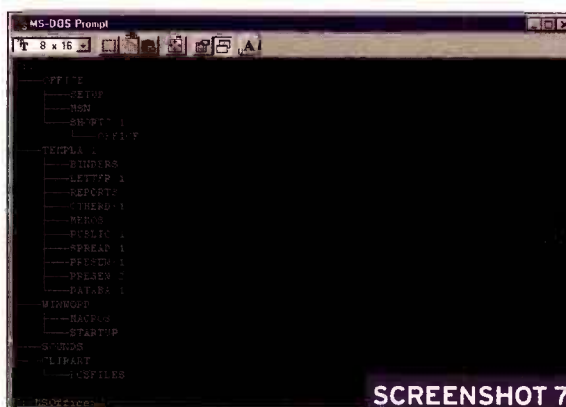
`instsupp.bat`

Then press Enter and follow the prompts to install the supplementary Dos commands. When it has finished, you'll need to restart your PC. Open an MS-Dos window and type:

`tree`

You will see a list of all the folders

Using the MS-Dos Tree command in Windows 95



SCREENSHOT 7

and subfolders, connected by lines. If you add the /f switch you'll see files as well, and the /a switch will replace the lines with Ascii symbols such as crosses and dashes – the graphic line characters won't display properly when exported to a Windows file. You can also specify a drive and path before the switches. As with many MS-Dos commands, you can redirect the output from the screen to a file by typing a space, greater than (>) another space and a file name (and path if you don't want the file created in the same folder you are listing). For example, assuming you are at the C:\ prompt, typing:

```
tree c:\windows /a /f > c:\windows\desktop\wintree.txt
```

will create an Ascii text file on the Desktop listing the files, folders and their contents from c:\windows down. However, there's a snag, as the redirected output may be truncated and you may not get a full listing. The workaround is to restart in MS-Dos mode, issue the redirected tree command, then type EXIT followed by Enter to return to Windows. You should find wintree.txt on the Desktop: no long file names, but that's the way it is. Note that Tree.com is not included with Windows 98 or ME.

Dancing icons

Back in the days of Windows 3.0, a man called Scott Gourley (not, as far as I know, the rugby player of that name) wrote a couple of rather fine toys. One, called Gatling, let you machine-gun your desktop, making loud noises and leaving a trail of bullet holes, and very satisfying it was. The other was a rather more subtle prank – Icofrite caused icons to 'run away' from the mouse pointer. Both these toys are history, but recently there have been reports of desktop icons doing a similar thing. If you find this happening, then it could be bad news: you may be a victim of the Magistr virus. And, according to the Symantec security site, this behaviour only starts after the computer has been infected for two months, during which time other damage may have been done. You can check out the full story, including disinfection instructions, at http://securityresponse.symantec.com/avcenter/venc/data/w32_magistr.24876@mm.html.

CONTACTS

Tim Nott welcomes your comments on the Windows column. Email him at: win@pcw.co.uk. Please do not send unsolicited file attachments.

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Shooting the messenger

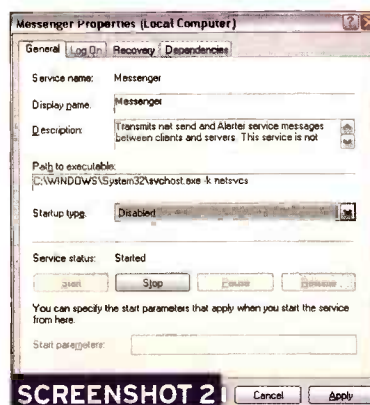
How to disable the Windows Messenger Service and customise your keyboard

Users of Windows 98 and ME who are connected to a network have a useful little utility called Winpopup, which can be used to send text messages to another user or an entire workgroup. Windows XP doesn't include Winpopup, but you can still send messages over a local network if you don't mind the starkly retro experience of the command prompt. To send a message to another user on the network – Alice, for example – type the following:
Net send alice this ✓
is the message

(Key: ✓ code string continues)

The 'net send' command is smart enough to parse this to recognise that 'alice' is the name and what follows is the message: you don't have to enclose the message in quotes unless it contains a slash. If you want to send a message to all users, use an asterisk instead of the name. There are various other options for sending messages to domains or users, which you can discover in the XP Help and Support centre. The recipients will see a small box titled 'Messenger Service' with the name of the sender and recipient, the date and time, the message text and an OK button that haven't been restricted from use of the command prompt. It also co-operates with Winpopup: if you 'net send' a message from an XP machine to a 98 or ME machine, it will appear in Winpopup, and if you send a Winpopup message the other way, it will appear in a 'Messenger Service' box.

**Turning off
Messenger Service
– a compromise
solution**



SCREENSHOT 2

This brings us neatly to a problem and a certain measure of confusion. First, the confusion. The Windows Messenger Service is not the same thing as the Windows or MSN Messenger instant chat client: the former works only over local networks rather than the Internet, and disabling the latter will not stop the messages appearing. Now the problem. In their never-ending efforts to enrich your Windows experience, developers have found a way to send unsolicited messages directly to your desktop via Messenger Service. So you don't even have to read your email in order to find those special deals on medicines, fake degrees or the enlargement of body parts. You can find full information on this Powerblaster technology at www.3032.com. Unfortunately, they haven't figured out a way of getting a live link into a message, so you'll just have to write the URL down – or dig it out from the event viewer.

On the other hand, you may wish to forego this advertising stream completely. Although there are commercial solutions available, you don't need them. One method is to disable the Messenger Service, which just takes a few mouse clicks. Go to Control Panel, Administrative Tools, Services. In the list of Services on the right, double-click on Messenger. In the dialogue that appears, change the Startup Type to Disabled, then click the Stop button below – you need to be logged on as an administrator to succeed at this (see screenshot 2).

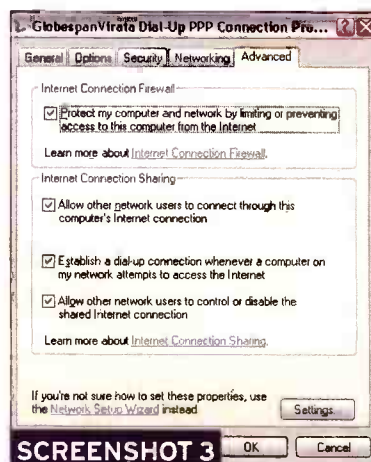
This solution is less than optimal. For a start, it will stop you receiving genuine messages. And, more importantly, the fact that someone is able to send you these messages indicates a rather alarming breach

of security: simply stopping them appearing doesn't plug the leak. For a better solution, enable the built-in XP firewall. First make sure you have XP Service Pack 1 installed. If your copy of XP is recent, then this may already be included; check 'Help – About Windows' in Explorer. If you don't have the service pack, then Windows Update will provide it. Next, go to Control Panel, Network and Internet Connections, right-click on the connection you use to access the Internet, and choose Properties. Turn to the Advanced tab, and check the box marked 'Protect my computer and network by limiting or preventing access to this computer from the Internet'. Click OK, and the job is done (see screenshot 3). If you have more than one PC using Internet Connection Sharing, you need only do this on the machine that has the physical Internet connection.

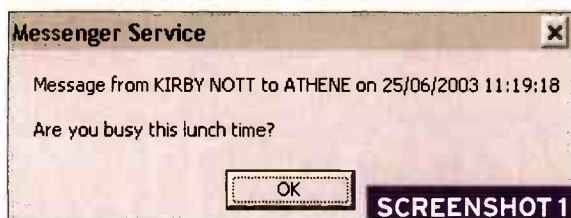
Key change

Last month we looked at a way to use a Registry key to manipulate the keyboard Scancode Mapper, in order to change the default behaviour of the MS Keyboard F-lock key. So you may be wondering if and how it is possible for a user to customise their keyboard in other ways. This has long been possible under Dos, using ansi.sys and 'escape sequences', but the facility was lost with Windows 95/98/ME. The Scancode Mapper in XP (and 2000) restores this feature with a little Registry editing. Create a Reg file in Notepad, rather than attacking the Registry directly with Regedit.

Turn on the XP Firewall – but make sure you have SP1



SCREENSHOT 3



SCREENSHOT 1

**A missive from
Messenger Service**



So, the first thing is to create a plain text file with the correct heading. Type in:

```
Windows Registry Editor ✓
Version 5.00
[HKEY_LOCAL_MACHINE\
SYSTEM\CurrentControlSet\
Control\Keyboard Layout]
"Scancode Map"=hex:
```

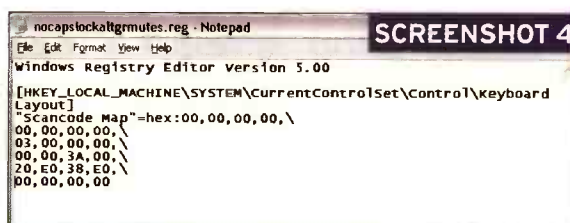
Make sure you have this exactly right (note that there is an existing 'Keyboard Layouts' with an -s key which you don't want to change). Save the file as, say, Mykeys.reg. When this is merged into the Registry (not yet), it will establish a Scancode Map binary value, but as yet this is empty and doesn't do anything. The next thing is to understand how the Scancode Map is constructed. As it's in hex, each byte consists of two hexadecimal characters, and each byte is separated by a comma. If you don't want to type everything on one line, then a backslash followed by Enter will be interpreted as a continuation of the current line.

The first eight bytes constitute the header, and at the current state of development these are all zeros, so you just type '00,' eight times, immediately after the colon. The next four bytes declare how many key mappings are to follow, including a final null value, so this will be equal to the number of actual mappings plus one. This is 'little-endian' so, assuming the number of mappings is 255 or fewer, just the first byte is used. This is followed by the mappings, four bytes for each, and finally the last four bytes are again all zero – the null value mentioned previously.

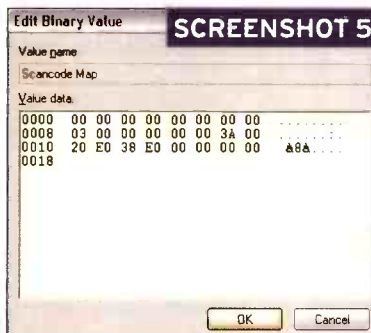
So – on to the key mappings themselves. Each four-byte sequence consists of the desired result followed by the key code pressed. Again, this is in 'little-endian' format, and the codes may consist of one or two bytes. For example, the code for the Caps Lock key is 003A, so you would enter this as '3A,00,' and the code for the right Alt key is E038, which you would enter as '38,E0,'. As you might expect, a target of '00,00,' does nothing. So the following example disables the Caps Lock key and makes the right Alt key mute the sound even on a keyboard that doesn't have a mute button (see screenshot 4).

```
"Scancode
Map"=hex:00,00,00,00,\
00,00,00,00,\
03,00,00,00,\
00,00,3A,00,\
20,E0,38,E0,\
00,00,00,00
```

Once you've saved the .reg file, then you would be wise to create a System



SCREENSHOT 4



SCREENSHOT 5

Above: Changing the Scancode Map – as it appears in Notepad...

Left: ...and as it appears in the Registry

Restore Point. Having done this, you can add the code into the Registry by right-clicking on the .reg file and choosing 'Merge'. If you then check with Regedit, the value should look like screenshot 5). Incidentally, the reason that Jason Tsang's fix is so lengthy is that the F-lock key itself is hard-wired and can't be programmed, so the Scancode Mapper has to swap each of the affected keys individually. You need to reboot for the changes to take effect, and you will probably have noticed that, as this is an HKEY_LOCAL_MACHINE entry, it

Common key codes

FIG 1

KEY	CODE
Left Shift	002A
Right Shift	0036
Left Control	001D
Right Control	E01D
Left Alt	0038
Right Alt (Alt Gr)	E038
Left Windows key	E05B
Right Windows Key	E05C
Caps Lock	003A
F1	003B
F2	003C
F3	003D
F4	003E
F5	003F
F6	0040
F7	0041
F8	0042
F9	0043
F10	0044
F11	0057
F12	0058
Mute sound	E020
Mail to:	E06C
Run Calculator	E021
Open My Computer	E06B

affects all users of the PC. If you get unexpected results from your key mappings, the easiest thing to do is run Regedit, go to the Scancode Map value and delete it, before rebooting again.

Which leaves just one little problem – where do these mysterious codes come from? You can find links to a full specification of the codes from www.microsoft.com/whdc/hwdev/tech/input/Scancode.mspx. There's a self-extracting Word file and a table in Excel or Acrobat. Be warned that it is not an easy read, so I've compiled a list of the most common codes in figure 1. Remember, these need to be entered in little-endian, so reverse each pair – for example, E03D is entered as '3D,E0,'. Programmers think this sort of thing is fun.

Quick Search revisited

Back in 2001, Philip Joslin submitted a rather ingenious tip to the Windows column concerning use of the Quick Search add-on for Internet Explorer. Two years later, he's back with an update for Windows XP running IE6. This time you don't need an add-on as the whole thing can be done from TweakUI which, as regular readers will know, can be downloaded free from www.microsoft.com/windowsxp/pro/downloads/power toys.asp.

Expand the Internet Explorer branch, then click on Search. Now hit the Create button. In the prefix field type an abbreviation for the site you want to search. In the URL field type in the search URL, replacing the search string with %s. The easy way to do this is visit the site in IE, perform a search for a word or phrase then, when the search results have loaded, copy the URL from the address bar. Paste this into Notepad, so you don't have to edit 'through the letterbox' then replace whatever you searched for with %s. Copy and paste this into the URL field in TweakUI, and hit the Apply button. Try it out by typing the abbreviation followed by a new search string into the IE address bar.

This doesn't work for all sites – Amazon, for instance, uses a different way of searching and the text doesn't appear in the URL, and trying to find an article on the Microsoft Support Knowledgebase in this way brought about the collapse of Internet Explorer. I have got this to work, however, with the *Guardian* site and Ebay.co.uk.

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

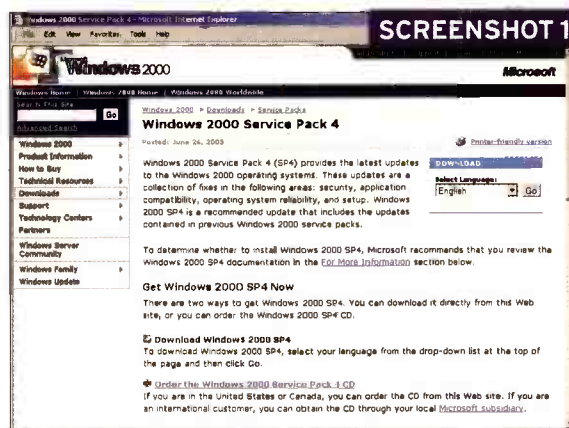
Installing Service Pack 4

Take the right precautions, and you'll benefit from Microsoft's fixes

Microsoft released Windows 2000 Service Pack 4 (SP4) to the masses on 26 June, almost a year after Service Pack 3 (see screenshot 1). One question always asked when a new service pack is released is whether earlier service packs must be applied first. The answer is no – service packs are cumulative, so you need only install the most recent. The other popular question is whether it's safe to apply the service pack. In general, yes, but don't rush it onto a computer on which your livelihood or happiness depends. Take sensible precautions, as the service pack makes wholesale changes to hundreds of critical system files. Take the time to peruse newsgroups for reports of problems, and don't install SP4 without either having a backup, or performing a test install of SP4 on a spare Windows 2000 installation closely resembling your main Windows 2000 computer. One option would be to apply SP4 to a separate instance of Windows 2000 installed in a spare partition on your main Windows 2000 computer.

There are three ways of installing SP4: the Express Install, the Network Install and the CD, which you should be able to order from Microsoft UK for a nominal charge, though the Microsoft UK site was still offering SP3 at the time of writing. The CD or Network Install both offer flexibility to install, reinstall, or install SP4 on multiple computers running any client or server version of Windows 2000 (except Datacenter – contact your OEM). Express Install is an option if you only have one PC to update and don't mind doing so online. Express begins with a small 600KB download that scans your computer for files that need updating and typically results in a download of between 15MB and 30MB.

If you have only ever installed updates from Windows Update, SP4 will detect any updates you have already downloaded and installed through Windows Update and these won't be duplicated. But if you have ever contacted Microsoft Product Support Services and it has sent you a specific update, you should read <http://support.microsoft.com/?id=822384> before applying SP4. Updates that you have installed from Windows Update will reduce the download size



Top: Windows 2000 Service Pack 4 has been released after several months in beta testing

Bottom: If you run ZoneAlarm, consider disabling or removing it before installing SP4

but not by much, as SP4 includes many bug fixes and other updates that haven't been made available through Windows Update. Also, as SP4 has been in beta test for several months, many updates on Windows Update were released after SP4 was set in stone; applying SP4 won't bring you up to date in terms of critical updates.

The Network Install is a 129MB download. It's big because it covers all client and server versions of Windows 2000. 129MB won't tie up DSL or a cable modem for long but it's a five-hour download for a fast modem or Highway/ISDN line. With restricted connections that time out after an hour or two, a download manager like Internet Download Manager www.internetdownloadmanager.com can maximise download speeds and schedule the SP4 download in two or three chunks, for example, allowing you to set it off before bedtime and find SP4 on your hard disk in the morning.

Preparation

Whether you decide on the Express Install or the Network or CD versions, be sure to read all about it at www.microsoft.com/Windows2000/downloads/servicepacks before applying SP4. Read the documentation carefully – it'll pay off with a successful

upgrade. Some points you should note before starting: you must use administrator rights in order to install SP4; you need loads of free space; and some anti-virus and firewall software may prevent a clean install (see screenshot 2).

Because it replaces loads of system files, it goes without saying that you need to log on as administrator to install SP4. You also need 340MB of free space available in order to use Express Install (or the CD), if you retain the default install option that backs up the files being replaced so that SP4 can be removed. You only need 165MB of free space if you opt to skip the backup. These figures are for Windows 2000 Professional. You need a little more space for server versions, and a little less space if you download the Network Install and decompress it to a shared network drive before installing it.

Problems encountered when installing service packs or immediately afterwards are quite often associated with software firewalls or anti-virus software. We have never experienced such problems with Kaspersky Antivirus, Etrust EZ Antivirus or Kerio Personal Firewall, but problems with other products have been reported. The Microsoft Knowledgebase article at <http://support.microsoft.com/?id=812344> suggests disabling anti-virus software before applying a service pack. While anti-virus software may prevent files being copied, firewall software effects often don't show up until after the service pack has been successfully installed. At this point you may find that some online or network activities are curtailed. It could be a firewall configuration problem. Check your firewall supplier's website for advice, or temporarily disable the firewall to see if that has any effect.

Normally it is not necessary to reinstall a service pack. By design, the updated files are copied to a local folder so that they are accessible to the operating system if required. But if the service pack hasn't installed properly, a reinstall (after correcting any other problems or disabling anti-virus and firewall software) may help. If you've used the online Express Install, you'll have to start from scratch.

Reading the bug fix list for SP4 reveals a large number of fixes associated with file system and network redirector files. There's a fix

for the popular 'NTLDR not found,' which apparently can be caused by excessive use of the TEMP directory; another for system hangs caused by NTFS when renaming files on a remote Windows 2000 server; one for a bottleneck when NTFS is 'stressed', and yet another for when the boot disk is formatted as NTFS. Network slowdowns when accessing large files, slow disk performance when Write Caching is enabled, STOP errors from HP user mode printer drivers, problems with Automatic Update and Windows Update, and hanging caused by flaws in the graphics code are all covered by SP4. The general nature of many of these fixes suggests that SP4 is well worth applying.

USB fixes

There are also numerous fixes for USB bugs, and new support for Enhanced USB controllers – USB2.0 controllers, in other words. If you have a USB2 controller in your PC and wish to enable Microsoft's USB2 support, you must update your USB2 drivers after SP4 has been installed. Details are provided in the SP4 Readme www.microsoft.com/Windows2000/downloads/servicepacks/sp4/readmesp.htm, but the Readme description is a little terse. In Step 4 where it says 'click on Update Drivers' you must click on the Drivers tab first in order to display the 'Update Drivers' button. If you have previously installed a manufacturer's USB2 drivers, for example when fitting a USB2 peripheral card, the Add New Hardware wizard which runs after you click on 'Update Drivers' may report the existing driver as being the best driver. This would happen if the manufacturer drivers had later date stamps than the Microsoft drivers. In this case you can choose to keep the manufacturer's drivers or you can replace them with the generic Microsoft drivers. If you have



experienced any odd glitches since installing manufacturer-supplied USB2 drivers, give the Microsoft drivers a whirl. They may fix the problem – it worked for us.

Microsoft recommends installing the USB2 support even if you have previously downloaded and installed the earlier USB2 support made available through Windows Update. Comparing file versions, using the information in Knowledgebase article <http://support.microsoft.com/default.aspx?id=319973>, the USB2 files in SP4 are later versions than those supplied by Windows Update.

Dual boot

Last month we promised to explain how to add Dos or Windows 98SE to a computer running Windows 2000 when the C: drive is formatted as NTFS. Surprisingly, it turns out to be easier than falling off a log.

In our test case, Windows 2000 occupies the Active Primary disk. Its NTFS format means it cannot be accessed by Windows 98. Windows 2000 has to remain on C: thanks to hard-coded drive paths in the Registry. This prevents us from inserting a new partition for Windows 98SE 'in front' of Windows 2000. Fortunately, though Windows 98SE can only be installed if its Setup program can access the Active Primary partition (typically C:), the Windows 98SE system files can be installed to any partition. This gives us the answer to our problem. We create another primary partition and temporarily make it active in order to install Windows 98SE. We'll need a partition manager like Powerquest

Enhanced support for USB2 Hi-Speed devices is included in SP4

Partitionmagic to resize the existing C: partition, freeing up enough space to create a partition on which to install Windows 98SE. You can either use the partition manager or the Dos command Fdisk to set the active status (see screenshot 3).

A hard disk can contain up to four primary partitions. The Active flag determines the primary partition on which the PC Bios will look for the Master Boot Record. The MBR contains a small program which reads the drive Partition Table, locates the operating system boot record, and hands control of the computer to it. By switching the active status between the primary containing Windows 2000 and the primary containing Windows 98SE, we can choose which to boot. Try it a few times to be sure all is in working order. Use Fdisk from an MS-Dos window in Windows 98SE, and Disk Management in Windows 2000 to make the change. As Windows 98 cannot access the NTFS-formatted partition, Windows 2000 is unaffected by this sleight of hand.

This is a tedious way to switch OS though, so the next step is to add Windows 98SE to the Windows 2000 boot menu, which is stored in boot.ini. In effect we manually recreate the procedure Windows 2000 Setup follows when installed in a dual-boot configuration with Windows 98SE. To do this we create an image of the Windows 98SE boot sector which will be referenced in boot.ini and used to load Windows 98SE. As a matter of interest the process mimics the steps necessary to add Linux to the boot.ini menu. The procedure was first detailed by J David Bryan in a Windows NT newsgroup posting way back in 1996. A copy can be found at www.bcpl.net/~dbryan/ntfs-dual-boot.html.

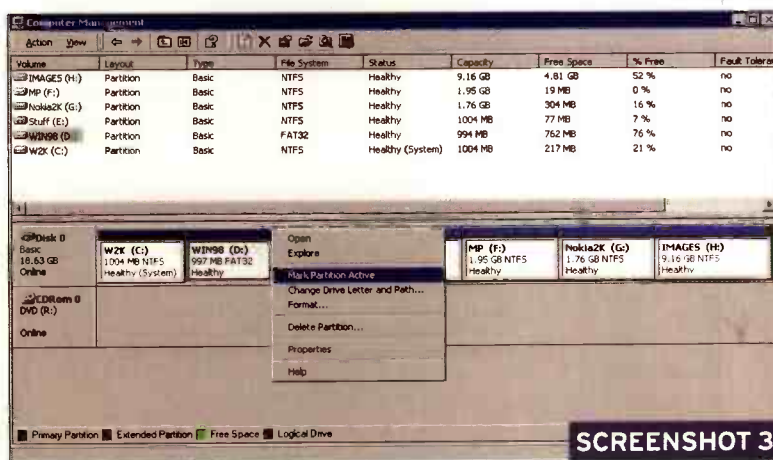
To be successful, you must make the Windows 2000 partition Active, and boot into Windows 2000 to do this. Follow Bryan's Debug instructions exactly in order to create the bootsect.dos file; check that you have correctly created a copy of the boot sector by using Debug to list the beginning and end of the bootsect.dos file, and check that the relevant entries are displayed in the first and last bytes.

Once that is done, edit the boot.ini as Bryan describes, and you're ready to roll.

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.

Setting the Active partition flag using Disk Management



SCREENSHOT 3

**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

Let RPM take the strain

How to organise your software with ease, and play Windows games under Linux

Maintaining software packages on different systems can be quite a pain. Each uses its own format, and on some there isn't even any standard at all. Commercial Unix systems, as well as Linux distributions, have never really resorted to relying on the traditional Dos and Windows idea of just copying files anywhere, and having no centralised database of what's there – at least for the system software, anyway.

On Linux, the most popular package manager is from the most popular distributor, Red Hat. The RPM Package Manager (yet another recursive acronym) has been around more or less since the birth of Linux. While it's possibly not the best system around, it is the most prevalent – it's the standard for Red Hat, Suse, Lycoris, Mandrake and others. The Linux Standard Base (www.linuxbase.org) has chosen RPM as its package manager, so it's unlikely to go away any time soon.

But what does a package manager do? At its most basic, it provides a method to install and remove software packages, and to keep a record of all those packages installed on the system. In addition to knowing where every file of a package is located, other details are included, such as the version of the software, a description, a category of application and information about where and when it was created. All of this is contained in an RPM file, an archive with a .rpm suffix.

Installing packages

So, to get straight in, you can install and remove software using the 'rpm' command. You need to be logged in as root to run it, as you're not only copying files across system directories, you're also modifying the central package database. As usual, all examples that begin with '#' need to be run from root:

```
# rpm -i blob-1.0.i386.rpm
```

This is the simplest way to install a package. Although the filename of the package is irrelevant to RPM, its name is usually formatted in this particular style: the name of the package, a version number, the CPU architecture (remember Linux runs on many platforms) and the rpm suffix. Running the above results in a bit of disk-chugging and seemingly

```

[root@redhat root]# rpm -q libdvdcss-1.2.7-fr1.i386.rpm
warning: libdvdcss-1.2.7-fr1.i386.rpm: V3 DSA signature: NOKEY, key ID e42d547b
Name      : libdvdcss                      Relocations: (not relocatable)
Version   : 1.2.7                        Vendor: Freshrpms.net
Release   : fr1                          Build Date: Wed 25 Jun 2003 09:49:12
        BST
Install Date: (not installed)            Build Host: shrike.freshrpms.net
Group     : System Environment/Libraries Source RPM: libdvdcss-1.2.7-fr1.src
        .rpm
Size      : 70468                        License: GPL
Signature : DSA/SHA1, Wed 25 Jun 2003 09:49:12 BST, Key ID e42d547b
Packager  : Matthias Sauou<matthias.sauou@est.une.marmotte.net>
URL       : http://www.videolan.org/libdvdcss/
Summary   : A portable abstraction library for DVD decryption.
Description
This is a portable abstraction library for DVD decryption which is used by
the VideoLAN project, a full MPEG2 client/server solution. You will need
to install this package in order to have encrypted DVD playback with the
VideoLAN client and the Xine navigation plugin.
[root@redhat root]#
  
```

SCREENSHOT 1

To get information on a package, use the RPM command

not a lot else. It's standard in Unix for commands to return nothing if there isn't a problem.

An alternative set of options gives some visual feedback, something especially pleasing when you're installing several large packages sequentially (think of the operating system installation, for example). The 'v' option encourages RPM to be more verbose, while the 'h' option prints a '#' symbol to show the progress of the package installation:

```
# rpm -ivh blob-✓
1.0.i386.rpm
```

(Key: ✓ code string continues)

If a new version of 'blob' is available, and the older one is installed, you must use the 'U' option instead of 'i' to perform an upgrade instead of an installation. In fact, the 'U' option works whether there's an earlier version around or not, so it's best just to use this one for all packages. You've probably seen this sort of example on websites and in previous columns in PCW:

```
# rpm -Uvh blob-✓
1.1.i386.rpm
```

Removing packages is just as simple. As we're concerned with a package on the system, and not an archive on the disk, the name of the package should be given rather than a filename as before. If you try using

a full filename, the rpm command will return an error. Use the 'e' option to erase a package:

```
# rpm -e blob
```

And that's it for basic package manipulation. Adding and removing packages this way ensures that it's done cleanly and the system knows which versions are in place.

Querying packages

It's possible to see various information about any package on the system, using the 'q' option to 'query' the RPM database. This does nothing by itself; you need a qualifying option to tell rpm what you want to query. To get general information about a package, use the 'i' option (see screenshot 1):

```
# rpm -qi blob
```

You can see a list of all the individual files in a package using the 'l' option:

```
# rpm -ql blob
```

These commands also work on an RPM archive as well as currently installed packages, but you need the 'p' option to tell the command to look for a file instead:

```
# rpm -qip blob-✓
1.0.i386.rpm
```

This latter method is really useful for examining RPM files before installing them. You can see what the software does and where all of its files will get installed.

Now, since the database knows all of the files a package contains, and where they're located, it'd be useful if you could do a reverse look up – that is, to give a file on the system, and find out which package it belongs to. It's not nearly as difficult as it might sound – just run another query:

```
# rpm -qf /bin/bash
```

The 'f' option tells rpm to look for a file given on the command line and returns the package it belongs to. It's now you begin to see how powerful a package management system like this is.

```

[root@redhat 9]# rpm -Uvh bash-2.05b-20.1.i386.rpm xpdf-2.01-9.i386.rpm mutt-1.4
.1-1.i386.rpm
Preparing...
1: bash [100%]
2: xpdf [ 33%]
3: mutt [100%]
[root@redhat 9]#
  
```

SCREENSHOT 2

It's possible to install several RPMs at once



Dependency hell

RPM is impressive, but it can be incredibly frustrating, too. If you ever try installing archives, you might well find you get an error saying there's a failed dependency: another package is required for this one to work properly. The next step is to go off and find the missing package, only to discover you now have another three packages needed and so on. This frustration is commonly called dependency hell. There's no mechanism built into RPM to ameliorate the problem, though several Linux distributions have extra utilities to try and help out. The problem mostly arises with third-party utilities, as there's no easy way for RPM to know where to get any other packages needed by the one you are trying to install.

Another problem occurs sometimes when you try to install one package and receive a failed dependency; you try to install the second only to find it's dependent on the first. This circular dependency problem is a little simpler to resolve: just install all the packages simultaneously, by supplying each on the command line (see screenshot 2):

```
# rpm -Uvh pkga.rpm
pkgb.rpm
```

The dependency function isn't there just to test us; it prevents you from removing a package that others rely on, and it ensures that any packages you install have all the others they need to work. The modular approach here is common with open-source software, because software and libraries from multiple separate projects are used together to avoid code reproduction. For example, the code to manipulate jpeg images is all held in the jpeg libraries, which are in one RPM package. Any application that handles jpegs will be dependent on that package. Additionally, if there's a bug in the jpeg library, it just means one package upgrade, and all the programs using it will use the new version.

Sometimes, though, it's necessary to overrule dependency errors. An example is if you have installed a dependent package in non-RPM form; perhaps the version you have installed is new and there is no RPM available, or there are problems with the RPM that's requested. If software isn't installed using RPM, the database won't know of its existence, and will spit out dependency errors, even though the software is present. In these instances, use an override option with the RPM command:

```
# rpm -Uvh --nodeps blob-
1.0.i386.rpm
```

RPM options

TABLE 1

Option	Function
-Uvh	Install and upgrade packages
-e	Remove a package
-ql	List all the files in an installed package
-qlp	List all the files from an rpm file
-qi	Provide detailed information about an installed package
-qip	Provide detailed information about an rpm file
--nodeps	Install or remove a package and override dependency issues
--force	Forcibly install or remove a package, ignoring potentially serious errors

The 'nodeps' option takes two dash symbols, unlike the others; it's standard practice for single-letter options to take a single dash, and word-options two.

Finally, for some obscure problems, and for re-installing same versions of a package, there is the force option. This one, like the previous, shouldn't be used without good reason, as packages might end up broken or overwritten by others.

See table 1 (above) for a summary of the different options for the rpm command.

Source RPMs

Though it's much more common to install packages in binary form, you almost always have the choice of installing through a sourcecode RPM. The main exception is for proprietary or commercial binary-only software. Source RPMs have the extension src.rpm; the package hasn't yet been compiled so it wouldn't make any sense to have a CPU architecture.

We've advocated compiling binaries from the sourcecode on many occasions in previous columns. You get your hands dirty, but quite often see a performance boost too. Most binary distributions are compiled to run on the Intel 386, and don't take advantage of enhancements to newer CPUs, like MMX or SSE instructions. The other main advantage is that compiling software on your own system ensures that it's all linked optimally.

To install a source RPM, use the rpmbuild command instead of RPM. Older versions of Red Hat and some other current distributions, still use RPM, but the command options remain the same.

A source RPM contains, not surprisingly, all the sourcecode for the package. It also has a 'spec' file, which contains the instructions to build the software, as well as apply any patches, and to run any configuration scripts. The build process consists of multiple stages,

but unless you want to modify the spec file, there's a far quicker way of performing the build:

```
# rpmbuild --rebuild
blob-2.0.src.rpm
```

The 'rebuild' option extracts the data from the source RPM, and automatically runs through the spec file, compiling the code and producing a binary RPM file that is (hopefully) more tuned to your system. The resulting name is in the standard format – in this case 'blob-2.0.i386.rpm' – and is written to a distribution-specific directory. For Red Hat this is /usr/src/redhat/RPM/i386; for others, it's a similar destination – check /usr/src for an appropriately named directory.

For better tuning, you can give the CPU architecture more specifically. While not every model variation of each processor is catered for, you can probably get a bit closer. For example, use the following for an AMD Athlon system:

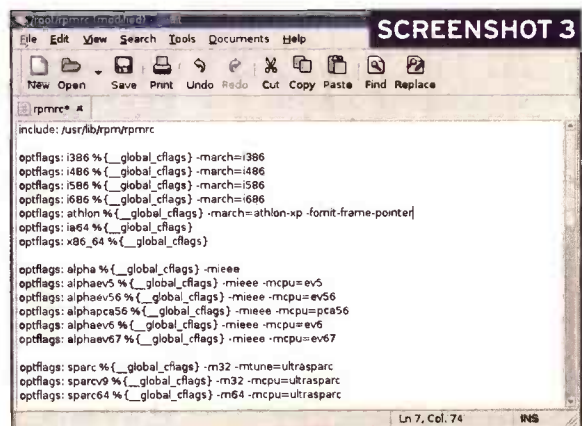
```
# rpmbuild --arch=athlon
--rebuild [...]
```

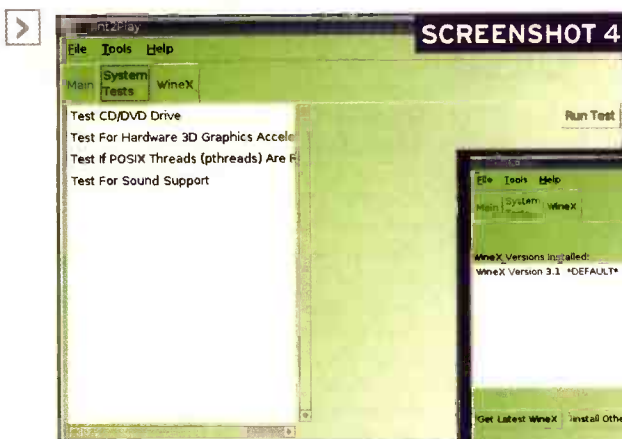
In these instances, the final RPM is named differently. The suffix here is athlon.rpm, and the directory is /usr/src/redhat/RPM/athlon.

The precise options the compiler uses are set in the rpm configuration file. You can edit this for even finer tuning of the rebuild process. Again, the location differs between distributions, but on a Red Hat system it is at /usr/lib/rpm/redhat/rpmbrc (see screenshot 3).

Find the lines that begin 'optflags:' and add any compile options you want for the necessary architectures. You could, for example, change '-march=athlon' to '-march=athlon-xp' to produce binaries better tuned for Athlon XP systems. Another popular option is 'fomit-frame-pointer' – one that usually improves performance, sometimes considerably, but prevents debugging.

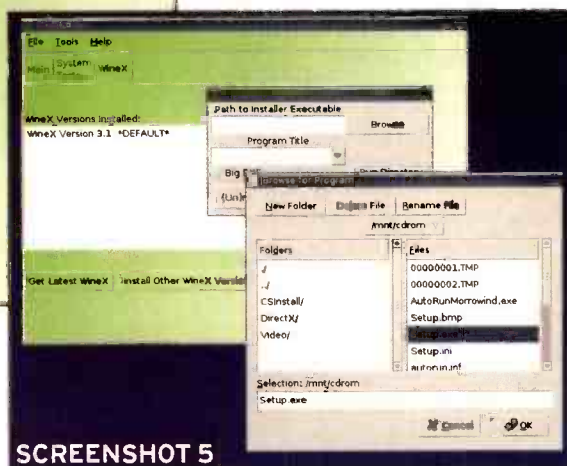
Modify the rpmbrc file to tweak the compilation flags when rebuilding source RPMs





SCREENSHOT 4

Left: The main Point2Play window – here you can perform system tests
Below: Installing a new game with Point2Play



SCREENSHOT 5

Packages that gain a lot from rebuilding are ones that do a lot of number crunching. Compression software like Gzip, bzip2, zlib, and multimedia libraries and utilities including libjpeg, lame and libvorbis are likely to gain a boost. Bear in mind though that you're unlikely to get any support from vendors if you recompile system packages with different options.

Linux gaming

There's a wealth of games available for Linux and some Unix systems. Gnome and KDE come with a collection of small games, usually of the card, puzzle or strategy variety. There are a few others that are more advanced: the arcade game Chromium, the racing game Tuxracer, and the hugely addictive Tetris-like game Frozen Bubble. There are probably hundreds of others, including the old favourites like Nethack. All of them are free, and the more desktop-orientated distributions, such as Mandrake and Suse, supply quite a few as standard.

But for the big games – Warcraft, Simcity 4, the Sims, and so on – you usually have to turn to Windows or a Mac. There is an alternative option though, which comes in the form of WineX from Transgaming Technologies (www.transgaming.com).

We've talked about Wine in previous columns. It's a project that lets software designed for Windows run on Linux and FreeBSD. The system API calls made by the applications are translated into Linux equivalents, so that the Windows operating system isn't itself needed. A huge project like this clearly has its imperfections, though; it's eternally in a beta status and is forever playing catch-up to the latest changes from Microsoft. Still, it does a good job with a good deal of applications.

Codeweavers produces the popular Crossover Office software, a

commercial offering of Wine, which lets you install and run many of the most desired Windows titles: Microsoft Office, Lotus Notes and others (www.codeweavers.com). Transgaming isn't quite as well known as Codeweavers, but WineX does the gaming equivalent of Crossover Office, by allowing you to run certain Windows games. These include the titles listed above, as well as many others that run either perfectly, or adequately, well with only minor problems.

WineX works by using the features of Wine, and translates Microsoft DirectX calls to natively supported OpenGL equivalents. Because of this, some games might run slower, and games that aren't purely 3D action-based are more likely to work.

In order to obtain WineX, you must subscribe to the Transgaming website for a minimum of three months, at a cost of \$5 per month. You can then download the current version of WineX, and any future

Not so different from a Windows installation



SCREENSHOT 6

releases, while you subscribe. There are two versions available: a traditional, command-line-based one, and a newer GUI version. Both have the same core, and support the same games, but the way in which you install the games differs. The traditional version is called, simply, Winex, while the newer GUI one is Point2Play (see screenshot 4). Subscription also provides online support and help, as well as being able to give feedback, such as votes on which features or games should be supported in future versions.

Both forms are available as compressed tar archives (tar.gz), in Debian's apt format, or RPM. A recent distribution of Linux is required, as the 2.4 kernel and Xfree86 4.0 (or higher) are needed. For people with Nvidia graphics cards, the binary-only proprietary drivers from Nvidia must be installed, otherwise 3D graphics won't work. Documentation and more information on other requirements is on the website, though the basic install process is easy enough. For RPM-based systems, you should now be familiar with the command:

```
# rpm -Uvh winex-3.1-1.i386.rpm
```

For the tarred archive, use the following:

```
# cd /
# tar xfvz winex-3.1-1.i386.tgz
```

The installation for Point2Play is the same, but once you run the GUI, you need to have the program download and install the core WineX software – enter your login details and select the 'Get WineX' option; it'll do the rest. You can launch Point2Play by either running it from the menu, or entering 'Point2Play' in a shell.

To install a game from Point2Play, run the 'Install' option from the file menu (see screenshot 5), and enter the directory in which the setup.exe file is located. There's a facility to mount the CD, if it isn't automatically done for you. Once the game has finished installing, there isn't much difference at all – an icon is put on the desktop, and a menu entry added (see screenshot 6).

Now there's one less reason to reboot into Windows.

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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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

The numbers game and a bullfight

A blunder-proof way to create numbered lists in Word, and how to jettison the jargon

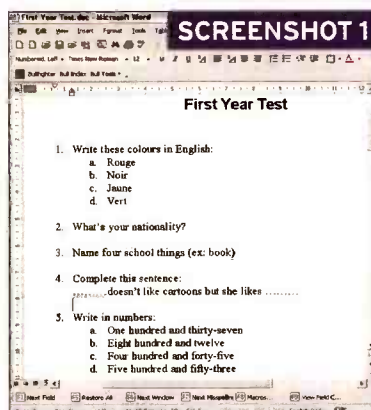
One of Word's many powerful features is creating numbered lists. There's a wealth of opportunities for creating legal or academic documents, incorporating styles and outline levels to achieve recursive levels of numbering that would bring a smile to the most exacting of control freaks. For the rest of us, it's all rather intimidating. Using numbering in Word is, in fact, a piece of cake. But like many of Word's features, the cake is lavishly encrusted with icing, oozing cream and topped with hundreds and thousands. So here's a blunder-proof way to have your cake without getting in a mess.

First, turn off the autoformat option to convert typed numbers into automatic numbered lists. This is one of those 'hey look at this' features that can save the canny user a whole mouse-click, while reducing the rest of us to a state of confused, frustrated misery. You'll find this under Format, Autoformat, where there is an Options, button, or Tools, Autocorrect. In either case turn to the 'Autoformat as you type' tab, and untick the 'Automatic numbered lists' feature. You may also want to take this opportunity to disable some of the other 'helpful' encumbrances. If you are using Word 2002 (XP), make sure the option to 'Set... indents with tabs and backspaces' is turned on. In Word 97 or 2000 you'll need to go to Tools, Options, Edit to find this option. You should now be ready to go.

To take a real-world example, I had to help Mrs Nott to prepare a school test paper. This consisted of 20 numbered questions. Some of these were followed by another question; some by multiple-choice answers of the form a, b, c, d; and others by an un-numbered paragraph, for example, 'Complete the following sentence...' (see screenshot 1).

So the first step is to type a suitable title, plus any other information needed, then start the numbered list by clicking the Numbering button on the formatting toolbar. A '1' should magically appear. Before you type anything else, go to Format, Bullets and Numbering, turn to the Outline Numbering tab and select, for argument's sake, the first option and OK the dialogue. Now type the first list item, press Enter and a '2' should spring onto the next line. This may

Taming numbering in Word



not be what you want, but don't panic. If you click the 'Increase Indent' button on the formatting toolbar, then the line should take a short leap to the right and the '2' will be replaced by an 'a'. Type some text, press Enter and a 'b' will appear and so on.

When you want to return to the higher level of numbering, press Return, and then click the Decrease Indent button: the numbering scheme and position will return to the '1,2,3...' level. That's the basics – but we have a few more tricks to make it even easier. Using the 'Set indents' option we enabled earlier, you'll find that you don't need to pick up the mouse to change levels. At the start of a numbered or lettered line, the Tab key will take you down a level, and the Backspace key (or Shift & Tab keys) will take you up. If you are at the top level already, then the latter will turn off all numbering for the next paragraph.

Finally, if you want to insert un-numbered lines or paragraphs at any level, there are several solutions for suspending and resuming numbering without losing the numbered schema or formatting. I don't have room to describe them, but here's the easy,

way. Press Shift & Enter, instead of Enter: this will give you a line break instead of a paragraph break, and the following line won't be numbered. You can repeat this any number of times, and when you want to return to numbered paragraphs, press Enter. Finally, there's another way to turn off numbering from the current point onwards: press Enter twice at the end of the last numbered paragraph.

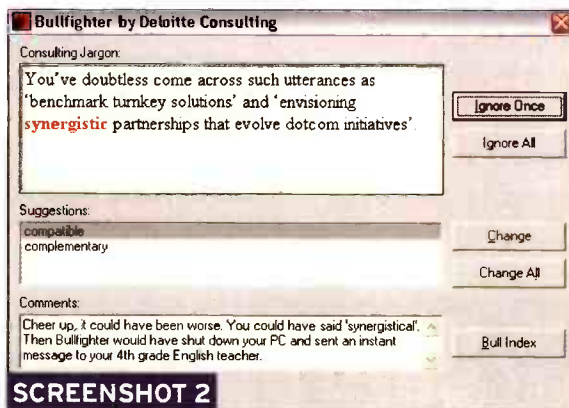
Cut the bull

One of the more dubious joys of IT journalism is reading press releases. Despite being written by intelligent professionals, these are often couched in a language only distantly related to English as we know it. You've doubtless come across such utterances as 'benchmark turnkey solutions' and 'envisioning synergistic partnerships that evolve dot com initiatives'. The trouble with this, apart from incomprehensibility, is that it's viral, especially in a corporate environment. Once the CEO starts bandying this sort of jargon about, you can be sure that the lower ranks will be quantum-leaping and shifting paradigms in a matter of days.

So, a warm welcome to Bullfighter from Deloitte Touche Tohmatsu. This is a free Word add-in that analyses your prose for, well, bull, and advises you accordingly. You can find it at www.dc.com/bullfighter, and I am convinced this thoughtware comprises a value-added, leverageable, empowerment of the user experience (see screenshot 2).

Finally, several readers have had trouble turning off the Autocomplete feature that appends a month and day to a year. Re-reading August's issue, I admit my instructions were somewhat limited. So here's another try. Go to the Insert menu, click Autotext, then Autotext again on the submenu. You then get a dialogue with four (or five in Word XP) tabs. On the Autotext tab (which should already be selected) there's a check box labelled 'Show Autocomplete suggestions' or 'Show Autocomplete tip...' Untick this.

Eschew obfuscation with Bullfighter



CONTACTS

Tim Nott welcomes your comments on the Word processing column. Email him at: wp@pcw.co.uk. Please do not send unsolicited file attachments.



Optimising stock levels

The easy way to control inventory levels and set prices in a small business

With commercial activities from B&Bs to vintners represented among the correspondents of this column, it's appropriate to devote some space to business applications.

Retail, wholesale and manufacturing small businesses all carry stock. How much they carry has a significant influence on the success of the business. Too much stock ties up capital. Too little and customers go to competitors. So management needs to calculate how often to reorder and how much to reorder. Obviously this depends on the number and frequency of units taken out of inventory for sale. But any spreadsheet can help make the calculation easier.

The classic formula for establishing the economic quantity to order is $Q = \sqrt{(2AS/rv)}$, where A is the ordering cost per order; S the annual usage (or sales) of the item; r is the inventory carrying charge (a decimal fraction), and v is the cost of the item. Obviously this is for non-seasonal items. You don't want to order 50 sets of Christmas lights every month.

To create a simple example for one item in stock, you can enter the price of the item in cell B6. The number of this item typically sold in a year is entered in B7. The estimated administrative cost of buying an order is entered in B8.

The cost of storage as a percentage of the cost of stock sold in the year is put in B9. For instance, if total sales are 10,000 and normal inventory level is 1,250, the percentage cost in B9 is 12.5 per cent.

From this data, in cell B11 we can calculate the optimum number of times to reorder this item in a year with the formula:

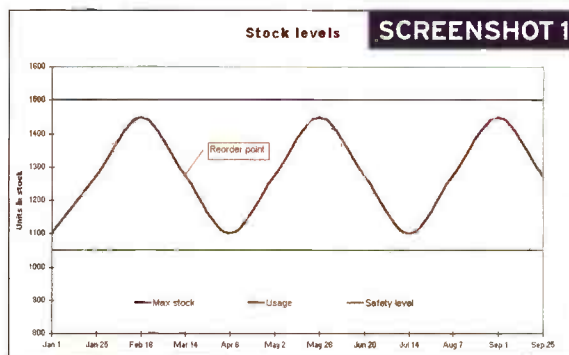
`=SQRT(B6*B7*B9/100/(B8*2))`
In cell B12 enter:

`=SQRT(B7*2*B8/(B6*B9/100))`
to calculate the optimum number of units to order each time. And in B13 enter:
`=SQRT(266450*B8/(B7*B6*B9/100))`

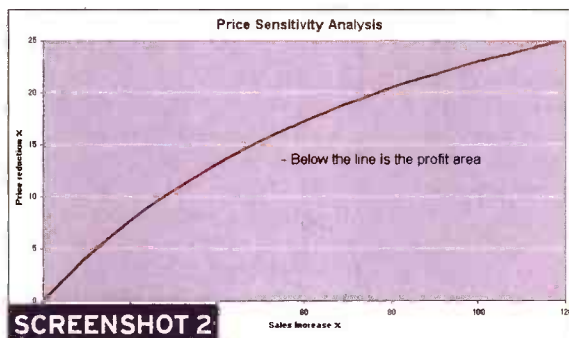
(Key: ✓ code string continues)

to calculate the optimum stock level for this item measured in days' supply.

If the price of the item entered in B6 is £2.99, the number sold in a year entered in B7 is 1,950, the administration cost of each order in B8 is £17.50, and the cost of storage in



Charting the usage of an item from stock



The sales increases need to compensate for price reductions

B9 is 15 per cent, then the item would be ordered five times a year (calculated in cell B11), 390 items would be the optimum number to order (B12) and the preferred stock level, measured in days' supply, would be 73 (B13).

Screenshot 1 visualises this activity in chart form. The central line descends when quantities of the item are withdrawn from inventory for sales, and rises when purchases are made and stocks replenished. This is a plain line chart but, using Excel, if you right-click on the central line, choose Format Data Series under the Patterns tab and check the Smoothed line box, the angled lines turn into a wave.

Getting the price right

Maintaining optimum inventory levels helps a small business' balance sheet. But a significant factor in obtaining a satisfactory P&L statement is pricing. Overall profitability can frequently be improved with a very small increase in margins. Conversely, there is no harm in reducing the price of a loss leader for a small portion of the year or a small part of the company's total range, but it can require a significant increase in sales to compensate for an overall reduction

in prices, as screenshot 2 illustrates. In this example, unless costs could be significantly reduced, the company would have to increase sales by 60 per cent to compensate for a 15 per cent reduction in prices. If prices were reduced by 25 per cent then sales would have to increase by 120 per cent to maintain the same level of profitability.

Here's how to make this chart. Enter the company's annual sales in cell B2, and the cost of goods sold in B3. In B4 enter:

`=B2-B3`

This is the gross profit. In B5 enter:

`=B3/B2`

That's the cost of sales as a decimal.

In the range B6 to K6, enter increasing percentages from 2.5 to 25 in 2.5 steps. (C6 is 5, D6 is 7.5, and so on).

In cell B7 enter:

`= (100-B6) / 100 - B5`

and drag this along the row to cell K7. In B8 enter:

`=B$4/B7/$B$2`

and drag this over to K8. Finally, in B9 enter:

`= (B8-1) * 100`

and drag this over to K9.

For the chart, the source of the horizontal x-axis is the range B9:K9. The source of the vertical y-axis is B6:K6. If you're using Excel, the Chart Type is the fourth one down among the Standard Types and is called an XY (Scatter) chart. Any combinations of price reduction with compensatory sale increases below the line maintains profitability. But a large price reduction with only a small increase in sales depicted in any point above the line will produce a loss.

Mark-ups and margins

Here's the difference between Margin and Mark-up – and the link between them – if Sales, in A1, are £150,000, and Cost of Goods, in A2, is £120,000, then enter =A1-A2 in A3 to display Gross Profit of £30,000. The Gross Profit Margin of 20 per cent is shown in A4 with =A3/A1*100. The Mark-up of 25 per cent displays in A5 with =A3/A2*100.

CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Email him at: spreadsheets@pcw.co.uk. Please do not send unsolicited file attachments.



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

Keep your head above water

Learn a few titling tricks and how to make the most of underwater photography

Like sound, titles are one of those things that are all too often ignored by video makers, but with a little effort, they can make a huge difference to the quality of a finished video production. One reason many people may have fought shy of titles is that, until recently, the tools for producing them have been thin on the ground. Until the most recent release, Adobe Premiere's titling tools weren't that good and other manufacturers, like Pinnacle, have included third-party titling applications such as Title Deko with their video-editing products.

But the situation has improved substantially and these days even very basic video-editing applications, like Microsoft's Moviemaker 2 and Ulead Videostudio 8, provide pretty sophisticated title-editing tools.

Titles can be as simple, or as complicated as you want them to be, but simple often works best – just because all you've got to work with is white text on a black background doesn't mean you can't produce something with style and impact. If you find that hard to believe, take a look at the intro titles next time you watch an episode of *Inspector Morse*.

At the other end of the spectrum you'll find titles that have had almost as much creative effort expended on them as the movie they introduce. More than 30 years on, the title sequences that graphic artist Saul Bass produced for the Hitchcock thrillers *Psycho*, *Vertigo* and *North by Northwest* remain fresh and contemporary looking.

And titling doesn't have to be restricted to the beginning and end sections of your video – subtitles, credits and rolling commentary give you the opportunity to provide the viewer with additional information at any time.

Later I'll run through creating a big, bold introductory video title that doesn't obscure or detract from the background, but first a few titling rules. Like all rules, you can deliberately ignore them and set the groundbreaking style for the next generation of screen typography – but only if you're aware of them in the first place – anything else will look like the sad mistakes of an ignorant novice.



You will be able to see more of the background video if you use transparent type

The rules

As most videos are likely to be viewed on a 4:3 TV you need to be aware of the image boundaries. TVs don't give you the whole picture, but crop overscan and underscan areas to provide clean edges. Many older sets also have tubes shaped like goldfish bowls, so if you place type near the edges at best it may be badly distorted and, at worst, it could disappear altogether. If your video-editing application can display the title safe area then use it to make sure this doesn't happen. Alternatively create your own title safe area by placing four guides 70 pixels in from the frame edges.

TVs are low-resolution devices and consequently have a hard time resolving fine detail like very small type, or that with thin strokes and twiddly bits. Avoid anything smaller than 10point and try to stick to sans serif fonts of at least medium weight. You'll also find that certain colours can cause problems and you'll need

to take particular care if you're producing type in another application. Photoshop has a filter which brings all the colours within an image into the broadcast-safe gamut. Generally speaking though, it's best to avoid full-on colours. Rather than solid white, add about 10 per cent black. If you have a video card that allows you to use a TV as a monitor you can preview the results and avoid problem colours early on.

Lastly, there's the question of transparency. One big advantage to using a video-editing application's title editor is that it automatically creates an alpha channel, which is then used to create transparency when you overlay the title on a video track. If you produce your titles in an image editor you need to ensure the alpha channel is saved with the image and can be accessed by your video-editing application.

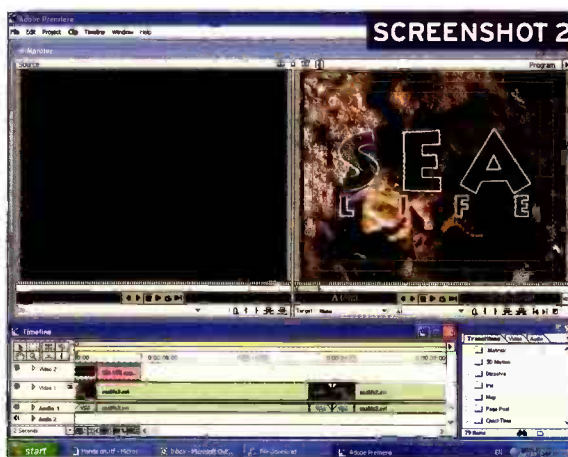
Overlaying titles on video can create readability problems. Your light blue caption, which is perfectly readable against a dark building, suddenly disappears when the shot changes and the building is replaced by sky. To avoid this you can put a black keyline around the type or put it in a coloured box. For a much more subtle approach, add a hint of a drop shadow or dark coloured glow with minimal spread to differentiate it from the background.

Alpha channels

So, you want your titles to be big, impactful and above all readable but you don't want them to obscure the action that's going on in the background video track. One solution to this problem would be simply to reduce the opacity of the title track to around 50 per cent. This looks OK, but making the title semi-transparent weakens it considerably and you still can't see what's going on behind it. A better solution, and one that looks far more striking, is to make the title text an alpha channel graphic so that the lettering itself controls the opacity of the video image beneath it.

Start by creating a blank RGB document in Photoshop 720 x 576 pixels in size with a transparent background. Using the text tool drag to create a rectangle in the middle third of the screen that extends almost to the edges, and key in your

Rescale your title to fit





title. I've used Lithos black all caps and made the main title 288point – so no problems with readability there. If the title isn't already black then make it so by clicking the text colour swatch in the options bar.

Next, reduce the opacity of the type layer to around 30 per cent. The more transparent you make the type layer at this stage, the more of the background video you'll be able to see. You might have to experiment a bit to get it right.

When you're happy with the type create a work path from it using Layer/Type/Create Work Path, then create a new layer and stroke the path using a small brush to create a white outline. Then reduce the opacity of the outline layer to about 90 per cent (see screenshot 1).

Save the Photoshop file as a .psd, then save a copy in targa (.tga) format, making sure to select the 32bit option or you will lose the alpha channel information.

Open your Premiere project, import the .tga title file and position it in a video track on top of your background video. If the title safe area isn't displayed in the project window, turn it on by right-clicking in the monitor and selecting Safe Margins for Program side from the contextual menu. If your title doesn't fit you'll need to rescale it (see screenshot 2).

Make sure the title clip is selected and click the checkbox in the Effects Control Panel to enable transparency. In the Transparency settings dialogue select Alpha Channel as the key type, click OK and preview the title. Screenshot 3 shows the final effect. The background video shows through the body of the text, but is darkened slightly by the 30 per cent alpha channel transparency. The effect of the 90 per cent opacity on the white outline is to turn it slightly grey – on a TV this will look white, but won't have the burned out nuclear glow that a 100 per cent white stroke would have produced.

To add the final touch, expand the title track to show the opacity rubber bands and add a fade-in and fade-out at either end of the clip.

Underwater photography

During my not infrequent visits to the coast earlier this summer, I couldn't help but notice how popular waterproof cameras are becoming. Mostly I've seen people using what look like fairly basic fixed focus models for snapshots near the shore, but many of these models have built-in flash, and are capable of submerging to depths of several

SCREENSHOT 3



metres. If you've ever been on a diving or snorkelling holiday, or just want to get closer to water-borne action without exposing your expensive digital camera to a dousing, the appeal of these devices is obvious.

There are two approaches to getting in the water with your camera, one is to buy a waterproof housing for your existing camera, the other to get a dedicated underwater model. Option one can be expensive and, depending on the make and model of your digital camera, the choice of underwater housings may be limited or even non-existent.

I've all but given up trying to find a waterproof housing for my Fujifilm S602 Pro Zoom, but Nikon and Canon owners fare much better. Underwater housings are available for most of the Coolpix range, as well as the D1 and D100 digital SLRs. Canon owners are similarly well served with waterproof housings available for the digital Ixus, Powershot and Eos digital SLRs ranges.

Underwater housings aren't cheap – in many cases they cost more than the camera they're designed for. The Ikelite CP 5700 (pictured right) housing for the Nikon Coolpix 5700, for example, costs £1,317. It is a substantial piece of kit mind you, manufactured from clear polycarbonate with large bracket mountings either side for external flash units and operational to a depth of 200ft.

You can find out more about the Ikelite CP 5700 at www.ikelite.com. To find out if there's an underwater housing available for your camera try www.digideep.com. If you're not yet ready for the expense of a waterproof housing, take a look at www.sealife-cameras.com.

The finished title, with the background showing through the body of the text

Sealife's reefmaster DC200 sells for £399.99 including VAT.

If like me, you want to experiment a little before committing that sort of cash, then go in search of a Lidl supermarket where you'll find the Sea Shot underwater camera for the bargain price of £2.99. This is one of those disposable cardboard cameras sealed into a clear plastic housing which is waterproof to a depth of 3m; at a mere £2.99 you might be prepared to risk it a bit deeper, but with no flash you probably won't see much. It's not digital, but takes 24 shots on 400 ISO film.

Matrox RT.X10 Xtra

Matrox has upgraded its RT.X10 realtime DV editing suite and renamed it RT.X10 Xtra. The package consists of the RT.X10 Xtra realtime card, Matrox X.tools capture software and a full copy of Premiere 6.5. It's a software upgrade, consisting of a new version of X.tools and a revised realtime Premiere plug-in. Existing RT.X10 owners can download the upgrade free of charge from www.matrox.com/video/support/rtx10xtra/software.

The zip file containing the installer for X.tools build 4263 is 312MB, a pretty hefty download even for those with a broadband connection. If you're not already using it, or something like it, I'd suggest you get hold of Star Downloader 1.42 from www.vnunet.com/Download/1132660. Star Downloader makes the most of your available bandwidth by splitting large files into segments and simultaneously downloading them.

The realtime plug-in adds several new 3D effects, including particles, spheres and cubes, and you can now set up realtime effects using up to

The Ikelite CP 5700 works up to 200ft





two video clips and four single frame graphics clips. The Matrox Effect Setup dialogue box allows you to isolate individual tracks for preview, so even if you have too many effects to preview all of them in real time, you can view them individually without having to go back to the timeline and toggle video tracks on and off.

The RT.X10 allows you to make and preview speed changes in real time; Xtra provides an additional method of processing realtime speed changes called blended fields. While the existing repeat-field algorithm provides good results with fast-action material, slower-paced video and panning shots can look jumpy. The new blended field algorithm provides a much smoother effect.

The Mediatools capture module has also been significantly upgraded. You can now capture live video with a camcorder in camera mode, export single frames of video to a Matrox DV avi file and capture from an analogue source from an application other than Premiere, using the Matrox VFW capture driver. Support for interleaved files has been added, so it's goodbye to separate video and audio files, and Directshow support means you can preview video from Windows Media Player, DVD-IT SE and other Directshow-compliant applications on a TV monitor connected to the RT.X10 realtime card.

Plug-in of the month

Starting in this issue I'll be reviewing a different plug-in every month. Mostly, I'll be looking at Photoshop compatible plug-ins which can be used by most image-editing applications, but who knows what'll turn up. I'll look at anything that could loosely be termed a plug-in for any digital image or video-editing application. So if you have a favourite plug-in that you think deserves more widespread recognition let me know.

Imagealign

Take a picture of a tall building by pointing your camera upwards and it will appear to be falling over backwards as the vertical edges converge. Professional photographers use expensive monorail cameras with independently adjustable lens



The Kaidan 360 One VR lens can produce a panoramic view in a single shot

The Imagealign plug-in helps you to remove the curvature of straight lines from extreme wide-angle shots

and film planes to overcome this problem.

Photoshop users will know that you can use the perspective tool to correct this and similar perspective problems while cropping, but the Imagealign plug-in provides more control and can also be used to correct for pin cushion and barrel distortion. This means you can get rid of the tell-tale curvature of straight lines which occurs when you use extreme wide angle lenses (see screenshot 4).

Imagealign provides a bank of sliders that are used to apply perspective and skew adjustments in both horizontal and vertical planes, as well as rotation and scaling.

There's a reset button for when things go badly wrong, and you can save a group of settings as a preset to apply to other images, although as the required perspective adjustment tends to be specific to individual images, this is of limited use.

The preview window is amply sized and you can get a large preview in a separate window, but although there's a before and after toggle, it would be a lot more helpful to see both before and after images in the preview window at the same time.

Imagealign costs \$199, and you can download a 10-shot trial version from www.imagealign.com.

Fujifilm S602 Pro Zoom

Cast your minds back to the July issue when I spent an enjoyable few days in Venice with a Nikon Coolpix 5700 and a Fujifilm S602 Pro Zoom. The S602 Pro was just too good a bargain to resist, so I took the plunge and bought one from an online retailer at the very

competitive price of £544.98, including VAT and delivery.

The camera duly arrived and I was pleasantly surprised to discover a 512MB Microdrive in the box instead of the 340MB one that came with the review model and is specified on the Fujifilm website.

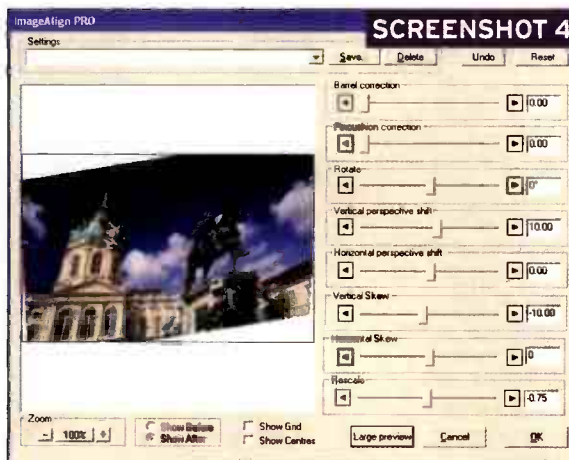
I spoke to Fujifilm to ask if it had upgraded the package to include a 512MB Microdrive, but was disappointed to hear that it hadn't, and that the 512MB one that crept into my box was a one-off fluke. I'm just lucky I guess. However, perhaps this is one of a small batch, so if you want to try your luck, check out www.pcw.co.uk/bestprices for a list of online retailers and perhaps you'll strike gold, too

Panorama

Cast your minds even further back, to the July 1999 issue of PCW, when this column was preoccupied with panoramas. Although there hasn't exactly been an explosion of interest in panoramic photography since then, panography has provided us with some stunning images. The number of websites providing 360 degree virtual panoramas has grown steadily, and many basic image-editing applications provide panoramic stitching tools.

I'll be taking an in-depth look at all things panoramic in a future Hands On; in the meantime take a look at this beauty (pictured left), which I came across while doing some online research. It may look like an upside down pickled onion jar, but it is in fact the latest thing in panoramic lenses. The Kaidan 360 One VR can produce a 360 panoramic image with a 100 degree vertical field of view in a single shot – forget about spending hours stitching together multiple images.

The 360 One can be attached to an ordinary digital camera and produces extremely distorted circular 360 degree images, similar to those produced with a fisheye lens. The accompanying Photowarp software then straightens everything out to produce the conventional undistorted panoramic picture we're all used to. At \$1,000 only those with a professional interest in panography are going to be in the market for a 360 One VR – the rest of us will have to persevere with the sewing kit a while longer.



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



Remote chance

Train your PDA to become a remote control, as long as you don't lose it down the sofa

There's the nightmare, and there's the dream. The nightmare happened to me: I was trying to get some work done in a hotel in Manchester, and while I was waiting for someone to call back, I switched on the TV to watch (the cricket, as it happens) for a moment.

Every five minutes, the wretched box turned itself off. The remote control wouldn't work; the only choice was to walk over to the set and physically switch it off, then on again.

Of course, eventually I twigged that my PC had an infra-red port and it was happily chatting to the TV. Neither understood each other, but every five minutes, the PC said something which sounded to the TV like 'Die, you useless piece of pond-scum!' and the TV went into a sulk. Fun for them. Not for me.

Here's the dream: you walk into a hotel room, and there's a TV on the wall. You pull out your PDA, and point it at the TV. A second later, the screen of the pocket device shows all the functions the TV is capable of, and gives you the opportunity to devise your own personal remote control system.

But it's not just a dream; in fact, it could be reality very soon. The idea is simple: why not pick your own user interface? You have a PDA – and it has infra-red. And there are lots of ways of getting it to generate the right codes – not just for the TV, but the DVD player, the old VHS tape and, believe it or not, a host of other things, from photocopiers to factory equipment.

Key to this is the creation of a standard protocol for 'discovery' – probably, an XML-based file which responds when you interrogate the device by sending a standard list of functions. Functions like 'fast forward' or 'rewind' or 'increase volume' obviously – but also other functions that may not be visible to the normal home user, but are built into the device.

This project is well under way at Carnegie-Mellon University, under the codename PUC (Personal Universal Controller). You can read the full story in pdf format at www.cs.cmu.edu/~jeffreyn/papers/chi2002puc.pdf.

The key to getting this going, however, is some way off – that is, the ability of the controlled object to



Nevo is one of the best remote control packages around (see left) – but it's only available built-in to a small range of devices. Some smart displays and Ipaq models do also include it (see below)



report its functions. Ideally, the Carnegie-Mellon research project would have finished, and the user interface would no longer be an issue. The trouble is, it is an issue today. And what makes it worse is that you have to train your PDA.

Some software is available, including Nevo (see above) which claims it knows the remote commands for a range of well-known VCRs and DVD players already. I don't happen to have those TVs or VCRs, so I couldn't test them. Instead, I had to take the ordinary remote control, and then tell the PDA what I was going to do (for example, 'fast forward') – and then tell the PDA to watch the infra-red output of the real remote control.

It turned out to be tedious and error prone. Time after time, the PDA would attempt to reproduce the data sequence that the remote had generated, and the TV would do something else. It's possible that after

you have spent a month or so with some of these interfaces, you might get used to them.

Finally, the question of visibility became important. A backlit display on a Pocket PC is a bright thing; when the lights are low, the PPC becomes the brightest light in the room. So there's no problem finding which 'button' on the screen to press, but it can sometimes be a bit blinding.

The Palm devices, originally, were backlit in a way that gave you dark letters on a bright background. Someone calculated that you use more power this way; so they switched to bright letters on a dark background. I never found this particularly legible; when used with buttons for remote control, it became hard to decide which was worse; backlight on, or off.

And if all that isn't enough to warn you off, there's the final problem; if you really did use your PDA as a TV remote, you'd tend to leave it in the TV room; or other people would borrow it to switch channels. Then, when it came to that important meeting, where is the PDA? Answer: in the TV room, somewhere. Most families find it easy enough to lose the remote control anyway. A small PDA is far easier to put on the cushion next to you, and the sofa will simply eat it up. I started these tests with a Treo, and it hasn't been seen since. It's really not funny.

Remote control software

So you've decided to ignore my advice, and get some software. What can you run it on? Well, the list is long, and lengthening daily; already, it includes most PDAs, both Windows and Palm, and increasingly it includes phones – Symbian and Windows and Palm.

For the Symbian phone user, the name to remember is the Polish firm, Psiloc, which is currently close to releasing several products. I tested the late beta version of a universal control program for the Sony Ericsson P800. Frankly, it was no more practical than any other PDA, but at least it works: www.psiloc.com.

Psiloc also has Total Irremote – this is a preprogrammed version of Infrared Remote Control. It lets users import profiles for specific devices – files are provided in Philips Pronto





CCF and Linux Lirc formats.

Imported definitions can be attached to any key on the layout. This means a user can take a standard layout and modify it according to needs, adding in the definitions. This is due for release to customers very soon.

Again, I didn't own the right VCR or other infra-red-controlled equipment to perform working tests.

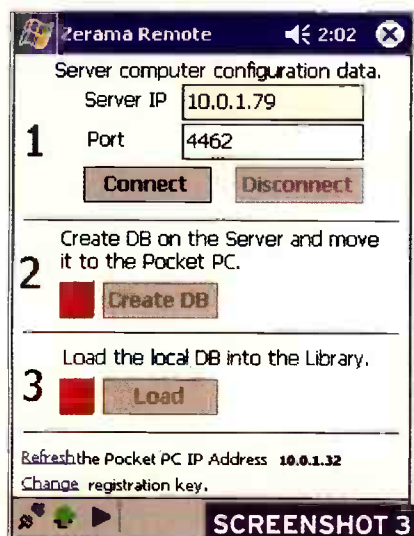
For the Pocket PC user, there are dozens of devices and products to choose from. Palmremote is one of the oldest and best. It comes in two versions: Palm and Windows CE (Pocket PC). It costs \$20 (£12.50) to register online at <http://hp.vector.co.jp/authors/VA005810/remocon/premocce.htm>, and it's pretty simple to install and run.

Total Remote is rather different from most, and comes with a qualified recommendation – because it isn't just hardware. It includes a 'booster' for the infra-red, to ensure that you can actually use it remotely, without having to get up and cross the room before it can reach the TV (see boxout above).

The astonishing thing about this is that it works at all; because it actually uses the audio port. It pumps audio into a little infra-red unit, which doubles the frequencies to reach TV remote range.

It worked on all devices we were able to test, but word from the experts is that some Pocket PC devices – specifically Dell Axim and Casio E200 – won't be able to generate audio frequencies high enough to drive it. See www.griffintechology.com/griffinmobile/totalremote for details.

Omniremote is Palm only. It's available from www.pacificneotek.com/download.htm and you can use it as freeware for two weeks, if you're content to control just one device. Pay \$20 (£12.50) to register it, and



With Zerama, you can control your PC's MP3s, and play them back via your PDA

The problem of range

During testing, it became apparent that there is a problem with using PDAs as remote controls; namely, power. My Palm, an M515, isn't especially feeble in the infra-red department, but the fact that it's pretty similar to other handheld computers doesn't mean it's adequate to the task of talking to a TV. Few of them are, if you have a big room, or any obstructions.

The reason is simple enough: the handheld device is not intended to blast its way into the reception of every other infra-red device within 100m. The standard TV remote control, however, is. When TV designers build their remotes, they assume that the signal will not be pointed directly at the sensitive spot on the display. They build a remote that is not only able to beam directly into the TV, but can send a signal that bounces off the curtains, the carpet or a small child. So the 'spread' is huge – not quite omnidirectional, but certainly over 90 degrees.

Today's handheld generation is substantially less forceful; and it's also much more focused on its target. The result is that it's a relatively low power beam, with about a 7-8ft (2m) effective reach, and about five degrees in 'spread'. It can be worse: the Sony PEG(LrDA1.2) needs you to be within about 5ft (just over a metre) of your TV. The displays on PDAs aren't really very visible in the right sort of conditions for TV viewing, but that's a minor problem compared with the problem of 'remote' not being very remote at all.

you can control multiple devices.

You need more patience than I could muster just to do one. Here, if you can stand it, is the sequence for getting just one button on one device:

On the menu, pick Modes; then select Training. Omniremote will ask you which button you want to train. Select a button. Now take the remote control of whatever device you want Omniremote to emulate. Point the infra-red output of the official remote toward the infra-red sensor of the device. Push the corresponding button and you should hear a beep. Touch the Palm screen. Now press the same button on the remote control again. Repeat for every function.

Omniremote will still be in Training mode. And at this point you might feel you want to test to make sure it worked; you'll have to switch out of Training to do so, then back again to do the next button.

Now count the number of buttons on your official remote... and you will probably opt to save your \$20 as I did.

This product does stand out, however, because there is a Springboard module, for old Handspring devices. And it also has a preprogrammed Lego Mindstorms robot controller – but I don't have Lego Mindstorms.

Maverick ideas

Controlling the TV and DVD player is one thing, but I was intrigued to find that some people had moved on, and decided to use the wireless Lan to link PDA to computer, for serious remote control.

Specifically, Zerama has come up with a way of seeing (and controlling) the stored MP3 files on your networked PC, and playing them back (www.zerama.net – see screenshot 3).

One of our testers suggested that

we should be taking this more seriously, and test purpose-built universal remotes. Companies such as Celadon, which makes industrial infra-red control devices, also sell a huge range of boxes – wall-mounted, mains powered and expensive.

We consigned this heretical suggestion to the slush pile, together with the equally perverse idea that you might want to use your PC for the purpose – especially since the typical notebook PC has a far more powerful infra-red output. There is at least one working solution to this – Remoconcon for Windows 95. It has the immediate and obvious drawback that it won't work on any later version of Windows, which should tell you something about the popularity of this product.

Apart from the fact that nothing will make me install Windows 95 ever again, I don't want anybody in my family to realise that I can theoretically control the TV from my laptop – on the grounds that as soon as they get that idea, they'll simply lose the official remote, and want to borrow my computer. But I do have a sneaking suspicion that it would be a great trick, because the TV would 'magically' switch to my favourite channel, all the time. A strange 'fault' I could assure them...

This PDA remote trick isn't really recommended for everyday living. It can be made to work, and it will impress your technically aware friends. But at the end of our tests, frankly, I felt that getting a life would be a far superior solution.

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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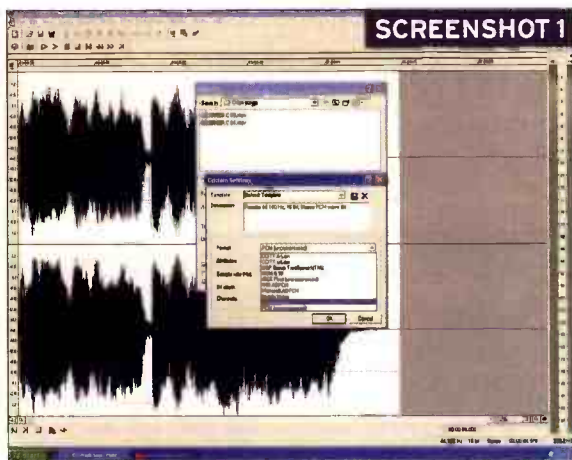


Niall Magennis

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

Conversion notes

We look at the ins and outs of converting between audio formats



SCREENSHOT 1

Whether you're a serious samplehead, a web designer or just someone who likes to grab music from the net, you're likely to need to convert between different audio formats at some time or other. Unfortunately, there are literally hundreds of flavours of audio around, and trying to convert from format A to format B can be more frustrating than attempting to solve the Rubik's Cube with one hand tied behind your back.

The problem is that some formats only act as a wrapper for the audio they contain. For example, a wav file is really a container inside which loads of different audio formats can be placed. If you don't believe this then try changing the file extension of an MP3 file to '.wav' and load it in to Windows Media Player 9. Surprise, surprise – it plays back as normal. In fact a wav file can contain data in multiple different compression formats, including MP3 and ADPCM as well as the raw format you need to use when burning to audio CD (see screenshot 1).

So the file format you think you have may not be the file format you actually have. But is it all a ruse? Is converting between file formats really just a matter of renaming the file extension? The answer is a definite 'no'. Even if you rename an MP3 file, the data contained within the file is still in compressed format. Windows simply understands how to play back an MP3 file even if it's renamed to a .wav file – you are not converting the file in any way.

But since changing an MP3 into a raw wav file suitable for burning to CD is one of the most common

A wav file can contain lots of different types of compressed data

Below: You can use Winamp's Diskwriter plug-in to quickly convert an MP3 to raw wav format

problems people face, let's start off by looking at how you can achieve this using Winamp version 3.

First of all, if you haven't got a copy of Winamp, you'll need to pop over to www.winamp.com and download it. You'll also need to grab the Diskwriter plug-in from the components section of the website.

Winamp was one of the very first MP3 player applications and was written by the same free-thinking folk who later came up with the Gnutella file-sharing network. It's a small program that is a lot more elegant to use as an MP3 player than Windows Media Player. However, the important point is that you can pretty easily use it to convert an MP3 file into a raw wav file.

First, of course, you need to install Winamp, but you also need to make sure you run the Diskwriter installer too. In this latest version of Winamp, the Diskwriter plug-in is easier to use and understand. Instead of having to configure the plug-in as a virtual sound driver it's now more tightly integrated into the main program.



SCREENSHOT 2



SCREENSHOT 3

Left: Winamp shows you the percentage of the conversion completed

Converting with Winamp

To convert an MP3 to a raw wav file, start by loading the MP3 file you want to convert into Winamp's playlist. Next you need to right-click on the name of the file in the Playlist window. A pop-up box will appear, and from here you need to highlight Convert and then click on the Settings option. This will open the Preferences window for the Diskwriter plug-in (see screenshot 2).

You need to choose the right setting in the format box. Here you can choose to either write the audio data to disk as an aiff file – the raw format used by Macs – or as a PCM wav file, the format more commonly used on PCs. Select PCM wav and then in the output directory box click the '...' button to open the file explorer window. Select the folder you want to use for saving your files and then close the preferences window.

You're now ready to convert your MP3, so right-click in the Playlist window on the file you want to convert, choose the Convert option from the pop-up box that appears and then select PCM Wav. The Preferences window for the Diskwriter plug-in will appear again, but this time you'll see an indicator in the Status box showing the progress of the conversion process (see screenshot 3). You can press the stop button at any time to cancel the conversion, but if you leave it running you'll find the wav file saved in the folder you specified as the output directory.

That's all there is to it. However, if you want to convert multiple MP3 tracks to wav files – for example, change an entire album of MP3s to wav format for burning to a CD – then you can load all the tracks into the playlist and highlight them all by either pressing Control & A or by holding down the Control key and clicking on each individual file. Then when you start the conversion process, all the selected files will be converted in one go.

Winamp can, in fact, be used to convert any file format it supports to raw wav format using this Diskwriter plug-in. You can view the list of supported files on the Winamp website, but you can always just check whether a file is supported by dragging and dropping it onto the



main Winamp window. If the file plays then you can just turn on the Diskwriter plug-in and it will be converted to PCM wav format.

Awaving, not drowning

Winamp is pretty much limited to converting different formats to raw wav files. It can't convert to and from multiple different file formats. For that, you need another application called Awave Studio. If you're the type who's constantly messing around with audio, then it's handy to always have a copy of Awave at the ready. Why? Because it supports more than 200 audio file formats.

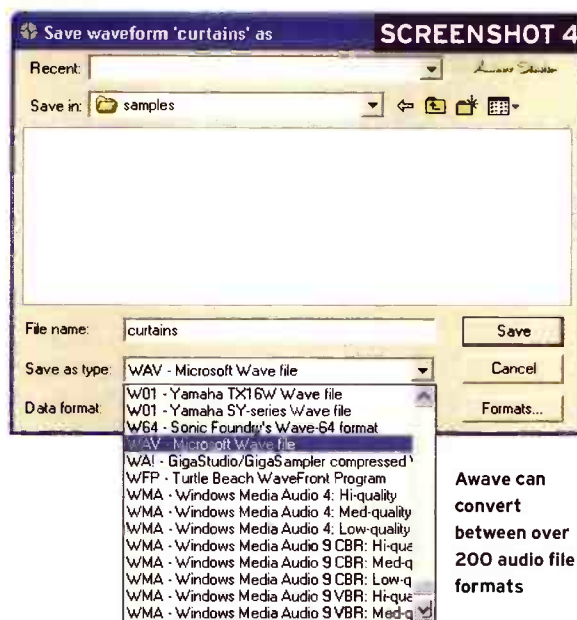
Awave will convert between pretty much any audio format, even old audio files from the Amiga and Atari ST. Another useful feature of Awave is that it can convert instrument and sample banks for one synth or sampler to another. So you can convert, say, program data for an Akai Professional sampler for use on a Creative sound card that supports soundfonts. Awave doesn't just convert the samples – it also tries to retain the patch information so the sample will play back with all the correct envelop and filter settings intact. There are, of course, limitations to the exchange process, because different synths have different parameters, but it generally does a good job and you can always tweak the results manually to make the converted file sound closer to the original. This is far less time consuming than recreating the entire patch by hand.

Awave supports so many different file formats that you can pretty much use all the different format synth and sample banks available for free download on the net with any type of hardware or software sampler or soundfont capable sound card.

The software costs \$99 (approx £60) but you can download an evaluation version from www.fmjsoft.com. The download is just over a megabyte in size so it shouldn't take too long to grab from the net.

Once you've got the software, all you need to do is unzip the file and double-click on the Awave executable to install it on your computer. Now that you've got the software up and running, let's look at how you would use it to convert a file.

In this example, we're going to take a sound sample from Monty Python's *The Holy Grail* that is currently in the .au format and convert it to a wav file. The .au format is a standard that is used by Sun workstations. It was also the format used by Next computers, the company Steve



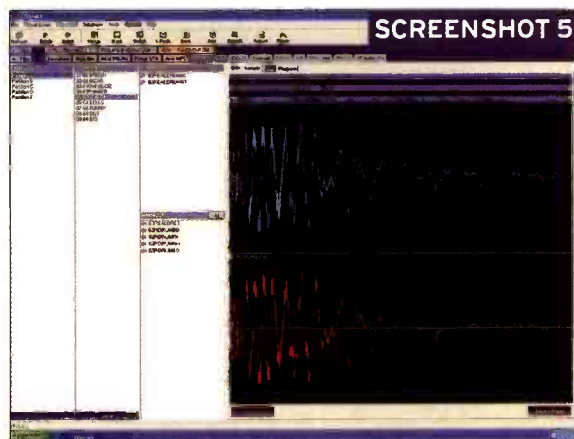
Awave can convert between over 200 audio file formats

Jobs founded during his time away from Apple. There are lots of older sound files on the net in this format, as both Sun and Next workstations were common in academic institutes when the World Wide Web was in its infancy.

First of all you need to load the sample into Awave. You can do this in two ways. The long way is to use the Open File command found in the File menu to select the audio file you want to open. The shorter way is to just drag and drop the file on the main Awave window.

To convert the audio to a .wav file all you need to do now is right-click on the filename shown in Awave's Waveforms window and select the 'Save Waveform as' option from the pop-up menu. This will open a pretty standard Save dialogue box, but under the filename box you'll see a box marked Save as Type. When you click on this dropdown box, a list appears showing all the file types that Awave supports. Select Wav from the list, make sure the data format is set to 16bit, and then just click Save (see screenshot 4).

Cdextract is an excellent tool to convert between different sampler formats



That's it; your waveform is now converted to the standard Windows .wav format.

Naturally Awave can do a lot more than simple single file conversions. It can also manage batch conversion jobs, allowing you to convert lots of files in one go, and it can import samples via Midi or Scsi from professional samplers. And as we've already seen, it's a great tool for converting between data from different samplers.

CDextract

There is another program that is an excellent choice for converting between the different formats that samplers use. It's called CDextract, and it started life as a tool to allow you to extract data from Roland and Akai format CD-Roms using your PC (see screenshot 5). These CD-Roms cannot normally be read by PCs because they use completely different proprietary formats.

However, over the years CDextract has expanded in functionality – it now allows you to convert between tons of different sample formats, and even supports the soundfont standard that is used by Creative's range of sound cards. But it goes even further than this because it now supports data for PC sampler plug-ins such as Vsampler, Gigastudio, Halion and Reason, as well as many more. In fact it's the best sample conversion tool out there, and is a must-have for musicians who use a range of different samplers in their set-ups.

The software can also act as a librarian for your sample collection and even has the ability to print the contents of a sample CD to paper in case you've lost the liner notes. All in all, it's a fantastic tool. You can download a demo from www.cdextract.com and the full version costs \$139 (£86.70).

Hopefully, by using these tools, you'll never find yourself in a position where you've got a piece of audio that your computer just refuses to play. So whether you're trawling the net for a new sound to use as your incoming email alert, or looking for an accordion sample bank to use on a Scottish folk tune, once you've found the right sound these tools will make sure you can audition the sample and convert it into the format you need.

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

Ooops! I'm a spammer

Junk mail can be a problem for website managers, so here's how to reduce the risk

No, of course I'm not a spammer. Long-time readers of this column will know I hold no truck with those who think mass email is a 'legitimate marketing method'. The number of sites receiving the error '550 drop dead evil spamming scum' from my mail server is steadily increasing.

Junk email is an issue that can directly affect people who run websites. There's been a lot of publicity about how some spammers may be using virus and trojan techniques on your home computer to relay their junk messages around the world, but it's equally important to consider your web server.

Look at the support forums or mailing lists for some web hosting companies or server software, and you'll often see messages along the lines of 'Someone's sending spam through my server, but it's blocked against mail relaying.'

Many people will spend ages protecting their mail server so that spammers can't use it, but that can come to nought if you don't check the scripts you put on the website.

One of the key culprits is a form-to-email script. Let's backtrack a bit, and look at what you might want to do.

Suppose you want to solicit feedback from your website. The old-fashioned way would have been to include an email address on the site, and maybe a mailto link. But as we all know, spammers will harvest addresses that appear on websites, so your helpful customer contact address will be bombarded with their 'carefully targeted' junk mail.

Using a form is an alternative solution; OK, people can't compose the message using their usual email program, but you don't have to put the email address on the page.

You can use a form on your web page with the method set to post and the action to 'mailto:someone@somewhere.com'. You need to set the encoding type of the form to text/plain. Unfortunately, there are two problems with this. First, it doesn't protect the target address from spam, since the address can be found easily enough in the page source. Second, for a number of the visitors to your website, it won't work. This sort of code relies on the web browser passing all the content of the form to the user's

email program, and the email program understanding what's being sent to it. If the user has the wrong browser version, or doesn't have their email client configured or the two can't communicate, the form won't work. You could insist people use a particular browser (and maybe email client too) when they view your site, but we don't recommend that. If a site won't let you enquire about their products without dictating which browser you should use, shop somewhere else.

How they do it

A solution is to use a form to email script, so when someone fills in a form on the website, the information is passed to a script on the web server, which processes the information and turns it into an email message.

That is where you can fall foul of spammers, finding your server being used to send out junk email, even though you thought you'd protected the mail system against abuse.

How's it done? All too simply, unfortunately. When it's suggested that people use a form to email script, they often find one on the net – but it might not be the most up-to-date one.

The way many forms have worked in the past – and often it's the case with ones that an ISP or hosting company wants to make available to all the users – is that you specify things like the recipient of the email and the subject by using hidden fields in your form, a little like this:

```
<form action='FormToEmail.cgi' method='POST'>

<input type='hidden' name='recipient' value='sales@mycompany.com'>
<input type='hidden' name='subject' value='Customer information request'>
```

(Key: ✓ code string continues)

When a spam merchant finds a form on a website, with hidden fields, there's a good chance it can be abused. All that's needed is a program that talks to the web server as if it's submitting the form, changing the recipient name each time. By doing that, the spammers abuse the script on your server to send their junk emails. Since the script is creating the email on your server, it won't be spotted as an attempt to relay junk from somewhere else.

Plugging the hole

You can avoid this by coding the script so that it doesn't accept the address as part of the input. But what happens if you need to be able to send mail to more than one place? It's not very convenient to have several scripts on your site, all varying just in one line, where you specify the address to send a message to. And it won't work if, for instance, you want a dropdown menu on the form that specifies if the message being typed is for the sales, support or some other department.

One solution, using PHP, might be to work a little like this: use a field on the form to give a simple destination, like 'sales', 'accounts', 'complaints.' Call this, perhaps, 'destination.'

Then, in a shared location on the server, create a list of allowed recipients, as PHP source. It might look a little like this

```
<?php
$deliverto['sales'] = ✓
'salesalias@mycompany.com';
$deliverto['accounts'] = ✓
'accounts@mycompany.com';
$deliverto['complaints'] ✓
= 'john.smith@mycompany.com';
?>
```

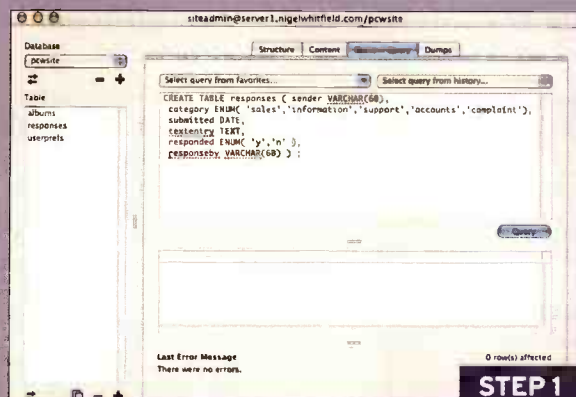
You can include this in your script in the usual way, and then when creating an email, refer to the address as \$deliverto[\$destination]. It's also worth checking the value of the register_globals setting in your PHP.ini file too – if it's set to 1, then variables passed as form input will automatically be set, and that could allow unscrupulous users to alter what's passed to the email system.

If you're running a server with lots of users, updating a text file with the different addresses they require for their forms is tedious of course, so why not provide a mechanism for them to create destinations via a password-protected form, storing the information in a MySQL database? The form to email script could then query the database to find out the delivery address.

You can find an example that shows how to process a form and create email using PHP's mail function at www.nigelwhitfield.com. Briefly, though, you can send mail from PHP with a command like this



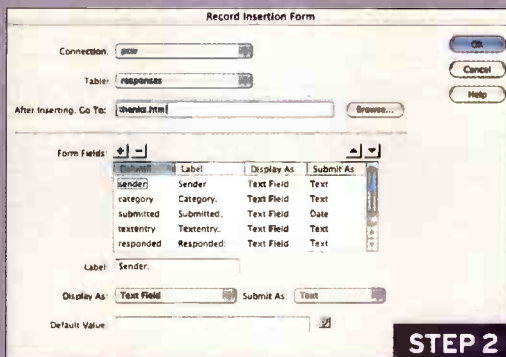
How to create a feedback form



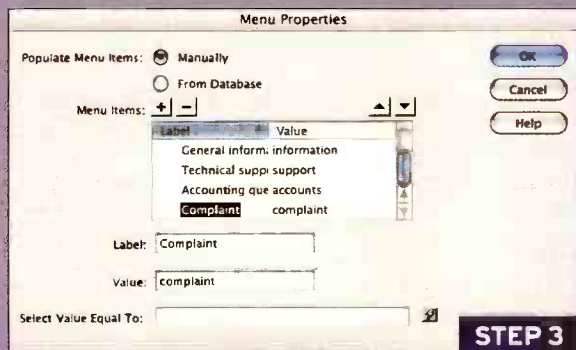
STEP 1

Now, in Dreamweaver, it's simple to create a feedback form for visitors to your site. Create the outline of the page, and ensure that you have the database connection set up. After creating the connection, click the Application tab on Dreamweaver's Insert toolbar, and then the Record Insertion Form button, which should be second from the right.

The screenshot shows the dialogue box; pick the connection and choose the new responses form. Then specify a page to send users to when they've filled in their details. Use the - button to remove any fields you don't need on this form, such as the name of someone who has responded, for instance. For multiple choice fields like Category, click on the field name, then choose Menu under Display As and click on Menu Properties.

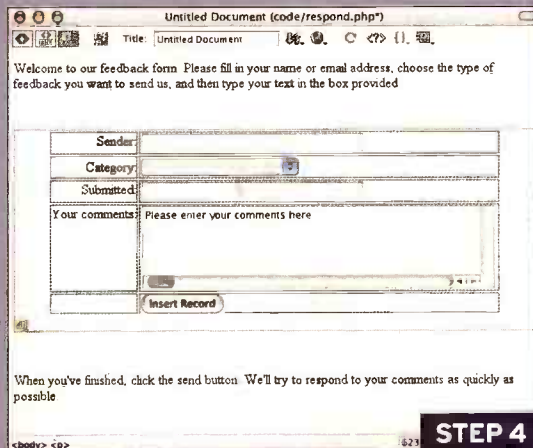


STEP 2



STEP 3

When you click the OK button, Dreamweaver will create a form like the one shown in this screenshot (right). You can change the text on the Insert Record button by clicking on it, and change other properties on the form. You'll notice that we've included the 'submitted' date field on the form; you can change the code behind the form to include the correct date and time automatically using SQL's NOW() function; we showed how to do that in the February 2003 column.



STEP 4

```
mail("webdev@pcw.co.uk",
Great article', 'Thanks
very much for the PHP
features', 'X-WebToMail:
1.0);
```

That's the recipient address, the subject, the message body and then, optionally, extra headers. You can give optional parameters to the mail program, but most users won't need them. The mail function returns true if the message was sent OK and false if it wasn't.

Alternatives

Receiving information from your website by email isn't the only solution. Look at what you want to do with the information, and consider if email will be the best answer.

An alternative is to use PHP/MySQL to save the messages in a database on your server – and if you're using Dreamweaver, it's simple to do. When you have the comments in your database, you can create pages to access them just as easily; the same trick could power an address book.

But when it comes to response, you can make this quite neat; save the responses in a database, with email addresses and other information, such as time submitted, and an action field. Then you can provide a web interface for yourself, or your staff, allowing them to see what's been sent, respond via a web page – which might send email, perhaps, accepting messages only from authenticated site users – and log what's been done. So instead of worrying about dealing with emails, all your website feedback will be stored neatly and dated, with a record of how it was handled. No more trying to find out which is the longest outstanding query. It'll all be there on your site, searchable, without having to provide public email addresses that can be used to send spam or harass your staff. You also don't run the risk of exposing a public form to email script which could be abused by spammers, causing you no end of hassle, not to mention potentially blackening the name of your company. Follow the walkthrough on the left for the first stage – creating the feedback form – and we'll look in more detail next month at tracking responses, along with how you can prevent image hijacking on your server.

CONTACTS

Nigel Whitfield welcomes your comments on the Web development column. Email him at: webdev@pcw.co.uk. Please do not send unsolicited file attachments.



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

The email business

For small companies setting up an email system over the Internet needn't be difficult

Having covered the basics of setting up a network server in the last few columns, I'm now going to talk about email. Over the next few months, I'll be looking at the ways in which a small to medium-sized company might go about making email available to employees, both on its local area network and externally by sending and receiving messages over the Internet.

Not much of a problem, you might think – but there are lots of ways to do this. Each has its own advantages and limitations and I want to start out by sketching the benefits and drawbacks of some of the different approaches.

Freemail?

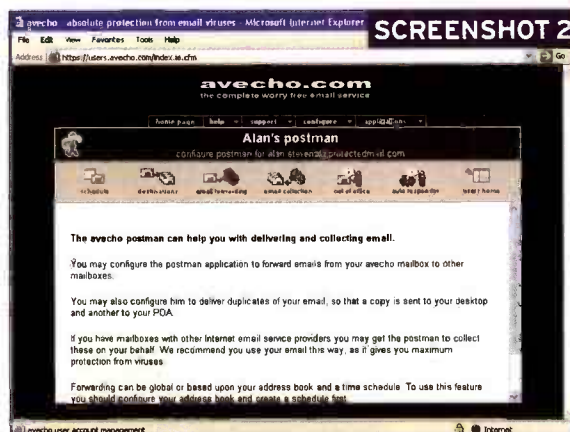
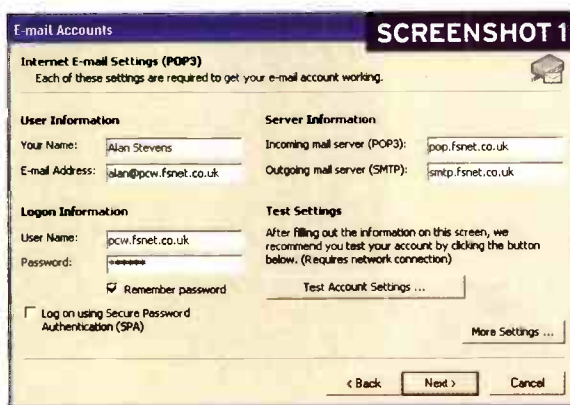
As most of you will appreciate, there are two parts to any email system. There's the software used to read and create messages (the mail client) and the mail servers needed to do the sending and receiving.

The clients are the easy bits, with a Microsoft client (Outlook Express) provided as part of Windows, and others included with Linux or available for free download on the web. Moreover, adherence to common standards, such as SMTP (the Simple Mail Transfer Protocol) and POP3 (Post Office Protocol 3), enables different servers and clients to be mixed together. As such, you can readily mix and match and don't even have to host the server side yourself, with many companies opting to outsource this part of the equation.

You may not realise it, but server outsourcing is exactly what you're doing when you opt to use the email accounts included with your Internet account. The ISP hosts the mail servers, the advantage being that you don't have to know how they work, manage them, or install any special software on the network at your end.

All you need is the client software, making for a cost-effective solution, especially where an ISP, such as Demon (www.demon.net) or Freeserve (www.freeserve.com), lets you have as many email users as you like. That way everyone in the organisation can send and receive messages using just one Internet account.

Of course, each user needs Internet access, and the client software has to be set up to send and receive



Top: If you opt to use the free email accounts provided by your ISP, the only software required is a POP3 client configured to access the ISP's mail server

Bottom: With a paid-for email service, like that provided by avecho.com, a company can manage its own email accounts even though the server is hosted remotely by the service provider

messages via the ISP-hosted mail server, but for a handful of users that's not a major job. Service providers are increasingly offering web-based mail where all you need to send or receive messages is a browser.

Not so perfect

Although this approach is cheap and easy, it's not suitable for everyone and doesn't scale well. All messages are routed via the ISP's mail servers over the Internet, even when communicating desk to desk, with associated performance, cost and bandwidth implications. Coping with many users can also be problematic, and each user gets an address such as **username@yourcompany.ispname.com**, which can be awkward and not very professional. In screenshot 1, for example, the default email address for my test Freeserve account ends up as **alan@pcw.fsnet.co.uk**.

It isn't too difficult to set up your own domain and have messages forwarded using more professional **username@yourcompany.com** addresses. And, if you have an always-on broadband connection, sending all

the mail via the Internet isn't that much of an issue. But there are other limitations to bear in mind, such as message size and storage restrictions.

Most ISPs set limits on the size and number of messages that can be sent, barring their services from being used for marketing mailshots, newsletter distribution and so on. They also limit the storage you get for incoming mail, especially on accounts that let you have an unlimited number of addresses. Each user gets their own address, but messages are stored in a single common mailbox. In some instances, this may hold no more than 10-20MB. That's not much, given the size of modern documents that are often sent as attachments.

You also have little or no control over the availability or management of email services with 'free' accounts. For example, you can't forward messages at the server when people leave a job. Neither is it (usually) possible to set up automatic responders when staff go on holiday. And you're unlikely to get more than basic anti-virus, content filtering or anti-spam tools, or guarantees of service and disaster recovery, unless you pay more for a custom outsourced solution or install a mail server of your own.

Paid-for outsourcing

Lots of companies offer email hosting as a paid-for service. A number of the ISPs provide such services, and there are specialist providers, such as UK-based avecho.com, which offers personal and business outsourcing.

The basics here are much the same as with 'free' accounts, in that the mail server is hosted by the service provider, so all the users need are mail clients. Most also offer web-based access from a browser and support for Imap4 (Internet Message Access Protocol 4), where messages remain on the server to enable users to access their mailbox from any system with Internet access. In addition to these basics, however, it's possible for customers to set up and do a lot of the day-to-day management of their mail accounts themselves.

With avecho.com, for example, the nominated administrator can create and manage user accounts via a browser. From here there are options to forward messages, set up auto-responders and so on (see screenshot 2), just as if you were running a local mail server.



Email server software comes as standard with most implementations of Linux, but if you lack Linux expertise, choose a ready-configured Linux server appliance like the Equinix NetPilot

Mail from multiple domains and service providers can also be consolidated using avecho.com, and there's the bonus of anti-virus scanning and anti-spam screening as standard. Most providers offer service-level agreements guaranteeing availability and data security. Plus, although there will still be restrictions on message size and bulk sending, these can be negotiated. The basic avecho.com service, for instance, starts at £75 ex VAT per user per year (£60 for 10 or more) with guideline usage limits of 100 messages per day. However, these are not rigorously enforced and the company offers bulk sending agreements for organisations looking to handle mailshots and newsletters on a regular basis.

On the downside, messages are still transferred over the Internet, even when sending mail internally. You're also restricted in terms of the anti-virus, spam and content filtering controls that can be applied, plus it can be difficult (although not impossible) to add groupware and resource sharing facilities, integrate other applications and so on. For those sort of tasks, it's hard to beat having an email server of your own.

A server of your own

Installing and running an email server can be a daunting prospect for those with limited expertise, but it doesn't have to be that complicated. In fact, one of the biggest problems facing anyone thinking of deploying a mail server is choice, with literally dozens of products available, and on a range of platforms – not just Windows. Indeed, one very good approach is to use the SMTP and POP3 server tools included as a standard part of most Linux distributions.

I'll be looking at such Linux-based email servers in more detail in future Hands on columns, but it's worth pointing out here that few come ready to use, making them a poor choice for

companies without the necessary in-house expertise. In which case a Linux-based appliance, such as the NetPilot from Equinix

(www.netpilot.com), is possibly a better solution. Such appliances typically come with the email server and other services ready-configured, together with a user-friendly browser interface to simplify day-to-day management.

Of course Linux isn't the only possibility, with lots of Windows products available, ranging from basic freeware and shareware applications to expensive email packages designed to support large corporations. Again I'll be looking at these in more detail over the next couple of months, but at this point it's important to make a distinction between the high-end corporate products, such as Microsoft Exchange, and the more general SMTP server solutions.

Why not Exchange?

The big company email packages, like Exchange, Novell's Groupwise and Lotus Notes, have been around for a

Top: As well as basic messaging facilities, Microsoft's Exchange Server offers a lot of extra collaboration and groupware functionality, but it's not necessarily a good choice for the smaller organisation

Bottom: You don't have to pay to get an email server; IMail Express from Ipswitch is a free yet fully featured SMTP/POP3/IMAP4 mail server that can support up to 10 users

long time. As such, they differ from more recent products, in that they were initially developed using proprietary mail protocols, which in many cases are still used, requiring specialised client software to go with them (see screenshot 3).

On the plus side, they have been extended to use SMTP, POP3 and other industry standards, so you can use other clients if you want. Added to which, as well as basic message handling, you can expect to get support for mobile devices, instant messaging and global address books as standard, along with calendar and document sharing and groupware functionality. Big name products stand out by way of facilities to integrate email with other messaging and communications applications, with lots of third-party add-ons available for Microsoft and Lotus platforms.

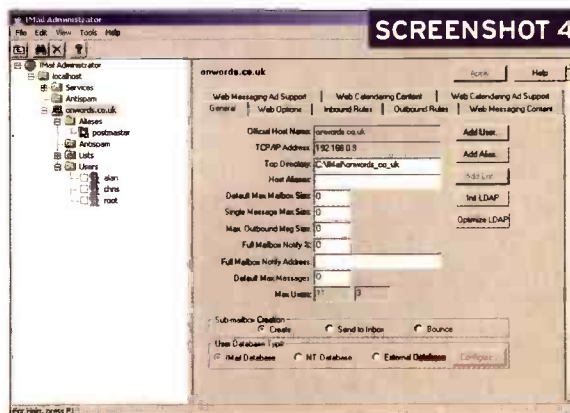
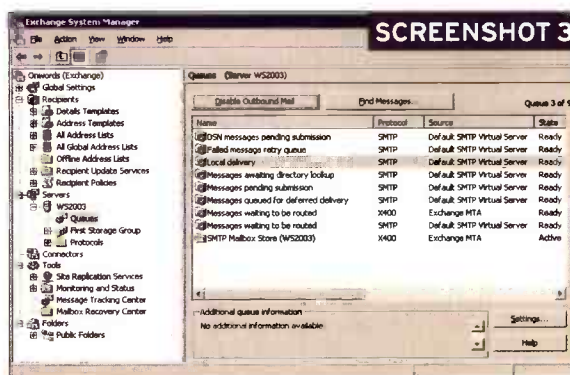
Some care is needed though, if these solutions are proposed as suitable for the smaller organisation. Exchange is often recommended this way and is included as part of the Windows Small Business Server package. However, I don't subscribe to the theory that it's a one-size-fits-all solution. Indeed, when it comes to the SME market, the Microsoft server has several major drawbacks, not least of which is its high buy-in price compared to some of the alternatives.

The basic Exchange Server 2000 package, for example, starts at around £900 ex VAT just for the server software with only five client licences. A similar-sized Windows-based SMTP mail server, on the other hand, can be had for around £100 ex VAT. Some vendors even make their software available free of charge, such as Ipswitch (www.ipswitch.com), which recently released IMail Express, a freely downloadable 10-user implementation of its Windows SMTP/POP3/IMAP4 mail server (see screenshot 4).

The second drawback with Exchange is that, because it offers a lot of functionality beyond basic messaging, the amount of setup and management effort required can be an issue for the smaller company. But that doesn't mean I won't be including Exchange in this series of articles on email servers; starting next month, I will be looking at a couple of simpler and cheaper generic SMTP solutions which I think are better suited to SME deployment.

CONTACTS

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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

Obey the rules or pay the price

A lottery problem and Access tables show the value of following database theory

If there is a moral to this month's column, it might be: 'The rules of good database design must be obeyed – whether you are a database or a database engine designer.'

But to be that dogmatic is, I believe, to start confusing function and form ('form' here being used in the non-database sense of 'appearance'). The relational rules are worth obeying, not simply because they are a set of rules, but because following them usually brings more gain than pain. If this is not the case, we should abandon the rules. We create and then obey them for our benefit, not the system's.

But when they are broken it often leads to tears.

It's a lottery...

For Camelot, the mechanics of running the lottery is about trying to choose a random set of six balls from a set of 50. By contrast, for most of the people who buy a ticket, the mechanical work is all about matching sets of numbers. Take Ian Bruce's mother, for example. She does 15 rows on the Irish lottery for friends and family, and 10 rows on the English one. Every Wednesday and Saturday night she checks them with a fine-tooth comb; Ian wants to automate this for her in Access.

At first it seems like a simple problem. Databases are very good at matching numbers, so all you need is something like table 1 to hold your guesses. Then you can perform a match against table 2 that holds the answer. This can be achieved using SQL like that in figure 1.

But you realise that the problem is worse than it seems because nothing matches, despite there being a match between five of the six numbers in

TABLE 3

GuessNo	BallNo
1	4
1	9
1	17
1	21
1	25
1	33
2	7
2	12
2	21
2	31
2	41
2	42
3	9
3	17
3	30
3	37
3	40
3	41

TABLE 4

DrawDate	BallNo
20/09/03	7
20/09/03	17
20/09/03	30
20/09/03	32
20/09/03	40
20/09/03	43

TABLE 1

GuessNo	BallNo1	BallNo2	BallNo3	BallNo4	BallNo5	BallNo6
0	23	25	27	29	31	33
1	3	4	12	17	23	45
2	2	6	12	24	32	43
3	5	6	7	12	17	50
4	1	2	4	6	17	50

TABLE 2

ResultNo	BallNo1	BallNo2	BallNo3	BallNo4	BallNo5	BallNo6
1	1	5	6	7	12	17

your third guess. The problem is that they are in the wrong columns. In case you were wondering, substituting OR for AND in the SQL doesn't help. (Both versions are given in the lottery.mdb file downloadable from www.penguinsoft.co.uk).

The problem lies in the fact that I have structured the data badly. In fact I have broken one of the fundamental relational rules; these tables are not even in first normal form because the same type of data is being stored in several columns.

In the lottery, you choose six numbers out of a set of 50. Each number is of equal 'importance', yet I am choosing to store them in different columns as if there is some fundamental difference between them. Each number chosen is an identical attribute of a guess and good database design practice suggests that identical attributes should be stored in the same column.

Having broken a fundamental rule, I'm now paying the price, because the data is difficult to query. For example, I can query this table but the SQL is horribly complicated (see figure 2).

The three lines in this code are repeated for each of the remaining five balls, so imagine a further 15 lines of SQL, finished off with...

```
AS Count, GuessNo FROM Guesses1;
```

(Key: ✓ code string continues)

The alternative is to restructure the data in line with good database practice, whereupon the SQL becomes easy.

Incidentally, I'm not trying to convince you that the correct data structure is intuitively easy to develop (I think that for many people the above solution is the intuitively obvious one); I'm trying to convince you that database theory often points us in the correct direction for a good solution.

So, how do we structure the data so that it obeys the rule? I've created two tables, called Guesses and Results – guesses looks like table 3. It contains six numbers for each of three guesses. All the ball numbers appear in a single column and so each is given equal 'importance'. The Results table looks like table 4.

GuessNo	CountOfBallNo
1	1
2	1
3	3

The answer table generated by our query: the third guess was the best, containing three correct numbers

Now we need a query to look at the ball numbers in the Results table and compare them with those in the Guesses table. Every time a match is found, a new row is generated and then these are grouped by the guess number and the number of matches for each guess is counted.

The SQL we need is in figure 3 and the outcome of our guesses are shown in screenshot 1.

Our third set of numbers scored three hits but the first two sets only scored one hit each. Oh well, there's always next week.

For a form view of the results, you can build a form based upon the Matches query and set the Default View property of the form to Continuous Forms. Play with the layout and fonts to give a clear picture and that's it.

Of course, this solution gives just the bare essentials and is tweakable in many ways. You could, for instance, store the results from multiple draws and track the success of your guesses over time.

If, like Ian's mum, you indulge in two lotteries, simply build another pair of tables and a query. Checking to see if your ship has come in is then a matter of typing in the winning numbers and running the queries.

That said, I am well aware that the lottery is a serious business with the potential to win you several million pounds. Any database solution for a multimillion pound business is extensively error checked: the solution shown above has had none. It isn't provided as a guaranteed method of matching lottery numbers but as an example of how to tackle a particular class of database problem.



FIG 1

```
SELECT Guesses1.BallNo1, Guesses1.BallNo2, Guesses1.BallNo3, Guesses1.BallNo4,
Guesses1.BallNo5, Guesses1.BallNo6
FROM Guesses1
INNER JOIN Results1 ON (Guesses1.BallNo6 = Results1.BallNo6)
AND (Guesses1.BallNo5 = Results1.BallNo5) AND (Guesses1.BallNo4 = Results1.BallNo4)
AND (Guesses1.BallNo3 = Results1.BallNo3) AND (Guesses1.BallNo2 = Results1.BallNo2)
AND (Guesses1.BallNo1 = Results1.BallNo1);
```

FIG 2

```
SELECT DISTINCTROW
iif((select BallNo1 from Results1)=BallNo1,1,iif((select BallNo1 from Results1)=BallNo2,1,
iif((select BallNo1 from Results1)=BallNo3,1,iif((select BallNo1 from Results1)=BallNo4,1,
iif((select BallNo1 from Results1)=BallNo5,1,iif((select BallNo1 from
Results1)=BallNo6,1,0)))))) +
```

FIG 3

```
SELECT [Guesses].[GuessNo], Count([Results].[BallNo]) AS CountOfBallNo
FROM Guesses INNER JOIN Results ON [Guesses].[BallNo]=[Results].[BallNo]
GROUP BY [Guesses].[GuessNo];
```

(Key: ✓ code string continues)

Table trouble

When is a table not a table? When the table is held by Access.

Before we start, remember that I love Access dearly. This is not to be read as a vitriolic attack on what is one of my favourite database engines (and may well be yours), but at the same time I think the design team at Microsoft has lost the relational design plot in this instance.

Relational database practice is based around the concept that data is stored in simple, two-dimensional tables. These have rows and columns and the data is at the intersections. The model actively separates the data containers (tables) from extraction, interpretation and translation mechanisms (queries, forms and reports). This separation allows us, for example, to change the presentation without changing the data structures. Not so in Access tables.

You can see in screenshot 2, in the column labelled Employee, I have been able to pop down a combo box which allows me to select a value for this field – a lookup field. These were clearly introduced into Access tables with the best of intentions. They ensure that instead of an abstract foreign key value we see, in this case, the employee's name.

But the table is no longer a simple structure, the model is broken, and pain follows close behind – more than enough, in my opinion, to outweigh the gain.

We can ask 'What is really being stored in the EmployeeID field; is it text or a foreign key value?' One answer is to run a query against this table, such as:

```
SELECT Orders.OrderID,
Orders.EmployeeID
FROM Orders
```

which returns:

Query1

Order ID	Employee
10248	Peacock, Margaret
10249	Suyama, Michael
Etc	Etc

That implies the field is of data type text. So you would expect this SQL statement to run successfully.

```
SELECT OrderID, EmployeeID
FROM Orders
WHERE EmployeeID=
"Peacock, Margaret";
```

But it doesn't; not even if you build it with Access' query builder. The statement you need is:

```
SELECT OrderID, EmployeeID
FROM Orders
WHERE EmployeeID=4;
```

This works because EmployeeID is a numeric field, despite every other indication that you've been given by Access (see screenshot 3).

The pain is that as soon as you start to build queries against this table, you have to understand not only primary and foreign keys, but also the very mechanism that's supposed to be shielding you from the complexity of primary and foreign keys.

And if you don't understand what

Lookup looks
friendly enough

SCREENSHOT 2

Order ID	Customer	Employee
10248	Wilman Kala	Peacock, Margaret
10249	Tradição Hipermercado	Suyama, Michael
10250	Hanari Carnes	Peacock, Margaret
10251	Victuailles en stock	Callahan, Laura
10252	Suprêmes délices	Davolio, Nancy
10253	HILARIÓN-Abastos	Dodsworth, Anne
10254	Chop-suey Chinese	Fuller, Andrew
10255	Richter Supermarkt	King, Robert
10256	Wellington Importadora	Leverling, Janet
10257	HILARIÓN-Abastos	Peacock, Margaret
10258	Ernst Handel	Suyama, Michael
10259	Centro comercial Moctez	Peacock, Margaret
10260	Old World Delicatesser	Peacock, Margaret

Record: 3 of 630

SCREENSHOT 3

Field Name	Data Type	Description
OrderID	AutoNumber	Unique order number
CustomerID	Text	Same entry as in Customers table
EmployeeID	Text	Same entry as in Employees table
OrderDate	Date/Time	
RequiredDate	Date/Time	
ShippedDate	Date/Time	
ShipVia	Number	Same as Shipper ID in Shippers
Freight	Currency	
ShipName	Text	Name of person or company to whom order is sent
ShipAddress	Text	

Field Properties

General | Lookup

Field Size: Long Integer

Format: Auto

Decimal Places: Auto

Input Mask: Employee

Caption: Employee

Default Value: No

Validation Rule: No

Validation Text: No

Required: Yes (Enforces O/R)

Indexed: No

EmployeeID is actually a numeric field

is happening, you will be even more confused when you use a query to sort on EmployeeID:

```
SELECT OrderID, EmployeeID
FROM Orders
ORDER BY EmployeeID;
```

because, although the employee names appear in the answer table, they will seem to be randomly ordered because they are being sorted on the underlying numeric values.

It gets worse. What happens if you upsize this table into a proper client/server database? No matter which database engine you upsize to (SQL Server, Oracle, DB2) the data suddenly reverts to numeric. This means if you upsize a complex Access database with many lookup fields, your interface is likely to need substantial redesign. For example, forms that used to show employee names as text suddenly start showing numeric values, combo boxes fail to proceed and existing queries start to return different data.

I heartily applaud the addition of functionality that helps people trying to get to grips with relational database design. But tables are supposed to be simple repositories of data, nothing more. Forms and queries are there to interpret and transpose data. Lookup fields blur these elegant and necessary distinctions, and that is not to our long-term advantage. (The so-called subdatasheets that have appeared in tables cause exactly the same sort of havoc.)

The big problem here is that the Access development team has embedded interpretation capabilities into tables and it doesn't belong there. Superficially it looks as if it helps; in practice it is an accident waiting to happen. Just say 'no'.

CONTACTS

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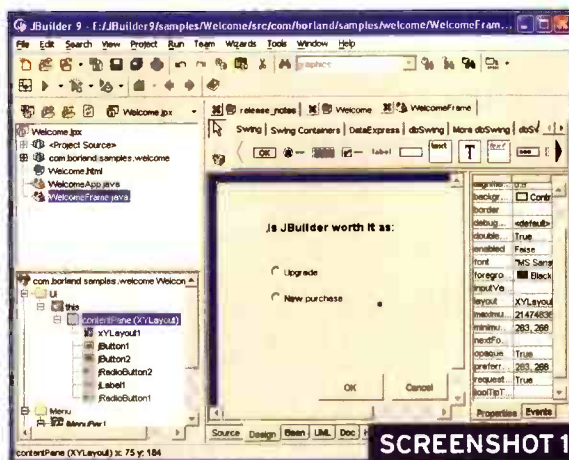
Jbuilder marches on

What's new in Jbuilder, plus the future of Visual Studio and listing files in Excel with VBA

Borland's first Jbuilder release came out long after Delphi, yet Jbuilder is now at version 9.0 while Delphi has only reached 7.0. The reason is Jbuilder's rapid release cycle, which Borland claims is needed to keep pace with Java's evolution. The rationale is unconvincing, since Borland could release updates to Jbuilder without forcing developers to purchase an entirely new version. It means the only sensible way to keep up with Jbuilder is via a subscription, which perhaps is Borland's real motivation.

One of the biggest changes is in the different editions on offer. In previous versions, the SE edition lacked important features, while the high-priced Enterprise version was poor value for developers not requiring application server support. Jbuilder 9.0 introduces the Developer edition, which includes features supporting XML, database work, JSP and servlets, and J2ME for mobile devices. Extras in the Enterprise version are mostly to do with EJB (Enterprise Java Beans) and UML modelling, which are properly classed as Enterprise features. However, web services are not a feature of Developer – a shame, because web services are useful for development on any scale. But this is Java, so there's nothing to stop Jbuilder Developer users from downloading Apache Axis and using Web Services; it is only the wizards and tools that are lacking.

When it comes to new features, Jbuilder 9.0 is thin. The product installs a huge set of Java libraries, many of them open-source offerings, and these have been updated to recent versions. There are new features in the core Jbuilder product, but they can't be called major. For example, you can now insert macros into code templates, such as `$CurrentMethod`, which will automatically be replaced by the name of the current method when the template is used. It's useful, but not worth upgrading for. The reason is that Borland's focus is on what the company calls Application Lifecycle Management. This embraces requirements analysis, modelling, source-code management and profiling, as well as writing code. The modelling area is interesting, since Borland's acquisition of TogetherSoft brought in one of the best modelling and code visualisation tools. Borland is busy integrating Together's technology



Jbuilder 9.0 is excellent, but has little changed from previous versions

with a range of products, including Jbuilder, Delphi and C#Builder. A marketing slide describes Jbuilder 9.0 as 'the developer gateway into ALM for Java', which sums it up well.

Clearly, Borland wants users to buy into its entire platform. But where does this leave smaller-scale developers, from creative individuals through to those developing for departments or small businesses? Jbuilder 9.0 is good value without a previous version, but can't be justified as an upgrade, whereas Microsoft's Visual Studio .Net is typically current for two years, or intermediate releases like Visual Studio 2003 are at nominal cost. In the Java world there is a great range of free tools such as the IBM-sponsored Eclipse or Sun One Community Edition. Jbuilder has a Personal edition, but it is not licensed for deployment, so it is only useful for learning.

C# and VB.Net futures

At this year's Tech Ed we quizzed Microsoft on where, from the developer's perspective, .Net is going.



Tony Goodhew,
product manager
for the .Net
Framework,
expounds the
future of .Net at
Tech Ed Europe

One thing is clear: Microsoft does regard .Net as the future of Windows programming, and in Longhorn (previewed in *PCW*'s August edition) .Net will be more deeply embedded into the Windows API. At long last, Microsoft itself is releasing .Net applications, such as the next version of SQL Server, codenamed Yukon, which uses .Net for its management tools as well as supporting stored procedures in C# and VB.Net. This is good, because it means there is pressure for improved performance and quality from teams within Microsoft, as well as from third-party developers. Yukon is likely to be released in the second half of 2004, with a new release of Visual Studio codenamed Whidbey. The versions of C# and VB.Net in Whidbey will have new features. One of these is generics, which is the ability to use types as parameters. For example, you can have a collection class that accepts a type in its constructor. Instances of the class are strongly typed collections of this type, so one instance might be a collection of integers, another a collection of floats.

The next version of VB.Net focuses on ease of use. Edit and continue is returning, which means you can run a debug build, break into the debugger, edit the code, and continue with the change in place. This is a much-missed feature of VB 6.0. There will also be simplifications of things that have tripped up developers in VB.Net. These include reading and writing files, printing, and ensuring objects get disposed of correctly. Finally, database programming will be easier. ADO.Net works well, but it presents a complex set of objects and fails to provide truly rapid application development. A new `dbTable` class will combine features of the existing `datatable`, connection and command objects with built-in support for common tasks like queries, updates and conflict resolution. The idea is to bring back the power of the ADO recordset type without losing the advantages of ADO.Net. With the .Net integration in Yukon, this might tempt database programmers into working with the .Net languages.

Check your owner

There is a curious problem you can run into with Windows Forms in Visual Studio .Net. You build an application which opens various windows, some of which raise modal dialogues. With



FIG1

Code to index a directory tree

```
'module-level variable
Dim jCount As Integer

Sub ListFiles()
Dim sFolderName As String
Dim fso As FileSystemObject
Dim fld As Folder
Dim subfld As Folder
Dim f As File

jCount = 1

Cells(1, 1).Value = "Folder"
Cells(1, 2).Value = "Filename"
Cells(1, 3).Value = "Last Modified"

'set this to the folder you want to search
sFolderName = "e:\documents and settings\tim\my\
documents"
```

```
Set fso = CreateObject("Scripting.FileSystemObject")
```

```
Set fld = fso.GetFolder(sFolderName)
```

```
For Each subfld In fld.SubFolders
'search each folder recursively
ListTheFiles subfld
Next subfld
```

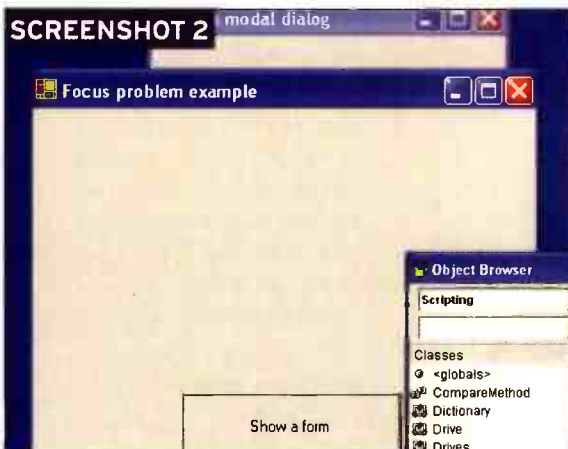
```
End Sub
```

```
Sub ListTheFiles(fld As Folder)
Dim f As Scripting.File
```

```
For Each f In fld.Files
jCount = jCount + 1
Cells(jCount, 1).Value = f.Path
Cells(jCount, 2).Value = f.Name
Cells(jCount, 3).Value = f.DateLastModified
Next f
```

```
End Sub
```

(Key: ✓ code string continues)



Left: This shows how a modal dialogue can appear behind another form. If hidden completely, the application is frozen unless the user presses Alt & Tab

The FileSystemobject is the easiest way to work with file listings in VB

one of these modal forms open, your user switches applications, then clicks the taskbar to return to the .Net application. But the modal dialogue can appear behind the main form. From the user's point of view it has frozen solid, unless they try Alt & Tab to bring the dialogue to the front (see screenshot 2).

The key to fixing this is the Owner property – part of the Windows API. Owned forms have three traits: they are always in front of their owner; they are destroyed when their owner is destroyed; they are minimised when their owner is minimised. So if your application displays several windows, which you want to float independently as if they were separate applications, they should not be owned forms. Windows should normally have the application's main form as the owner. In general, programming languages have some way of setting a form's owner. In Delphi you pass the owner to the form's constructor, while in VB 6 the Show method has an optional ownerform argument. However, neither Delphi nor VB 6 allows modal forms to appear behind other forms.

In .Net this occurs easily: simply have a form display a non-modal form, then have that non-modal form display a modal form. By default, all three forms appear in the taskbar. Clicking any of these brings it to the front, even though the modal form prevents you doing anything with the others. If Showintaskbar is set to False on these secondary forms, then you can get an apparently frozen application.

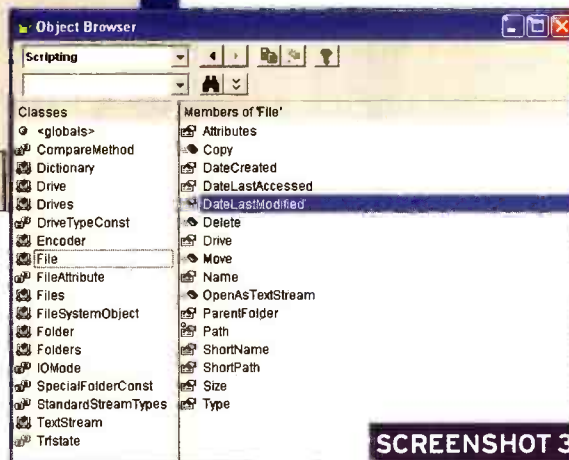
One solution is to make the main form the owner of the secondary forms, by explicitly setting their Owner property in code. Another is to pass the main form as an argument to Showdialog. Curiously, you may need to do this even if the form to be shown already has an owner. Whether this is a bug is a matter for debate, but

.Net can easily fox developers who do not realise the significance of Owner.

Listing files

Reader Anthony Prince asks: 'I work on a project where large numbers of files are created by team members. Files accumulate in a number of sub-folders under the project root folder, for exampleProjectRoot\Phase3\Costs etc. How do I create a macro to index all files under a given Projectroot into an Excel spreadsheet? Ideally each row of the spreadsheet contains details of a single file; and the columns contain various properties of the file (parent directory, date last modified, file type, author, keywords, hyperlink to access the file directly, etc).'

VBA in Office includes a Filesearch object that lets you search folders and read back the results, although it doesn't expose all the attributes. An alternative is the FileSystemobject, part of the Scripting library installed in all recent versions of Windows (see screenshot 3). You can use this from VB or VBA. First use VB's Tools – References dialogue to set a reference to the Microsoft Scripting Runtime. Now you can run code as shown in figure 1. You can get other information from the File object, including attributes such as read-only, archive status, short name and more. As with all code that traverses a tree, use recursion to ensure that you drill down as far as is necessary through folders and sub-folders. For information on Jbuilder 9.0, see www.borland.com.



SCREENSHOT 3

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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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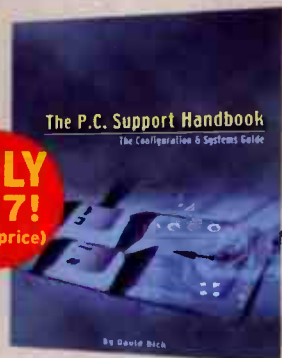


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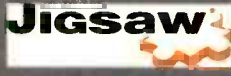
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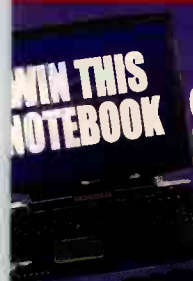
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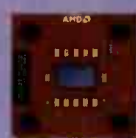


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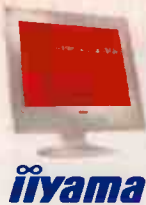
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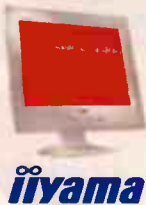
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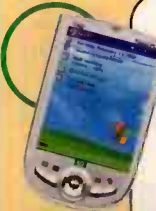
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2D5CPW	Powershot A70	257.32	219.00
2557PW	Ixus V3	345.00	293.62
2F7CPW	S50	475.87	405.00
25KHPW	Powershot C3	522.87	445.00
FUJIFILM			
244FPW	Finepix A202	128.00	108.94
244HPW	Finepix A205	182.12	155.00
14CHPW	Finepix 2800 Zoom	245.57	209.00
221TPW	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
298BPW	735 Digital Camera 3.2MP	169.00	143.85
24YYPW	Photosmart 850 Cam with Dock	339.98	289.35
KODAK			
2FG4PW	Easyshare DX6340	245.57	209.00
2FCRPW	EasyShare LS633	276.12	235.00
NIKON			
1YJWPW	Coolpix 2500	276.12	235.00
27TNPW	Coolpix 3500	351.32	299.00
SONY			
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2CWNPW	DSC-P52 Cyber-shot	199.99	170.21
2D39PW	DSC-P72 Cyber-shot	242.99	206.80
2FC9PW	DSC-P8 Cyber-shot	305.00	259.58
2FC8PW	DSC-P92 Cyber-shot	347.00	295.32
2FCBPW	DSC-P10 Cyber-shot	389.00	331.07
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quicklink	HP	inc VAT	ex VAT
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2P4TPW	Compact Flash 1GB 32X	186.00	158.30
2P4ZPW	Compact Flash 2GB 40X	418.00	355.75
28C3PW	Memory Stick 128MB	32.50	27.66
2P51PW	Memory Stick 256MB Pro	61.50	52.34
2P53PW	Memory Stick 512MB Pro	162.00	137.88
2P54PW	Memory Stick 1GB Pro	325.00	276.60
28FXPW	Smart Media 128MB	22.50	19.15
28COPW	XD Picture Card 128MB	34.00	28.94
2FZ4PW	XD Picture Card 256MB	82.00	69.79
28C3PW	MultiMedia Card 128MB	31.50	26.81
28C5PW	Secure Digital 128MB	32.00	27.24
28C8PW	Secure Digital 256MB	53.50	45.54
28C9PW	Secure Digital 512MB	181.00	154.05
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J7KPW	64MB Memory Stick	35.00	29.79
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2973PW	i950	276.12	235.00
205MPW	i70	222.07	189.00
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2113PW	C42UX	51.70	44.00
2310PW	C62	69.32	59.00
2577PW	C82	90.47	77.00
241VPW	Photo 830	86.95	74.00
257GWP	Photo 915	130.42	111.00
257JPW	Photo 925	173.90	148.00
1YRQPW	Photo 950	304.32	259.00
2113PW	Photo 2100	521.70	444.00
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24YNPW	Photosmart P7550	229.00	194.90
22YKWP	Photosmart P7150	115.00	97.87
256NPW	Photosmart P230	135.12	115.00
241JPW	Deskjet 6122	134.00	114.04
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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

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10GNPW	HL1440	175.07	149.00
10GTPW	HL1470N	346.62	295.00
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2114PW	EPL-6100	249.10	212.00
2B92PW	EPL-6100L	158.62	135.00
KYOCERA			
20NNPW	FS-1010	229.12	195.00
20FPWP	FS-1900D	504.07	429.00
LEXMARK			
107SPW	E210	163.32	139.00
13LGPW	E320	233.82	199.00
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2CTHPW	B4200	245.57	209.00
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2270PW	Pagepro 1200W	158.62	135.00
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2889PW	Lide 50	96.35	82.00
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24N4PW	8000F	193.87	165.00
20XJPW	9900F	287.87	245.00
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24LXPW	Perfection 1260	70.50	60.00
2445PW	Perfection 1660 Photo	131.60	112.00
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24VXPW	Scanjet 5500C	229.12	195.00
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1774PW	FilmScan 3600	433.57	369.00
UMAX			
11HXPW	Astra 4450	118.67	101.00
28MOPW	Astra 6700	137.47	117.00

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2803PW	OfficeJet 5110	158.62	135.00
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20CHPW	PSC 1205	92.82	79.00
21X2PW	PSC 2110	139.99	119.14
2HY2PW	PSC 2175	195.00	165.96
24YRPW	PSC 2210	219.00	186.39
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The new MFC-4820C is a combined colour printer, copier, scanner & fax. It also incorporates additional features such as telephone, answering machine and photo capture centre.

£233.82 inc
£199.00 exc

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Transform your home or office into a wireless network.

- USB Solution Provides Mobility
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P706 PhotoJet Printer

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- Up to 4800 x 1200dpi photo quality resolution
- Prints 4"x6" photos in 60 seconds
- PrecisionSense™ Technology

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£54.00 exc

Samsung ML1210 Laser Printer

quicklinx 1YHCPW

www.dabs.com/samsung



The Samsung ML-1210 brings a new level of performance to the home or small office. Its 12 ppm engine and 66MHz CPU deliver a faster printing speed than ordinary laser printers in its class. With its 600 dpi resolution, the ML-1210 produces a sharp output.

- 12ppm, 600 x 600dpi
- 8MB
- USB/Parallel

BONUS points /AIR MILES!

£99.00 inc
£84.00 exc

QUICKLINX	SAMSUNG	INC VAT	EX VAT
23TPW	ML1210/1250 Toner	43.47	37.00

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GeForce Ti 5200 cards from £50.00 (£42.56)

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2DBXPW	Radeon 9000 DVI VO 64MB	46.50	39.58
2G9YPW	Radeon 9200 DVI VO 128MB	59.00	50.22
2LJMPW	Radeon 9600 DVI VO 128MB	94.50	80.43
2LJNPW	Radeon 9600 Pro DVI VO 128MB	134.00	114.05
2MYSPW	Radeon 9800 Pro DVI VO 256MB	370.00	314.90
CREATIVE			
2DBXPW	Radeon 9000 DVI VO 64MB	46.50	39.58
2G9YPW	Radeon 9200 DVI VO 128MB	59.00	50.22
2LJMPW	Radeon 9600 DVI VO 128MB	94.50	80.43
2LJNPW	Radeon 9600 Pro DVI VO 128MB	134.00	114.05
2MYSPW	Radeon 9800 Pro DVI VO 256MB	370.00	314.90
GAINWARD			
2MBSPW	ULTRA/760 TV-DVI 128MB	134.00	114.05
2MBGPW	ULTRA/760 TV-DVI 256MB	149.00	126.81
2MBGPW	ULTRA/760 XP "CS" 128MB	213.00	181.28
2MBJPW	ULTRA/780 XP "Pro" 256MB	223.00	189.79
2MFXPW	ULTRA/1200 XP "CS" 128MB	366.00	311.49
2MFPWP	ULTRA/1600 XP "CS" 256MB	465.00	395.75
2MGCPW	COOL FX ULTRA/1600 XP "CS" 256MB	599.00	509.79
LEADTEK			
2MBSPW	ULTRA/760 TV-DVI 128MB	134.00	114.05
2MBGPW	ULTRA/760 TV-DVI 256MB	149.00	126.81
2MBGPW	ULTRA/760 XP "CS" 128MB	213.00	181.28
2MBJPW	ULTRA/780 XP "Pro" 256MB	223.00	189.79
2MFXPW	ULTRA/1200 XP "CS" 128MB	366.00	311.49
2MFPWP	ULTRA/1600 XP "CS" 256MB	465.00	395.75
2MGCPW	COOL FX ULTRA/1600 XP "CS" 256MB	599.00	509.79
MSI			
2M5JPW	GeForce FX5200 VO 128MB	56.00	47.66
2M5KPW	GeForce FX5200 DVI VO 128MB	65.50	55.75
2M5NPW	GeForce FX5600 DVI VO 128MB	121.00	102.98
2M5PPW	GeForce FX5600 DVI VO 256MB	136.00	115.75
2M5QPW	GeForce FX5600 DVI VO 128MB	129.00	109.79
2MTDPW	GeForce FX5900 DVI VO 128MB	294.00	250.22

Sound Cards

quicklink	CREATIVE	inc VAT	ex VAT
13QVPW	SoundBlaster 5.1 Digital	25.50	21.70
18C2PW	SB Exigy	125.01	104.69
2LJTPW	SB MP3+ USB	33.50	28.51
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
PHILIPS			
2FR2PW	Dynamic Edge 4.1 Channel Retail	26.50	22.56
2FR1PW	Sonic Edge 5.1 Channel Retail	35.50	30.22
12LQPW	Acoustic Edge 5.1 Channel Retail	59.50	50.64
PURE DIGITAL			
282YPW	SonicXplosion RP	40.50	34.47
283CPW	SonicXplosion DVD RP	61.00	51.92
TERRATEC			
11RTPW	128i PCI	15.00	12.77
28B9PW	Aureon 5.1 Fun	26.00	22.13
28BCPW	Aureon 5.1 Sky	80.00	68.09
28BDPW	Aureon 7.1 Space	107.00	91.07
21R2PW	DMX 6Fire 24/96	159.00	135.52

DVD Drives

quicklink	AOPEN	inc VAT	ex VAT
X09PW	DVD-1648 Bonus IDE 16x DVD 48x CD	23.00	19.58
OMEGA			
2MSSPW	32700 IDE DVD+-R/RW	175.00	148.94
LITE-ON			
2533PW	LTD-165 OEM IDE 16x DVD 48x CD	24.15	20.56
24G7PW	LTD-165 Retail IDE 16x DVD 48x CD	25.00	21.28
2PFBPW	LDW-4015 Retail IDE DVD+-R/RW 4x	127.00	108.09
INITSUMI			
2H34PW	DM2000TIE OEM IDE 16x DVD 50x CD	30.50	25.96
2FTOPW	DW7081TIE IDE DVD+-R/RW 4x	163.00	138.73
PANASONIC			
2FMKPW	LFD-521E IDE DVD-RAM+-R/RW	175.00	148.94
PHILIPS			
2MF6PW	DVDRW416K/00 IDE DVD+-R/RW 4x	171.00	145.54
PLEXTOR			
2FQYPW	PX-504A IDE DVD+-R/RW	180.00	153.20
PIONEER			
2DH6PW	DVD-120 IDE 16x DVD 40x CD	28.00	23.83
2G9FPW	DVD-120S IDE 16x DVD 40x CD	30.50	25.96
2NBSPW	DVR-106 IDE DVD+-R/RW 4x	147.00	125.11
2NB6PW	DVR-A06 IDE DVD+-R/RW 4x	187.00	159.15
TDK			
2NPPPW	DVW-A04021N IDE DVD+-R/RW	194.00	165.11
TOSHIBA			
2CSKPW	SD-M1612 Black IDE 16x DVD 48x CD	32.50	27.66
288CPW	SD-M1712B IDE 16x DVD 48x CD	32.00	27.24
2DH7PW	SD-M1712KIT IDE 16x DVD 48x CD	39.50	33.62
291HPW	SD-R5002B IDE DVD-R/RW	145.00	123.41
291JPW	SD-R5002K IDE DVD-R/RW	169.00	143.83

GeForce FX 5900 Ultra 256MB VIVO

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quicklink	PNY TECHNOLOGIES GeForce/4	inc VAT	ex VAT
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2HNSPW	FX5200 2xVGA VO PCI 128MB	80.50	68.51
2HNTPW	FX5200 2xVGA VO ACP 128MB	63.50	54.05
2LH6PW	FX5200 Ultra DVI VO ACP 128MB	105.00	89.37
2LH7PW	FX5600 DVI VO ACP 256MB	146.00	124.26

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quicklink	DABSVLUE GeForce	inc VAT	ex VAT
2H2FPW	FX5200 DVI VO 64MB ACP	47.50	40.43
2CM9PW	FX5200 DVI VO 128MB ACP	50.00	42.56
2H2CPW	FX5200 Ultra DVI VO 128MB ACP	110.00	93.61
2H2JPW	FX5600 DVI VO 128MB ACP	105.00	89.36
2H2LPW	FX5600 DVI VO 256MB ACP	125.00	106.38
2H2MPW	FX5600 Ultra DVI VO 128MB ACP	149.00	126.80
DABSVLUE Radeon			
2HMVPW	9200 DVI VO 128MB DDR ACP	58.00	49.37
2HMPW	9600 Pro DVI VO 128MB DDR ACP	129.00	109.78
2HN4PW	9800 Pro DVI VO 128MB DDR ACP	289.00	245.96
2HNSPW	9800 Pro DVI VO 256MB DDR ACP	379.00	322.56

3D Blaster 5 FX 5900 256Mb

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CREATIVE

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- AGP 8X support
- Memory configuration 256MB of DDR

SB Audigy 2 Platinum Ex

quicklink **2DH5PW**

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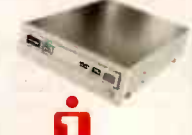
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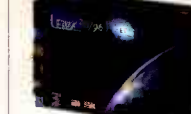
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quicklink	IOMEGA	inc VAT	ex VAT
2B07PW	ZipCD 48x48x24x USB 2.0	82.00	69.79
2FV6PW	CDRW 52x52x24x USB 2.0	110.00	93.62
2C38PW	Predator 40x40x12 USB 2.0	91.00	77.45
2M55PW	DVD+-R/RW Int IDE Retail	175.00	148.93

Premium/T3 CDRW 52X52X32 Int IDE RP

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2C6RPW	D2 52x52x24x USB 2.0	92.82	79.00
2B7SPW	D2 52x52x24x USB 2.0 • Firewire	116.32	99.00
29WNPW	PocketDrive 24x24x10x Firewire	139.82	119.00
2DN9PW	PocketDrive 24x24x10x USB 2.0	139.82	119.00

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quicklink	AOPEN	inc VAT	ex VAT
12NTPW	CD-956E PRO Retail IDE Fifty Six ARCHOS	14.50	12.34
2MRCPW	500002 MiniCD 24x PCMCIA TwentyFour	85.00	72.34
2MRLPW	500003 MiniCD 24x USB TwentyFour	72.00	61.28
12OSPW	CD-5520 IDE Fifty Two LITEON	16.00	13.62
2179PW	LTN-5265-02VVC IDE Fifty Two MITSUMI	14.00	11.92
17NXPW	FX-5410 OEM IDE Fifty Four MSI	15.00	12.77
2M3PPW	CS2 IDE Fifty Two	13.50	11.49
2M3QPW	CS2-Black IDE Fifty Two PLEXTOR	14.00	11.92
2LSHPW	PX-54TA/T3 IDE Fifty Four	19.50	16.60
2LSJPW	PX-54TA/T3BP IDE Fifty Four	19.00	16.17
2LSLPW	PX-54TA/T3BP IDE Fifty Four SAMSUNG	19.00	16.17
2CZFPW	SC-152 Retail IDE Fifty Two SONY	14.00	11.92
150VPW	CDV-5211 52x OEM	17.62	15.00

CD-ReWriters

quicklink	AOPEN	inc VAT	ex VAT
2H2BPW	CRW5224 Chameleon IDE 52r 52w 24rw	36.00	30.64
2B8BPW	BHW-5224L Bonus USB 2.0 52r 52w 24rw	74.00	62.98
2J3BPW	COM4012 IDE 16xDVD 40r 40w 12rw ARCHOS	52.50	44.69
2MRCPW	500230/315 MiniCDRW USB2 24r 16w 10rw	85.00	72.34
2MRGPW	500367 CESAR USB2 24r 24w 10rw	136.00	115.75
2B8JPW	CRW-5224A IDE 52r 52w 24rw	31.00	26.39
2J6NPW	CRW-5224L/External USB2 52r 52w 24rw	70.50	60.00
2C8PPW	4816ARET IDE 48r 48w 16rw	34.50	29.37
2CPNPW	5224PRET IDE 52r 52w 24rw LITEON	38.50	32.77
2779PW	LTR-522465 Retail IDE 52r 52w 24rw	31.00	26.39
2FTLPW	LXR-40245A-06YC USB 2.0 40r 40w 24rw LG	74.00	62.98
2F8BPW	GCE-8520B8 OEM IDE 52r 52w 24rw	37.00	31.49
2GZBPW	GCE-8520B8 Retail IDE 52r 52w 24rw	40.50	34.47
2FCVPW	GCC-4480B8 OEM IDE 16xDVD 48r 48w 24rw	52.00	44.26
2GZRPW	GCC-4480B8 Retail IDE 16xDVD 48r 48w 24rw MSI	56.50	48.09
2M3KPW	CR52-A2 IDE 52r 52w 24rw	30.00	25.54
2M3LPW	CR52-A2-Black IDE 52r 52w 24rw PHILIPS	33.00	28.09
2B0SPW	RWDV5210K IDE 12xDVD 40r 32w 10rw	58.00	49.37
2CCTPW	R33RMDVX USB 2 12xDVD 40r 32w 10rw SAMSUNG	158.00	134.47
2D0LPW	SW-248BEA Black OEM IDE 48r 48w 16rw	34.50	29.37
2J1KPW	SW-252BEA Black OEM IDE 52r 52w 24rw	35.50	30.22
2FH0PW	SW-252BEA OEM IDE 52r 52w 24rw	35.00	29.79
2GZCPW	SW-252BEA RP IDE 52r 52w 24rw	37.50	31.92
2HTMPW	SM-352 Retail IDE 16xDVD 52r 52w 24rw	58.00	49.37
2M3ZPW	SM-352 OEM IDE 16xDVD 52r 52w 24rw	56.50	48.09
2M2BPW	SM-352 OEM Black IDE 16xDVD 52r 52w 24rw TEAC	56.50	48.09
2DH0PW	CD-W552E-002 OEM IDE 52r 52w 24rw	43.00	36.60
2DHGPW	CD-W552EX Retail IDE 52r 52w 24rw	44.00	37.45
2DHHPW	CD-W552PUK USB2 52r 52w 24rw	103.00	87.66
2DHJPW	CD-W224PUK USB2 24r 24w 10rw	113.00	96.17
2CZ4PW	SD-R1312K Retail IDE 16xDVD 40r 32w 12rw PLEXTOR Plextorwriter	63.00	53.62
252WPW	PX-W4824TA/EPK DE48r 48w 24rw	56.50	48.09
252XPW	PX-W4824TA IDE 48r 48w 24rw	61.50	52.34
2CHSPW	PX-W4012TS SCSI 40r 40w 12rw	193.00	164.26
2LSPW	Premium/T3B IDE 52r 52w 32rw	88.00	74.90
2LSTPW	Premium-L/T3UK USB2 52r 52w 32rw	150.00	127.66
1YL2PW	PX-520A IDE 12xDVD 40r 20w 10rw	92.00	78.30
1SR8PW	PX-588TU Retail USB 2.0 24r 8w 8rw	96.00	81.71
28M2PW	PX-W4824TU Retail USB 2.0 48r 48w 24rw SONY	118.00	100.43
2FCZPW	CD-RW 52x24x52 OEM Int	34.07	29.00
2N20PW	CD-RW 52x24x52 Int	42.30	36.00
2m86PW	CD-RW/DVD Combo Int	52.87	45.00

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- IDE rp
- Buffer Under Run Protection
- 80ms Access Time



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quicklink 2BR5PW

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- Installs in seconds
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quicklink 2PF9PW

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CD-R 52r52w32rw

quicklink 2H33PW

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215VPW	Celeron 1.8GHz S478 400MHz	56.00	47.66
245CPW	Celeron 2.0GHz S478 400MHz	58.50	49.79
2CBMPW	Celeron 2.1GHz S478 400MHz	64.00	54.47
2CBNPW	Celeron 2.2GHz S478 400MHz	66.00	56.17
2FHWPW	Celeron 2.3GHz S478 400MHz	66.50	56.60
2HNHPW	Celeron 2.4GHz S478 400MHz	74.50	63.41
2PFDPW	Celeron 2.5GHz S478 400MHz	78.00	66.39
2PFPPW	Celeron 2.6GHz S478 400MHz	90.50	77.03

ATA Hard Disks

quicklink	HITACHI/IBM Deskstar	inc VAT	ex VAT
2PH8PW	7K250 80 UDMA100 2Mb 7200	70.50	60.00
2PHDPW	7K250 120 UDMA100 2Mb 7200	91.50	77.88
2PHFPW	7K250 120 UDMA100 8Mb 7200	99.50	84.69
2PHMPW	7K250 160 UDMA100 2Mb 7200	127.00	108.09
2PHNPW	7K250 160 UDMA100 8Mb 7200	133.00	113.20
2PHQPW	7K250 250 UDMA100 8Mb 7200	261.00	222.13

quicklink	WESTERN DIGITAL	inc VAT	ex VAT
10M1PW	Caviar 20 UDMA100 2Mb 7200	43.50	37.03
10M3PW	Caviar 40 UDMA100 2Mb 7200	54.50	46.39
2552PW	Caviar 40 UDMA100 8Mb 7200	56.00	47.66
10M4PW	Caviar 60 UDMA100 2Mb 7200	59.50	50.64
2570PW	Caviar 60 UDMA100 8Mb 7200	66.50	56.60
10M5PW	Caviar 80 UDMA100 2Mb 7200	64.00	54.47
211KPW	Caviar 80 UDMA100 8Mb 7200	76.00	64.69
12N1PW	Caviar 120 UDMA100 2Mb 7200	85.00	72.34
18HFPW	Caviar 120 UDMA100 8Mb 7200	90.50	77.03
2N5BPW	Caviar 120 SATA150 8Mb 7200	108.00	91.92
12NMPW	Caviar 160 UDMA100 2Mb 7200	115.00	97.88
2172PW	Caviar 160 UDMA100 8Mb 7200	129.00	109.79
2571PW	Caviar 180 UDMA100 2Mb 7200	139.00	118.30
2572PW	Caviar 180 UDMA100 8Mb 7200	133.00	113.20
2573PW	Caviar 200 UDMA100 2Mb 7200	157.00	133.62
2575PW	Caviar 200 UDMA100 8Mb 7200	170.00	144.69
2G0KPW	Caviar 250 UDMA100 8Mb 7200	221.00	188.09
2N70PW	Caviar 250 SATA150 8Mb 7200	265.00	225.54
1GK2PW	Raptor 36 SATA150 8Mb 10000	117.00	99.58

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quicklink	IOmega	inc VAT	ex VAT
21FNPPW	20 USB 2	120.00	102.13
21FPPW	40 USB 2	147.00	125.11
21FRPW	40 FireWire	147.00	125.11
2HPDPW	40 USB 2	107.00	91.07
2HPCPW	80 USB 2	147.00	125.11
21FWPW	120 USB 2	175.00	148.94
21FXPW	120 FireWire	175.00	148.94
29WKPPW	D2 USB2 40GB	89.00	104.57
255KPW	D2 USB2 80GB	109.00	128.07
255LPW	D2 USB2 120GB	139.00	163.32
2G6LPW	D2 USB2 200GB	199.00	233.92
255QPW	D2 FireWire 120GB	144.00	169.85
2G6PPW	D2 FireWire 160GB	159.00	186.82
2G6LPW	D2 FireWire 200GB	209.00	245.57
2N9FPW	D2 FireWire 320GB	269.00	316.07

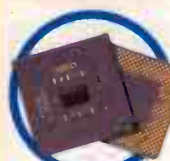
Flash Memory

quicklink	DABSVUE	inc VAT	ex VAT
2PFPPW	128Mb Compact Flash	18.00	15.32
2PFXPW	256Mb Compact Flash	39.00	33.20
2PFYFW	512Mb Compact Flash	80.00	68.09
2PFZPW	1GB Compact Flash	159.00	135.32
2DCPPW	128Mb Smartmedia	19.50	16.60
14JVPW	64Mb MMC	18.00	15.32
2B8FPW	128Mb MMC	35.00	29.79
2H6VPW	64Mb XD Picture Card	18.50	15.83
2H6WPW	128Mb XD Picture Card	35.00	29.79
2PL5PW	256Mb XD Picture Card	80.00	68.09
2B8PPW	64Mb Memory Stick	21.00	17.88
2B8RPW	128Mb Memory Stick	32.00	27.24
2PL6PW	256Mb Memory Stick Pro	60.00	51.07
2PL7PW	512Mb Memory Stick Pro	160.00	136.17
2PL3PW	1Gb Memory Stick Pro	320.00	272.34
153SPW	64Mb SD	18.00	15.32
153TPW	128Mb SD	30.00	25.54
2B8NPW	256Mb SD	50.00	42.56
2PL9PW	512Mb SD	220.00	187.24
2PB8PW	6 in 1 Card Reader	11.50	9.79
2NCFPW	32Mb Mini USB Drive	10.50	8.94
2NCHPW	64Mb Mini USB Drive	14.00	11.92
2NCLPW	128Mb Mini USB Drive	22.00	18.73
2NGNPW	256Mb USB Drive	40.00	34.05
2NGPPW	512Mb USB Drive	79.00	67.24
2NGQPW	1GB USB Drive	159.00	135.32
2NGRPW	64Mb USB2 Drive	16.00	13.62
2NGSPW	128Mb USB2 Drive	25.00	21.28
2NGTPW	256Mb USB2 Drive	45.00	38.30

AMD Athlon™ XP Processor

quicklink 2N72PW

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AMD Athlon™ XP word processor 3200+ 512Kb 400MHz - with QuantISpeed (tm) technology architecture powers the next generation of computing platforms.

quicklink	AMD Athlon™ XP	inc VAT	ex VAT
2BP4PW	1700+ 1.47GHz 256Kb 266MHz	36.50	31.07
2BP5PW	1800+ 1.53GHz 256Kb 266MHz	39.00	33.20
2BP7PW	2000+ 1.67GHz 256Kb 266MHz	46.00	39.15
21X3PW	2200+ 1.8GHz 256Kb 266MHz	51.00	43.41
24T9PW	2400+ 2GHz 256Kb 266MHz	59.50	50.64
2BP9PW	2600+ 2.08GHz 256Kb 333MHz	73.00	62.13
2B26PW	2700+ 2.17GHz 256Kb 333MHz	96.50	83.83
2CYCPW	2500+ 1.83GHz 512Kb 333MHz	67.50	57.45
2CYKPW	2800+ 2.08GHz 512Kb 333MHz	120.00	102.13
2CYLPW	3000+ 2.17GHz 512Kb 333MHz	186.00	158.30
2N71PW	A3000+ 2.1GHz 512Kb 400MHz	242.00	180.43
2N72PW	3200+ 2.2GHz 512Kb 400MHz	362.00	308.09

Intel® Pentium® 4 3.0 512KB 800Mhz

quicklink 2HNNPW

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quicklink	INTEL	inc VAT	ex VAT
2166PW	Pentium 4 2.40B 533Mhz	139.00	118.30
24SVPW	Pentium 4 2.67 533Mhz	164.00	139.58
24SYPW	Pentium 4 2.80 533Mhz	225.00	191.49
28UXPW	Pentium 4 3.06 533Mhz	330.00	280.86
2HNKPW	Pentium 4 2.4 800Mhz	153.00	130.22
2HNPW	Pentium 4 2.6 800Mhz	186.00	158.30
2HNMPW	Pentium 4 2.8 800Mhz	230.00	195.75
2HNNPW	Pentium 4 3.0 800Mhz	344.00	292.77
2PFGPW	Pentium 4 3.2 800Mhz	549.00	467.24

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quicklink	CRUCIAL MEMORY	inc VAT	ex VAT
1VWLPW	256Mb 184Pin DIMM PC2100 DDR RAM Non-Parity	CL2.5	
SHWLPW	256Mb 168Pin DIMM PC133 SDRAM Non-Parity	CL2	
SHHPW	128Mb 168Pin DIMM PC133 SDRAM Non-Parity	CL2	
17BJPW	512Mb 184Pin DIMM PC2100 DDR RAM Non-Parity	CL2.5	
SC7PW	128Mb 168Pin DIMM PC100 SDRAM Non-Parity	CL2	
SHV7PW	256Mb 168Pin DIMM PC133 SDRAM Non-Parity	CL3	

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quicklink 259XPW

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quicklink	MAXTOR DiamondMax Plus 9	inc VAT	ex VAT
24YDPW	Plus9 40.0 UDMA133 2Mb	41.71	49.00
24YFPW	Plus9 60.0 UDMA133 2Mb	48.09	56.50
24YHPW	Plus9 80.0 UDMA133 2Mb	54.05	63.50
259XPW	Plus9 80.0 SATA150 8Mb	67.24	79.00
259ZPW	Plus9 120.0 UDMA133 8Mb	73.62	86.50
2580PW	Plus9 120.0 SATA150 8Mb	83.83	98.50
2582PW	Plus9 160.0 UDMA133 8Mb	97.88	115.00
2583PW	Plus9 160.0 SATA150 8Mb	106.39	125.00
28UXPW	Plus9 200.0 UDMA133 8Mb	140.43	165.00
295VPW	MaxLine Plus II 250.0 UDMA133 8Mb	191.49	225.00
295XPW	MaxLine Plus II 250.0 SATA150 8Mb	202.56	238.00



Barracuda 7200.7 120GB SATA150 7200rpm

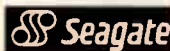
quicklink 2FZWPW

www.dabs.com/seagate



- 8MB Cache/Buffer Size
- 9.0ms Average Seek Time
- Interface Type Serial ATA-150

quicklink	SEAGATE U Series X/Barracuda	inc VAT	ex VAT
25DDPW	20 20 UDMA100 2Mb 5400	34.05	40.00
2CZ4PW	5400 40 UDMA100 2Mb 5400	41.28	48.50
2FZNPW	7200 40 UDMA100 2Mb 7200	42.56	50.00
2HT1PW	7200 60 UDMA100 2Mb 7200	48.09	56.50
2FZOPW	7200 80 UDMA100 2Mb 7200	52.34	61.50
2FZRPW	7200 80 SATA150 8Mb 7200	76.17	89.50
2FZSPW	7200 120 UDMA100 2Mb 7200	67.66	79.50
2FZVPW	7200 Plus 120 UDMA100 8Mb 7200	71.49	84.00
2FZWPW	7200 120 SATA150 8Mb 7200	85.11	100.00
2FZYPW	7200 160 UDMA100 2Mb 7200	93.62	110.00
2G00PW	7200 Plus 160 UDMA100 8Mb 7200	103.83	122.00
2G01PW	7200 160 SATA150 8Mb 7200	110.64	130.00



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25DDPW	20 20 UDMA100 2Mb 5400	34.05	40.00
2CZ4PW	5400 40 UDMA100 2Mb 5400	41.28	48.50
2FZNPW	7200 40 UDMA100 2Mb 7200	42.56	50.00
2HT1PW	7200 60 UDMA100 2Mb 7200	48.09	56.50
2FZOPW	7200 80 UDMA100 2Mb 7200	52.34	61.50
2FZRPW	7200 80 SATA150 8Mb 7200	76.17	89.50
2FZSPW	7200 120 UDMA100 2Mb 7200	67.66	79.50
2FZVPW	7200 Plus 120 UDMA100 8Mb 7200	71.49	84.00
2FZWPW	7200 120 SATA150 8Mb 7200	85.11	100.00
2FZYPW	7200 160 UDMA100 2Mb 7200	93.62	110.00
2G00PW	7200 Plus 160 UDMA100 8Mb 7200	103.83	122.00
2G01PW	7200 160 SATA150 8Mb 7200	110.64	130.00



Lacie PocketDrive 20GB USB 2 & Firewire

quicklink PMTPW

www.dabs.com



The PocketDrive's name gives away one of its key features and its main attraction - it's almost unbelievably small. So small you can easily drop one in a bag or a large pocket and carry it around.

quicklink	LACIE	inc VAT	ex VAT
1517PW	PocketDrive 40GB, Firewire and USB2	169.20	144.00
2511PW	PocketDrive 60GB, Firewire and USB2	245.58	209.00
2163PW	PocketDrive 20GB, USB2 cable	110.45	94.00
2165PW	PocketDrive 40GB, USB2 cable	139.83	119.00
2M7HPW	PocketDrive 80GB, USB2 cable	292.57	249.00



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2H3VPW	875P Neo-FS2R Intel 875P ATX	143.00	121.71
2H3YPW	865PE Neo2-FS2R Intel 865PE ATX	118.00	100.43
2H40PW	865PE Neo2-LS Intel 865PE ATX	84.50	71.92
2H41PW	865PE Neo-L Intel 865PE ATX	76.50	65.11
2H42PW	865G Neo2-LS Intel 865G ATX	89.50	76.17
2H43PW	845PE MAX-L Intel 845PE ATX	58.00	49.57
221XPW	845E Max Intel 845E ATX	51.00	43.41
280DPW	845GE Max-L Intel 845GE ATX	73.00	62.13
2N1LPW	648 Neo-L S5 648 ATX	58.00	49.57
2861PW	648 Max S5 648 ATX	53.50	45.54
287DPW	645 Combo-L S5 645 ATX	42.50	36.17
2H46PW	651M Combo-L S5 651 MATX	48.50	41.28
2N2MPW	K76 Delta-FIS2R VIA KT600 ATX	99.00	84.26

quicklinx	MSI	inc VAT	ex VAT
2N1TPW	K76 Delta-L VIA KT600 ATX	73.00	62.13
2222PW	M5-6578 VIA KLE133 MATX	37.00	31.49
2223PW	M5-6578-L VIA KLE133 MATX	40.50	34.47
2H2RPW	KM2M Combo-L VIA KM266 MATX	45.50	39.73
280GPW	K74 Ultra-FISR VIA KT400 ATX	88.00	74.90
2869PW	K74 Ultra-SR VIA KT400 ATX	72.50	61.71
287HPW	K74V-L VIA KT400 ATX	52.50	44.69
2MVKPW	K73V-L VIA KT333 ATX	47.50	40.43
287KPW	K72 Combo-L VIA KT266A ATX	39.00	33.2
280JPW	K7N2C-ILSR nForce 2 ATX	101.00	85.96
280KPW	K7N2C-L nForce 2 ATX	81.00	68.94
2H2VPW	K7N2 Delta-ILSR nForce 2 ATX	88.00	74.9
2M3CPW	K7N2 Delta-L nForce 2 ATX	65.50	55.75
2FHPWP	746F Ultra-L S5 746 ATX	53.50	45.54

£65.50
inc
£55.74
exc

- CPU: AMD Athlon XP/Athlon/Duron CPU, 333MHz
- Chipset: nVidia nForce2 IGP iCrush 18Gi, nVidia MCP-T
- Main Memory: DDR DIMM x3
- Graphics: 8X AGP slot
- Form Factor: AT

Motherboards

quicklinx	ABIT	inc VAT	ex VAT
2C91PW	IC7-G Intel 875P Socket 478 ATX	158.00	134.47
2L08PW	IC7 Intel 875P Socket 478 ATX	105.00	89.37
2H2VPW	IS7-G Intel 865PE Socket 478 ATX	126.00	107.24
2H3VPW	IS7 Intel 865PE Socket 478 ATX	95.50	81.28
2H4VPW	IS7-E Intel 865P Socket 478 ATX	80.50	68.51
24N1PW	KD7-RAID VIA KT400 Socket A ATX	59.00	50.22
2BRNPW	KD7-S VIA KT400 Socket A ATX	65.50	55.75
280JPW	KD7-G VIA KT400 Socket A ATX	70.00	59.58
24NVPW	AT7 MAX2 VIA KT400 Socket A ATX	79.50	67.66
2819PW	NF7 nForce 2 18D Socket A ATX	70.00	59.58
293RWP	NF7-S nForce 2 18D Socket A ATX	92.00	78.3
2C92PW	NF7-SL nForce 2 18D Socket A ATX	95.50	79.58
2BRSPW	NF7-M nForce 2 18G Socket A ATX	8.002	69.79

quicklinx	ASUS	inc VAT	ex VAT
2J31PW	AX45G-N Intel 865G Socket 478 ATX	84.50	71.92
2J32PW	AX45G Max Intel 865G Socket 478 ATX	131.00	111.49
2J33PW	MX45G-N Intel 865G Socket 478 MATX	79.50	67.66
2HRTPW	MK7M-II VIA KM266 Socket A MATX	50.50	42.98
280VPW	AK77-8XN VIA KT400 Socket A ATX	62.50	52.77
2810PW	AK77-8X MAX VIA KT400 Socket A ATX	68.50	58.3
2J37PW	AK77-8X VIA KT400 Socket A ATX	57.00	48.51
2J36PW	AK77-400 MAX VIA KT400A Socket A ATX	87.50	74.47
2J38PW	AK79D-400V nForce 2 Socket A ATX	74.00	62.98
2FSLPW	AK79C MAX nForce 2 Socket A ATX	100.00	85.11
2F5MPW	AK79D MAX nForce 2 Socket A ATX	94.50	80.43
2C90PW	AK79C-1394 nForce 2 Socket A ATX	73.00	62.13
2C93PW	MK79C-1394 nForce 2 Socket A MATX	81.00	68.94
2C94PW	MK79C-N nForce 2 Socket A MATX	74.50	63.41

quicklinx	ASUS	inc VAT	ex VAT
2D10PW	K7V12 VIA KT266 Socket A ATX	29.00	24.69
2D15PW	K7VM2 VIA KM266 Socket A MATX	41.00	34.9
2M8KPW	P4C800 Intel 875P Socket 478 ATX	125.00	106.39
2J4VPW	P4C800 Deluxe Intel 875P Socket 478 ATX	146.00	124.26
2P28PW	P4P8X Intel 865P Socket 478 ATX	75.00	63.85
2M8LPW	P4P800 Intel 865PE Socket 478 ATX	95.50	81.28
2M8MPW	P4P800 Deluxe Intel 865PE Socket 478 ATX	108.00	91.92
2M8NPW	P4P800-VM Intel 865G Socket 478 ATX	79.50	67.66
2819PW	A7N8X/DELUXE/CD nForce 2 Socket A ATX	89.00	75.75
28BVWP	A7N8X/LAN nForce 2 Socket A ATX	67.00	57.03
2P31PW	A7N8X-X nForce 2 Socket A ATX	62.00	52.77
2P33PW	A7N8X-VM nForce 2 Socket A ATX	76.00	64.69
2J5FPW	A7V8X-X/LAN VIA KT400 Socket A ATX	49.00	41.71
2P34PW	A7V600 VIA KT600 Socket A ATX	68.00	57.88
2P38PW	A7V8X-MX VIA KM400 Socket A ATX	51.00	43.41

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1008PW	Peerless USB 20GB Bundle	245.57	209.00
10PCPW	Ultimate Slim Zip 100MB n/Powered	57.58	49.00

GA nForce 7N400LI

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quicklinx	GIGABYTE	inc VAT	ex VAT
2855PW	GA-70XE AMD 761/VIA SoA	43.00	36.60
2L99PW	GA-7N1XPV nForce2 SoA	154.00	131.07
2L9KPW	GA-7N400V Pro nForce2 SoA	105.00	89.37
2M20PW	GA-7N400V nForce2 SoA	80.00	68.09
2L9LPW	GA-7N1XP nForce2 SoA	157.00	116.60
2L9MPW	GA-7N400 Pro nForce2 SoA	87.00	74.05
2L9NPW	GA-7VAXP-A Ultra VIA KT400A SoA	94.00	80.00
2L9PPW	GA-7VAXP-A VIA KT400A SoA	83.50	71.07
2L9QPW	GA-7VAX-A VIA KT400A SoA	64.00	54.47
285TPW	GA-7VAXP-Ultra VIA KT400 SoA	88.50	75.32
2505PW	GA-7VAXP VIA KT400 SoA	82.00	69.79

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- Chipsets: VIA Apollo KT400-VT8235
- CPU Bus Clock: 333MHz (EV6)
- AGP 8X/DDR400*/5.1 channel/ATA133/ LAN on-board

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- Chipsets: VIA Apollo KT400-VT8235
- CPU Bus Clock: 333MHz (EV6)
- AGP 8X/DDR400*/5.1 channel/ATA133/ LAN on-board

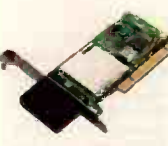
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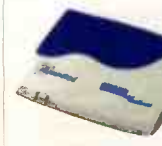
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14XHPW	5 Port 10/100Mbps	17.63	15.00
14XLPW	8 Port 10/100Mbps	20.56	17.50
1Y30PW	16 Port 10/100Mbps	58.75	50.00
1Y31PW	10/100 RJ45 PCI	5.58	4.75
28V1PW	10/100 CardBus	15.28	13.00
28V3PW	10/100 USB	17.63	15.00
29X1PW	802.11b+22Mbps Cardbus	24.68	21.00
178VPW	802.11b 11Mbps Cardbus	22.33	19.00
178ZPW	802.11b 11Mbps USB	29.38	25.00
1790PW	802.11b 11Mbps PCI	52.88	45.00

Modems/ADSL

quicklinx	DABSVUE	inc VAT	ex VAT
14XBPW	56k PCI Hardware Voice Intel	10.58	9.00
25BWPW	56k External USB	9.50	8.09
14XFPW	56k External Serial	17.50	14.90
86LPW	56k PCMCIA	23.50	20.00
28NPW	ADSL USB + Filter + PSU	29.38	25.00
1777PW	ADSL Conexant Router 1Port	29.38	25.00
178BPW	ADSL Conexant Router 4Port	59.35	50.51
2LPZPW	Wireless ADSL Router + Filter	117.49	99.99



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PC Software

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2CCLPW	Intuit QuickBooks 2003 Pro	233.82	199.00
2CWWPW	Intuit QuickBooks XG	57.57	
49.00			
2CWXPW	Intuit QuickBooks XG Startup	19.97	17.00
2NX2PW	MS Money 2004 Standard	SEE WEBSITE	
2NX3PW	MS Money 2004 Premium	SEE WEBSITE	
17XDPW	Sage Instant Accounts 8.0	104.57	89.00
17XCPW	Sage Instant Accounts 8.0	86.12	75.00
2H9BPW	McAfee TVD Suite 5-user Pack	205.62	175.00
2H9KPW	McAfee TVD Suite 10-user Pack	433.57	369.00
25QJPW	McAfee VirusScan 7.0 Home	30.55	26.00
25QKPW	McAfee VirusScan Professional 7.0	29.37	25.00
24V1PW	Symantec Norton Antivirus S8 5-user	175.07	149.00
247TPW	Symantec Norton Internet Security 2003	45.82	39.00
3P6PW	Dantz Retrospect Express 5.6	41.12	35.00
28C7PW	Elby Clone CD+CDRW	24.67	21.00
2NWJPW	Symantec GoBack	29.37	25.00
248BPW	Symantec Norton Ghost 2003	38.77	33.00
2MNMPW	PowerQuest Drive Image 7.0	41.12	35.00
202ZPW	AutoCAD LT2004	804.87	685.00
120TPW	Autodesk Volo View	151.57	129.00
15B6PW	Autodesk AutoCAD LT 2004	146.87	125.00
201QPW	Autodesk AutoCAD 9.0 Standard	64.62	55.00
14LFPW	Laplink Gold 11.0	111.62	95.00
15W6PW	Laplink PC Sync	52.87	45.00
2LWDPW	Symantec Norton Antivirus 2003	135.12	115.00
LC9FPW	Symantec WinFax Pro 10.0	52.87	45.00
WVDPW	Microsoft Outlook 2002	92.82	79.00
244TPW	Microsoft Outlook 2002	102.22	87.00
244VPW	Act! 6.0 5 User	574.57	489.00
Q25TPW	Filemaker Pro 6.0	245.57	209.00
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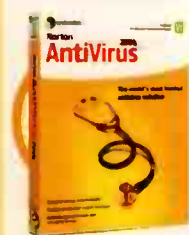
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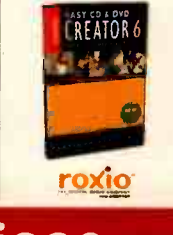
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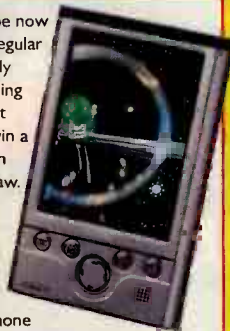
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What the Press Say About Encore...

"...the ultimate lifestyle PC..."
- The Sun Online July 2003

"An ideal space-saving system..."
- PC Pro August 2003

"The Encore transforms into a multimedia extravaganza offering DVD, TV, radio and web access at the touch of a button."
- PC Advisor August 2003

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- 120GB Hard Drive 7200rpm
- 52x24x52 CDRW & 16x DVD Combo Drive
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- On-Board NVIDIA GeForce 4 MX440 + 8x AGP Slot VGA
- Creative SBS-250 Speakers
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VGA Card Including Remote
Videologic ZXR-550 5.1 Speaker System
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VGA Card
Videologic ZXR-750 7.1 Speaker System
NVIDIA SoundStorm™ 5.1 Dolby Digital Audio
On-Board 10/100 Fast Ethernet
Systemax 3.5" 6-in-1 Media Card Reader
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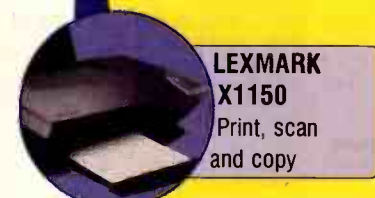
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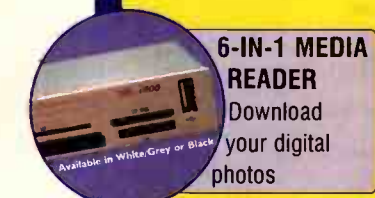
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SA900083	Systemax 3.5" 6-in-1 Media Card Reader	15.00	17.63
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SA900096	Creative Inspire 4400 Speakers	25.00	29.38
SA900266	Videologic ZXR-550 5.1 Speaker System	45.00	52.88
SA900267	Videologic ZXR-750 7.1 Speaker System	70.00	82.25
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Why buy a PDA?

If you use your handheld as a flashy address book, you're missing out. Here are a few additional uses for it.

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- Offline web browser** - when you synchronise your PDA to your desktop, you can go on the web and save pages to be browsed at your leisure, saving you money.
- Games console** - lots of games are available for PDAs, but why not try www.download-free-games.com for some of the older ones.
- MP3 Player** - the Sony SJ33 and Palm Zire 71 have MP3 players built-in. We would recommend an additional memory card for MP3 music storage.
- Portable video player** - if music is not for you, how about video. Movies for PDAs can now be purchased over the internet.
- Digital voice recorder** - most PDAs come with voice recording software to record the memos and save you carry scrap pieces of paper around.
- Digital photo album** - you can store your complete photo collection.
- Route Planning** - plan your journey without the need of an A to Z. Streetfinder software is readily available on the internet.
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SA70637	PCV-RZ324 P4 3.06GHz 160GB 512MB DVD +/-RW/DVD XPH	1237.45	1454.00	
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SA70628	D330 DT P4 2.4GHz 40GB 256MB DVD LAN XP Home	579.57	681.00	
SA70632	D330 DT P4 2.4GHz 40GB 256MB CD LAN XP Home	495.32	582.00	
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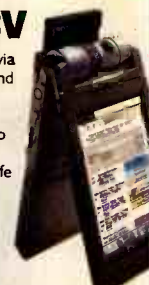


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Palm
SA70337 Palm Zire 71
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SA70637	Sony VAIO PCV-RZ324* P4 3.06GHz + Hyper-Threading	512MB	160GB	DVD +/-RW+DVD ROM	XP Home	1237.45	1454.00

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HP NX9005

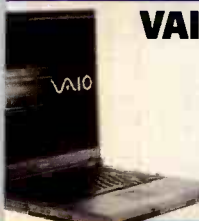
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SA70478	PCG-FR215S P4-M 2.66GHz 512MB 40GB 15" DVD-RW Modem LAN WXP Home	993.19	1167.00
SA70480	PCG-GRT715M P4 2.8GHz 512MB 40GB DVD+/-RW 15" TFT LAN WXP Home	1160.85	1364.00
SA70481	PCG-GRT716S P4 2.8GHz 512MB 60GB DVD+/-RW 16" TFT WXP Pro	1314.89	1545.00
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SA70996	SatPro A10 C2.0GHz 256MB 20GB DVD 14.1" Mod/LAN XP Home	498.72	586.00
SA70061	Tegra S1 P-M 1.3GHz Cent 30GB 14.1" TFT DVD M/WLAN 256MB XP Pro	875.74	1029.00
SA70064	Tegra S1 P-M 1.4GHz Cent 40GB 15" TFT DVD/CD-RW 256MB Modem LAN XP Pro	1168.51	1373.00
SA70997	Sat Pro A10 C2.0GHz 256MB 20GB DVD/CD-RW 14.1" Modem LAN XP Pro	587.23	690.00
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SA70509	nx9005 AMD Ath XP2400+ 40GB 256MB 15" XGA DVD/CD-RW XP Pro	688.51	809.00
SA70505	nx9000 P4-M 2.0GHz 30GB 256MB 14" XGA DVD LAN Modem XP Pro	788.94	927.00
SA70506	nx9010 P4-DT 2.66GHz 40GB 256MB 15" Modem DVD/CD-RW LAN XP Pro	845.96	994.00

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SA70789	1315LC A-2500+ 256MB 40GB DVD/CDRW 15" TFT Modem LAN WXP Home	617.87	726.00
SA70640	1601LC P4 -M 2.4GHz 256MB 30GB CD-RW/DVD 15" TFT Modem LAN WXP Home	834.89	981.00
SA70643	1703SC P4 -M 2.66GHz 512MB 80GB CD-RW/DVD 17" TFT Modem LAN WXP Home	855.32	1005.00
SA70494	TM 800LCI PM 1.3GHz 40GB 512MB CD-RW/DVD 15.0" M/WLAN Bluetooth XP Pro	1028.94	1209.00
SA70495	TM 803LCI PM 1.6GHz 40GB 512MB CD-RW/DVD 15.0" M/WLAN Bluetooth XP Pro	1320.00	1551.00

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SA64623 Athlon XP 1800+	46.99	55.21
SA64625 Athlon XP 2000+	46.99	55.21
SA64626 Athlon XP 2100+	51.99	61.09
SA64685 Athlon XP 2200+	52.99	62.26
SA64686 Athlon XP 2400+	58.99	69.31
SA48181 Athlon XP 2500+ 333MHz	59.99	70.49
SA64687 Athlon XP 2600+ 333MHz	69.99	82.24
SA48024 Athlon XP 2700+ 333MHz	85.99	101.04
SA48184 Athlon XP 2800+ 333MHz	120.00	141.00
SA48185 Athlon XP 3000+ 333MHz	176.00	206.80
SA49246 Athlon XP 3200+ 333MHz	233.00	281.28

AMD MP Retail Box

	Ex. Vat	Inc. Vat
SA64630 Athlon MP 2000+	79.99	93.99
SA64714 Athlon MP 2200+	89.99	105.74
SA48229 Athlon MP 2400+	97.99	115.14
SA48230 Athlon MP 2600+	129.00	151.58

AMD Opteron Retail Box

	Ex. Vat	Inc. Vat
SA49537 Opteron 240	209.00	245.60
SA49538 Opteron 242	489.00	574.60
SA49539 Opteron 244	549.00	645.10

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SA64514 1.7GHz 128K 400MHz	36.99	43.46
SA64515 1.8GHz 128K 400MHz	44.99	52.86
SA64716 2.0GHz 128K 400MHz	45.99	54.04
SA48121 2.1GHz 128K 400MHz	53.99	63.44
SA48122 2.2GHz 128K 400MHz	47.99	56.39
SA49219 2.3GHz 128K 400MHz	63.99	75.19
SA49220 2.4GHz 128K 400MHz	59.99	70.49
SA49355 2.5GHz 128K 400MHz	62.99	74.01
SA49353 2.6GHz 128K 400MHz	69.99	82.24

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	Ex. Vat	Inc. Vat
SA49223 2.4GHz 512K 800MHz	121.00	142.18
SA64671 2.6GHz 512K 400MHz	128.00	150.40
SA64672 2.6GHz 512K 533MHz	133.00	156.28
SA49224 2.6GHz 512K 800MHz	139.00	163.33
SA64673 2.8GHz 512K 533MHz	169.00	198.58
SA49225 2.8GHz 512K 800MHz	178.00	209.15
SA64980 3.06GHz 512K 533MHz	249.00	292.58
SA49226 3.0GHz 512K 800MHz	279.00	327.83
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3.5" Hard Drives

Code	Manufacturer	Capacity	Access Time	RPM	Cache	Interface	Ex. VAT	Inc. VAT
SA49367	ExcelStor	40GB	8.5ms	7200	2MB	UDMA100	33.99	39.94
SA49368	ExcelStor	60GB	8.5ms	7200	2MB	UDMA100	39.99	46.99
SA49502	Hitachi 7K250	40GB	8.8ms	7200	2MB	UDMA100	42.99	50.51
SA49503	Hitachi 7K250	80GB	8.5ms	7200	2MB	UDMA100	51.99	61.09
SA49504	Hitachi 7K250	120GB	8.5ms	7200	2MB	UDMA100	64.99	76.36
SA49505	Hitachi 7K250	120GB	8.5ms	7200	8MB	UDMA100	77.99	91.64
SA49506	Hitachi 7K250	160GB	8.5ms	7200	2MB	UDMA100	104.00	122.24
SA49507	Hitachi 7K250	160GB	8.5ms	7200	8MB	UDMA100	111.00	130.42
SA49508	Hitachi 7K250	250GB	8.5ms	7200	8MB	UDMA100	199.00	233.82
SA64678	Maxtor Fireball 3	40GB	<12ms	5400	2MB	UDMA133	36.99	43.46
SA64713	Maxtor DiamondMax Plus 8	40GB	<10ms	7200	2MB	UDMA133	38.99	45.81
SA64987	Maxtor DiamondMax Plus 9	80GB	<9.4ms	7200	2MB	UDMA133	45.99	54.04
SA64989	Maxtor DiamondMax Plus 9	80GB	<9.4ms	7200	8MB	UDMA133	52.99	62.26
SA64988	Maxtor DiamondMax Plus 9	120GB	<9.4ms	7200	2MB	UDMA133	59.99	70.49
SA64990	Maxtor DiamondMax Plus 9	120GB	<9.4ms	7200	8MB	UDMA133	65.99	77.54
SA64991	Maxtor DiamondMax Plus 9	160GB	<9.4ms	7200	8MB	UDMA133	94.99	111.61
SA48364	Maxtor DiamondMax Plus 9	200GB	<9.4ms	7200	8MB	UDMA133	126.00	148.02
SA49369	Maxtor DiamondMax Plus 9	80GB	<9.4ms	7200	8MB	SATA150	68.99	81.05
SA49370	Maxtor DiamondMax Plus 9	120GB	<9.4ms	7200	8MB	SATA150	79.99	93.99
SA49371	Maxtor DiamondMax Plus 9	160GB	<9.4ms	7200	8MB	SATA150	114.00	133.95
SA49372	Maxtor DiamondMax Plus 9	200GB	<9.4ms	7200	8MB	SATA150	156.00	183.30
SA49525	Samsung SP1604N	160GB	8.9ms	7200	2MB	UDMA133	82.99	97.51
SA64696	Seagate U Series X	20GB	12.7ms	5400	2MB	UDMA100	32.99	38.76
SA48210	Seagate Barracuda 5400.1	40GB	12.5ms	5400	2MB	UDMA100	36.99	43.46
SA48306	Seagate Barracuda 7200.7	40GB	8.5ms	7200	2MB	UDMA100	39.99	46.99
SA49216	Seagate Barracuda 7200.7	60GB	8.5ms	7200	2MB	UDMA100	45.99	54.04
SA48307	Seagate Barracuda 7200.7	80GB	8.5ms	7200	2MB	UDMA100	49.99	58.74
SA48308	Seagate Barracuda 7200.7	120GB	8.5ms	7200	2MB	UDMA100	62.99	74.01
SA49295	Seagate Barracuda 7200.7Plus	120GB	8.5ms	7200	8MB	UDMA100	66.99	78.71
SA48309	Seagate Barracuda 7200.7	160GB	8.5ms	7200	2MB	UDMA100	89.99	105.72
SA49296	Seagate Barracuda 7200.7Plus	160GB	8.5ms	7200	8MB	UDMA100	98.99	116.31
SA49298	Seagate Barracuda 7200.7	80GB	8.5ms	7200	8MB	SATA150	71.99	84.59
SA49282	Seagate Barracuda 7200.7	120GB	8.5ms	7200	8MB	SATA150	79.99	93.99
SA49297	Seagate Barracuda 7200.7	160GB	8.5ms	7200	8MB	SATA150	106.00	124.55
SA64110	Western Digital Protegé	20GB	12ms	5400	2MB	UDMA100	32.99	38.76
SA64103	Western Digital Caviar	20GB	8.9ms	7200	2MB	UDMA100	33.99	39.94
SA64113	Western Digital Caviar	40GB	8.9ms	7200	2MB	UDMA100	38.99	45.81
SA64114	Western Digital Caviar	60GB	9.5ms	5400	2MB	UDMA100	46.99	55.21
SA64104	Western Digital Caviar	80GB	8.9ms	7200	2MB	UDMA100	48.99	57.56
SA64105	Western Digital Caviar	120GB	8.9ms	7200	2MB	UDMA100	68.99	81.06
SA64423	Western Digital Caviar SE	120GB	8.9ms	7200	2MB	UDMA100	67.99	79.89
SA48091	Western Digital Caviar SE	180GB	8.9ms	7200	2MB	UDMA100	104.00	122.20
SA48093	Western Digital Caviar SE	200GB	8.9ms	7200	2MB	UDMA100	132.00	155.10

2.5" UDMA Hard Drives

Code	Manufacturer	Capacity	Access Time	RPM	Cache	Interface	Ex. VAT	Inc. VAT
SA64992	Hitachi Travelstar	20GB	9.5ms	4200	2MB	UDMA100	56.99	66.96
SA64993	Hitachi Travelstar	30GB	9.5ms	4200	2MB	UDMA100	61.99	72.84
SA64994	Hitachi Travelstar	40GB	9.5ms	4200	2MB	UDMA100	74.99	88.11
SA49497	Hitachi Travelstar	60GB	9.5ms	4200	2MB	UDMA100	99.99	117.49
SA49498	Hitachi Travelstar	60GB	9.5ms	7200	8MB	UDMA100	189.00	222.08
SA49499	Hitachi Travelstar	80GB	9.5ms	4200	8MB	UDMA100	154.00	180.95
SA48237	Fujitsu	40GB	9.5ms	4200	2MB	UDMA100	73.99	86.94
SA48238	Fujitsu	60GB	9.5ms	4200	2MB	UDMA100	109.00	128.08
SA49250	Toshiba	20GB	9.5ms	4200	2MB	UDMA100	52.99	62.26
SA49477	Toshiba	40GB	9.5ms	4200	2MB	UDMA100	74.99	88.11
SA48332	Toshiba	60GB	9.5ms	4200	2MB	UDMA100	106.00	124.55

SCSI Hard Drives

Code	Manufacturer	Capacity	Access Time	RPM	Cache	Interface	Ex. VAT	Inc. VAT
SA64800	Fujitsu Allegro 8	36GB	4.5ms	10K	8MB	U320 68Pin	106.00	124.55
SA64802	Fujitsu Allegro 8	73GB	4.5ms	10K	8MB	U320 68Pin	231.00	271.43
SA64804	Fujitsu Allegro 8	147GB	4.5ms	10K	8MB	U320 68Pin	589.00	692.08
SA48239	Hitachi Ultrastar	36GB	4.7ms	10K	8MB	U320 68Pin	99.99	117.49
SA48241	Hitachi Ultrastar	73GB	4.7ms	10K	8MB	U320 68Pin	232.00	272.60
SA48243	Hitachi Ultrastar	146GB	4.7ms	10K	8MB	U320 68Pin	429.00	504.08
SA48245	Maxtor 10K IV	36GB	4.8ms	10K	8MB	U320 68Pin	106.00	124.55
SA48247	Maxtor 10K IV	73GB	4.8ms	10K	8MB	U320 68Pin	246.00	289.05
SA48249	Maxtor 10K IV	147GB	4.9ms	10K	8MB	U320 68Pin	564.00	662.70
SA64645	Seagate 10K.6	36GB	4.7ms	10K	8MB	U320 68Pin	111.00	130.43
SA64642	Seagate 10K.6	73GB	4.7ms	10K	8MB	U320 68Pin	246.00	289.05
SA64639	Seagate 10K.6	146GB	4.7ms	10K	8MB	U320 68Pin	499.00	586.33
SA64654	Seagate 15K.3	18GB	3.6ms	15K	8MB	U320 68Pin	136.00	159.80
SA64651	Seagate 15K.3	36GB	3.6ms	15K	8MB	U320 68Pin	202.00	237.35
SA64648	Seagate 15K.3	73GB	3.6ms	15K	8MB	U320 68Pin	418.00	491.15

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64680	ABIT AT7 MAX2 ATX	AMD 462 Pin	VIA KT400	200/266/333	4DDR	5	8x	A/L/AR	112.00 131.60
64682	ABIT KD7-RAID ATX	AMD 462 Pin	KT400	200/266/333	4DDR	6	8x	A/L/AR	85.99 101.04
49528	ABIT NF7 ATX	AMD 462 Pin	nForce2	200/266/333/400	3DDR Dual Ch.	5	8x	A/L	58.99 69.31
49529	ABIT NF7-S ATX	AMD 462 Pin	nForce2	200/266/333/400	3DDR Dual Ch.	5	8x	A/F/L/SATA	78.99 92.81
48190	ASRock K7VT2 Combo ATX	AMD 462 Pin	VIA KT266A	200/266	2DDR+2DIMM	5	4x	A/L	31.99 37.59
48191	ASRock K7VM2 Combo mATX	AMD 462 Pin	VIA KM266	200/266	2DDR+2DIMM	3	4x	A/AMR/LV	34.99 41.11
54632	Asus A7N266-VM mATX	AMD 462 Pin	nForce220D	200/266	2DDR	3	4x	A/L/V	36.99 43.46
48179	Asus A7N8X/DLX ATX	AMD 462 Pin	nForce2	200/266/333	3DDR Dual Ch.	5	8x	A/F/L/SR	72.99 85.76
64633	Asus A7S333/A ATX	AMD 462 Pin	SiS745	200/266	3DDR	5	4x	A	51.99 61.09
64712	Asus A7V8X ATX ATX	AMD 462 Pin	VIA KT400	200/266/333	3DDR Dual Ch.	6	8x	A/L	42.99 50.51
49415	Gigabyte 7NXP ATX	AMD 462 Pin	nForce2	200/266/333/400	4DDR Dual Ch.	5	8x	A/Dual Lan/SATA/V	109.00 128.08
49416	Gigabyte 7N400-L1 ATX	AMD 462 Pin	nForce2	200/266/333/400	4DDR Dual Ch.	5	8x	A/L	53.99 63.44
49417	Gigabyte 7VT600L ATX	AMD 462 Pin	VIA KT600	200/266/333/400	3DDR	5	8x	A/L	48.99 57.56
49418	Gigabyte 7VA ATX	AMD 462 Pin	VIA KT400	200/266/333	3DDR	5	8x	A/V	41.99 49.34
48285	MSI 746F ULTRA-L ATX	AMD 462 Pin	SiS746FX	200/266/333	3DDR	5	8x	A/L	44.99 52.86
48139	MSI K7N2 Delta-ILSR ATX	AMD 462 Pin	nForce2	200/266/333	3DDR	5	8x	A/ACR/F/L/SR/V	81.99 96.34
49238	MSI K7N2 Delta-FISR ATX	AMD 462 Pin	nForce2	200/266/333/400	3DDR	5	8x	A/ACR/F/L/SR	70.99 83.41
64792	MSI KT4 ULTRA-SR ATX	AMD 462 Pin	VIA KT400	200/266/333	3DDR	6	8x	A/SR	67.99 79.89
48201	MSI KT4V-L ATX	AMD 462 Pin	VIA KT400	200/266/333	3DDR	6	8x	A/L/CNR	49.99 58.74
48287	MSI KM2M Combo ATX	AMD 462 Pin	VIA KM266	200/266	2DDR+2DIMM	3	4x	A/CNR	40.99 48.16
64611	MSI K7D MASTER ATX	AMD DUAL	AMD762	200/266	4DDR	5	4x	A/CNR	124.00 145.70
48192	ASRock GPRO Combo mATX	Intel P4 478 Pin	SiS650	400/533	2DDR+2DIMM	3	4x	A/L/V	40.99 48.16
48180	Asus P4G8X/DLX/GD ATX	Intel P4 478 Pin	E7205	400/533	4DDR	5	8x	A/F/L/SR	125.00 146.88
48174	Asus P4PE/LAN/GD ATX	Intel P4 478 Pin	i845PE	400/533	3DDR	6	4x	A/L	49.99 58.74
49419	Asus P4C800/DELUXE ATX	Intel P4 478 Pin	875P	400/533/800	4DDR Dual Ch.	5	8x	A/F/L/SR	118.00 138.65
49420	Gigabyte 8KNXP ATX	Intel P4 478 Pin	875P	400/533/800	6DDR Dual Ch.	5	8x	A/AR/F/L/SATA	129.00 151.58
49421	Gigabyte 8IPE1000 Pro ATX	Intel P4 478 Pin	865PE	400/533/800	4DDR Dual Ch.	5	8x	A/F/L/SATA	72.99 85.76
49422	Gigabyte 8IG1000 Pro ATX	Intel P4 478 Pin	856G	400/533/800	4DDR Dual Ch.	5	8x	A/F/L/SATA/V	76.99 90.46
49423	Gigabyte 8S648FX ATX	Intel P4 478 Pin	SiS648FX	400/533/800	3DDR	5	8x	A	48.99 57.56
48294	Gigabyte GA-SINXP1394 ATX	Intel P4 478 Pin	SiS655	400/533	4DDR	5	8x	A/F/L/SR	98.99 116.31
48286	MSI 655 Max-FISR ATX	Intel P4 478 Pin	SiS655	400/533	4DDR	6	8x	A/F/L/SR	83.99 98.69
49239	MSI 845PE Max3-FISR ATX	Intel P4 478 Pin	i845PE	400/533/800	3DDR	6	4x	A/F/L/SR	89.99 105.74
49240	MSI 875P Neo-FIS2R ATX	Intel P4 478 Pin	i875P	533/800	4DDR	5	8x	A/F/SR + Gbit LAN	119.00 139.83
49241	MSI 865PE Neo-FIS2R ATX	Intel P4 478 Pin	i865PE	533/800	4DDR	5	8x	A/F/SR + Gbit LAN	98.99 116.31
48297	Supermicro X5DAL-G ATX	Intel Dual Xeon	E7505	400/533	4DDR	4	8x	L	254.00 298.45
48296	Supermicro X5DAE eATX	Intel Dual Xeon	E7505	400/533	6DDR	5	8x	A/L	349.00 410.08
48003	Supermicro X5DA8 eATX	Intel Dual Xeon	E7505	400/533	6DDR	5	8x	A/L/S	477.00 560.48
48123	Supermicro P4SAA ATX	Intel P4/Cel 478 Pin	E7205	400/533	4DDR	6	8x	A/L	156.00 183.30
64541	Supermicro P4SGA ATX	Intel P4/Cel 478 Pin	i845G	400/533	2DDR	6	4x	A/L/V	82.99 97.51
64382	Supermicro P4SDA+ ATX	Intel P4 478 Pin	i845	400	3DIMM	6	4x	A/CNR	74.99 88.11
64139	Supermicro P4SBA+ ATX	Intel P4 478 Pin	i845	400	3DIMM	6	4x	A/CNR	71.99 84.59

A:Audio ACR:Advanced Communication Riser AR:ATA RAID CNR:Communication Network Riser F:Firewire L:LAN S:SCSI SATA: Serial ATA SR:Serial ATA RAID V:VGA

DDR400 PC3200	DDR266 PC2100	PC133 DIMMS	PC100 DIMMS
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DDR333 PC2700	SA49245 512MB ExVAT 49.99 Inc VAT 58.74	SA64055 256MB ExVAT 26.99 Inc VAT 31.71	SA37707 256MB ExVAT 15.99 Inc VAT 18.79
SA64490 256MB ExVAT 24.99 Inc VAT 29.36	Top Selling Memory Modules		
SA64491 512MB ExVAT 49.99 Inc VAT 58.74			
		SA64056 512MB ExVAT 39.99 Inc VAT 46.99	SA64058 512MB ExVAT 26.99 Inc VAT 31.71

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Memory	Ex Vat	Inc Vat
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SA64059 256MB ECC 3.3V	42.99	50.51
100MHz 168 PIN DIMM		
66MHz Unbuffered Synchronous DIMMS		
SA64060 64MB 168 Pin DIMM	12.99	15.26
SA64061 128MB 168 Pin DIMM	21.99	25.84
66MHz Buffered EDO/ECC DIMMS		
SA64062 128MB 168 PIN EDO/ECC DIMM	19.99	23.49
EDO 72 Pin SIMMS		
SA26264 8MB EDO	7.99	9.39
SA26265 16MB EDO	10.99	12.91
SA26266 32MB EDO	12.99	15.26
SA31788 64MB EDO	16.99	19.96
Non Parity 72 Pin SIMMS		
SA22575 16MB Non Parity	8.99	10.56
SA26262 32MB Non Parity	10.99	12.91
Parity 72 Pin SIMMS		
SA14695 16MB Parity	14.99	17.61
SA26261 32MB Parity	19.99	23.49

MSI Neo-FIS2R motherboard



- Supports Intel® P4 Processor
- Intel 875P chipset
- Dual DDR 400/PC3200
- 8x AGP 5 PCI Slots
- Onboard 5.1 Audio, RAID, Gigabit LAN, SATA & USB2.0.

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- Chassis design for easy assembly
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AOpen

SA48080	HQ08D Full Tower 5x5.25" 8x3.5" 300W ATX	Ex Vat	Inc
SA64345	H600A Super Tower 5x5.25" 5x3.5" 300W ATX	54.99	64.99
SA64346	HQ48A Power Midi 3x5.25" 3x3.5" 300W ATX	49.99	58.99
SA64349	H340A Slim Tower/Desktop 1x5.25" 2x3.5" 180W ATX	32.99	38.99
SA48083	H340A Black Slim Tower/Desktop 1x5.25" 2x3.5" 200W ATX	32.99	38.99

Antec Sonata

- The Sonata features low noise cooling vibration absorbing drive mounts
- TruePower 380Watt ATX 12V power supply with single fan design for enhanced quietness.



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- No PSU.



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Low Noise Power Supplies

- Low Noise
- Adjustable Fan Speed
- Ideal Case Upgrade.



SA48159	350W Variable Speed Fan ATX	Ex Vat	Inc Vat
SA48158	460W Variable Speed Fan ATX	44.99	52.86
SA48160	550W (no variable speed) ATX	58.99	69.31
		97.99	115.14

Power Supplies



PSU		Ex Vat	Inc
SA48113	200W Dual Outlet AT	13.61	15.99
SA48114	200W Dual Outlet mATX	19.99	23.99
SA64202	300W Dual Outlet AT	17.99	21.99
SA64732	300W Dual Outlet AS* ATX	21.99	25.99
SA64203	400W Dual Outlet ATX	39.99	46.99
SA64463	400W Dual Outlet AS* ATX	44.99	52.99

Fan Converter

- This is an ideal product for users who want to install an 80mm fan onto 60mm mounting holes.
- Vortex channeling design to centralise air flow and minimise pressure loss
- No special equipment required.



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Alloy Front Bezel

- Cooler Master's Alloy Front Bezel will solve your headaches.
- Special design Alloy Front Bezel that fits most CD/DVD-ROM/RW
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- Stealth your drives!



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- Celebrating Cooler Masters 10th anniversary
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Aero 7

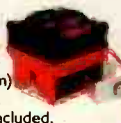
- More powerful blowers produce larger air pressure than traditional axial fans.
- External fan speed adjustment on PCI and 3 1/2" bracket allows user to set the desired fan speed (1900~4500RPM).



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XDream

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- Multilingual Installation Guide included.



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Acrylic Cases

SA49334	Akasa Crystal Clear - Drive Bays: 4 x 5.25" 2 x 3.5"	Ex Vat	Inc Vat
SA49335	Akasa Crystal Green - Drive Bays: 4 x 5.25" 2 x 3.5"	84.99	99.86
SA49336	Akasa Crystal Blue - Drive Bays: 4 x 5.25" 2 x 3.5"	84.99	99.86
	Micro - ATX Mini-tower		
SA49337	Akasa Crystal Clear - Drive Bays: 2 x 5.25" 2 x 3.5"	64.99	76.36
SA49338	Akasa Crystal Green - Drive Bays: 4 x 5.25" 2 x 3.5"	64.99	76.36
SA49339	Akasa Crystal Blue - Drive Bays: 4 x 5.25" 2 x 3.5"	64.99	76.36

Cold Cathode Case Lights

SA49325	Akasa 12" Cold Cathode - Blue	Ex Vat	Inc Vat
SA49326	Akasa 12" Cold Cathode - Green	9.99	11.74
SA49327	Akasa 12" Cold Cathode - Red	9.99	11.74

Akasa cold cathode lights include on/off switch and PSU connector

Case Fans

SA49328	Akasa 8cm Crystal Fan With 4 Green Led	4.99	5.86
SA49329	Akasa 8cm Crystal Fan With 4 Red Led	4.99	5.86
SA49393	Akasa 12cm Crystal Blue Case Fan with 4 Blue LED	9.99	11.74
SA49395	Akasa 12cm Crystal Red Case Fan with 4 Red LED	9.99	11.74
SA49394	Akasa 12cm Crystal Green Case Fan with 4 Green LED	9.99	11.74
SA48268	Cooler Master 80mm Silent BB* Fan With Thermal Sensor (26dB)	3.00	3.53
SA48269	Cooler Master 80mm Silent SB* Fan With Thermal Sensor (26dB)	3.00	3.53
SA48270	Cooler Master Blue LED 80mm Silent RB* Fan (25dB)	3.99	4.69
* BB=Ball Bearing SB=Sleeve Bearing RB=Rifle Bearing (patented)			
SA48278	Cooler Master 60mm to 80mm Fan Converter	1.45	1.70

CPU Coolers

SA49301	Silver Mountain2Q Athlon Cooler - Copper Base Silver Plated	22.99	27.01
SA49322	AMD XP 3000+, 8 x 8cm heatsink + 8cm fan with 4 green LEDs	12.99	15.26
SA49322	Akasa GREEN LED CPU COOLER (UPTO AMD XP3000+)	12.99	15.26
SA49391	Akasa BLUE LED CPU COOLER (UPTD AMD XP3000+)	12.99	15.26
SA49392	Akasa RED LED CPU COOLER (UPTO AMD XP3000+)	12.99	15.26
SA49323	Akasa Intel P4 3.5GHz Copper base with 4 Blue LEDs	11.99	14.09
SA49324	King Copper Intel P4 3.5GHz + 100% pure Copper heatsink	26.99	31.71
SA48084	Cooler Master Silent Heat Pipe Cooler Skt 370/7A, 462	18.99	22.31
SA48264	Cooler Master Silent Heat Pipe Cooler Skt 478	18.99	22.31

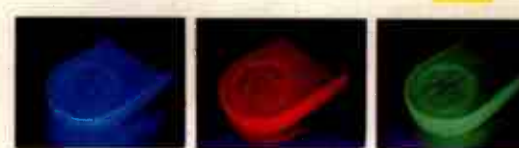
Cables

SA49340	Akasa Convellor - Connects UDMA HD to SATA motherboard	18.99	22.99
SA49341	Akasa SATA HDD Cable 45cm	5.99	7.14
SA49342	Akasa SATA HDD Cable 60cm	5.99	7.14
SA49343	Akasa SATA Power Cable	3.99	4.69
SA49429	Akasa UDMA133 Apple Green (45cm, 3 Connectors)	3.99	4.69
SA49430	Akasa UDMA133 Black 45cm	3.99	4.69
SA49431	Akasa UDMA133 Blue 45cm	3.99	4.69
SA49432	Akasa UDMA133 Purple 45cm	3.99	4.69
SA49433	Akasa UDMA133 Red 45cm	3.99	4.69
SA49434	Akasa UDMA133 Yellow 45cm	3.99	4.69
SA49435	Akasa UDMA133 Apple Green 60cm	5.99	7.14
SA49436	Akasa UDMA133 Black 60cm	5.99	7.14
SA49437	Akasa UDMA133 Blue 60cm	5.99	7.14
SA49438	Akasa UDMA133 Purple 60cm	5.99	7.14
SA49439	Akasa UDMA133 Red 60cm	5.99	7.14
SA49440	Akasa UDMA133 Yellow 60cm	5.99	7.14
SA49347	Akasa UDMA133 45cm Copper Mesh Cable	6.99	8.26
SA49428	Akasa UDMA133 45cm Silver Cable	6.99	8.26
SA49344	Akasa UDMA133 45cm Luminous Cable	6.99	8.26
SA49345	Akasa UDMA133 45cm Cable with Blue Neon String	10.99	12.99
SA49346	Akasa UDMA133 Cable with Red Neon String	10.99	12.99
SA49441	Akasa UDMA133 - Day Glo Blue UV Reactive 45cm	6.99	8.26
SA49442	Akasa UDMA133 - Day Glo Green UV Reactive 45cm	6.99	8.26
SA49443	Akasa UDMA133 - Day Glo Orange UV Reactive 45cm	6.99	8.26
SA49444	Akasa UDMA133 - Day Glo Red UV Reactive 45cm	6.99	8.26
SA49411	Akasa UDMA133 Cable Day Glo Blue UV Reactive 60cm	8.99	10.74
SA49412	Akasa ATA133 Cable Day Glo Green UV Reactive 60cm	8.99	10.74
SA49413	Akasa ATA133 Cable Day Glo Orange UV Reactive 60cm	8.99	10.74
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SA49445	Akasa UDMA133 - Day Glo Blue UV Reactive 90cm	9.99	11.74
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SA49448	Akasa UDMA133 - Day Glo Red UV Reactive 90cm	9.99	11.74



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SA49330	Akasa ShinEtsu Thermal Interface Pads (5x pads)	2.99	3.51
SA49331	Akasa TIM-clean, Cleaning fluid for all thermal interfaces	4.99 <td>5.86</td>	5.86
SA48266	Cooler Master Premium Thermal Compound -50°C to 170°C	3.50	4.11
SA48267	Cooler Master High Performance Thermal Compound 0°C to 170°C	2.00	2.35



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UV Reactive Exhaust Blowers		Ex Vat	Inc Vat
SA49396	Akasa Exhaust System Blower UV Reactive Transparent Blue	3.99	4.69
SA49397	Akasa Exhaust System Blower UV Reactive Transparent Red	3.99	4.69
SA49398	Akasa Exhaust System Blower UV Reactive Transparent Green	3.99	4.69

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SA64518 Intel Pentium 4 2.4GHz 512K 478 Pin 533MHz	117.00	137.48
SA64671 Intel Pentium 4 2.6GHz 512K 478 Pin 400MHz	128.00	150.40
SA64673 Intel Pentium 4 2.8GHz 512K 478 Pin 533MHz	169.00	198.58
SA48092 MSI 52x int EIDE CD ROM Kit	12.99	15.26
SA48161 MSI 52x24x52 BURNProof CD/RW Internal EIDE Kit	26.99	31.71
SA48155 MSI 16x DVD-ROM 48x CD-ROM Internal EIDE Kit	20.99	24.66

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SA64490 256MB DDR333 PC2700	24.99	29.36
SA64491 512MB DDR333 PC2700	49.99	58.74
SA49366 Hitachi 180GXP 30GB 7200RPM 2MB UDMA100	29.99	35.24
SA64982 Hitachi 180GXP 120GB 7200RPM 2MB UDMA100	59.99	70.49
SA49365 Cooler Master Alloy USB Keyboard	24.67	28.99
SA48329 Videologic ZXR-550 5.1 Speakers	51.99	61.09

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Sound Blaster Audigy 2 is the only PC solution to deliver Advanced Audio Definition DVD-Audio back at up to 23-192KHz fidelity. DVD-Audio 1 Surround Sound Creative Mediasource player.



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SA49426 Creative Sound Blaster 5.1 Audio Surround Kit	56.99	66.96

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SA48105 ZXR-200 2.1	29.99	35.24
SA48329 ZXR-550 5.1	51.99	61.09
SA49354 ZXR-750 7.1	79.99	93.99
SA48107 DigiTheatre ZXR	118.00	138.65
SA48106 DigiTheatre Platinum	297.87	350.00

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49304 PowerMax 100 0.9W RMS	7.99	9.39
49305 PowerMax 200 1.6W RMS	11.99	14.09
49306 PowerMax 300 4.5W RMS	CALL	
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- 100W RMS
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PHILIPS

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SA64710 A5.600 Seismic Power (100W RMS)	76.99	90.46
SA64709 A5.100 Extreme Surround Power (80W RMS)	51.99	61.09
SA63065 A1-2 Fun Power Plus (120W)	13.99	16.44
SA63060 A3.600 Acoustic Surround Power (1200W) Flat Panel	79.99	93.99
Sound Cards		
SA48344 Sonic Edge 5.1 channel	27.99	32.89
SA48345 Dynamic Edge 4.1 channel	22.99	27.01
SA63194 Rhythmic Edge 4 Channel PCI	37.99	44.64
SA63195 Seismic Edge 5.1 Channel PCI	57.99	68.14
SA63196 Acoustic Edge Digital 5.1 Channel PCI	72.99	85.76

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SA66111 Zillion 128MB MP3 Player	89.99	105.74

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ALTEC LANSING

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SA48352 2100 2.1 46W RMS	52.99	62.26
SA48353 641 4.1 200W RMS	136.00	159.80
SA49222 251 5.1 45W RMS	56.99	66.96
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- BURN-Proof
- Inc Nero Software
- Mount Rainer Compatible.



Teac		Ex Vat	Inc Vat
SA48001	52x24x52 CDRW Int EIDE Kit	33.99	39.94
SA49242	16x DVD-ROM 48x CD-ROM Int EIDE Kit	28.99	34.06

Plextor Internal CD-RW

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- 52x Write, 32x Rewrite, 52x Read
- E-IDE Interface
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- CD recording software: Nero and InCD
- Also includes "PlexTools"



Plextor		Ex Vat	Inc Vat
SA48310	PX-504A DVD+R/RW CDRW Int EIDE	136.00	159.80
SA49299	PlexWriter Premium 52x32x52 Int EIDE	67.99	79.89
SA49300	PlexWriter Premium 52x32x52 Int EIDE (Black)	68.99	81.06

Plextor DVD+R/RW

- **PX-504A**
- Writing DVD: 4x, CD: 16x
- Rewriting DVD: 2.4x, CD: 10x
- Reading DVD: 12x, CD: 40x
- 2MB Buffer
- E-IDE (ATAPI) interface
- 1x DVD+R disc, 1x DVD+RW disc
- E-IDE and Audio cable
- Nero 5.5 and InCD software



Mitsumi CD-RW

- 52x Write, 24x Rewrite, 52x Read
- Recording software: Nero
- InCD (UDF drag and drop software)
- Supports 80 min disks.



Mitsumi		Ex Vat	Inc
SA48300	CR487ETE 52x24x52 CDRW Kit	29.99	35.99
SA49228	DVD-ROM 16x DVD 50x CD Int EIDE	23.99	28.99

Asus 52x CD-RW

- 52x Write, 24x Read, 52x Rewrite
- Internal E-IDE (ATAPI) Interface
- 2MB Data Buffer
- 100ms Access Time
- Mount Rainer support
- Buffer Underrun Error prevention.

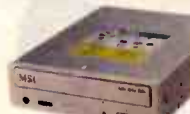


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IncVat **£30.54**
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MSI 52x CD-RW

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- BURN-Proof
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- Supports 99min CD-R discs.



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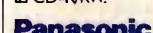


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- Up to 48x Audio Extraction
- Buffer Underrun protection by Seamless link
- Includes Nero 5 Software



Philips		Ex Vat	Inc Vat
SA48346	PCRWS224K 52x24x52 CDRW Int EIDE Kit	26.99	31.71
SA48217	JackRabbit 3 CDRW DVD MP3 Player USB 2.0	138.00	162.15

Philips JackRabbit 3

- Mobile DVD Player
- External CD ReWriter (32x10x40)
- Audio/MP3 CD Player
- 12x DVD-ROM.



Philips DVDRW416K

- Writing Speed: 4x DVD+R, 2.4x DVD+RW
- High Speed CD Recording (16x10x40)
- ATAPI Interface



ExVat **£128.00**
IncVat **£150.40**
Order SA48027



Simply 52x CDRW Bundle

- 52x Write, 24x Rewrite, 52x Read
- BURN-Proof
- Maximum 48x audio extraction
- Motorized easy touch tray loading
- Enhanced IDE/ATAPI Interface
- 2MB Internal Buffer.



ExVat **£37.99**
IncVat **£44.64**
Order SA49303

Includes 50 Spindle pack of 52x speed media

Simply computers

Jewel Cases

A place for every CD. Keep your CDs neat, protected and organised! Imation's Slim Design CD Storage Cases gives you half the thickness of standard jewel cases, with their innovative, patent-pending design. Convenient protection for all your discs.



		Ex Vat	Inc Vat
SA35102	25 pack Neon Jewel Cases	2.75	3.23

Firewire or USB2 Hard Drives



- Up to 500GB extra storage
- Stylish, sleek d2 aluminium design
- Fast speed data transfer
- Ease of use - Plug and play
- Standalone, stack or rack.

Lacie		Ex Vat	Inc Vat
SA56016	40GB 5400rpm USB2 HDD 'd2 model' + cbl	83.40	97.99
SA55472	80GB 7200rpm USB2 HDD 'd2 model' + cbl	108.94	128.00
SA55473	120GB 7200rpm USB2 HDD 'd2 model' + cbl	138.72	163.00
SA63229	120GB 7200rpm Firewire HDD 'd2 model' + cbl	143.83	169.00
SA70200	200GB 7200rpm Firewire HDD 'd2 model' + cbl	208.51	245.00
SA70721	320GB 7200rpm Firewire HDD 'd2 model' + cbl	268.94	316.00

*FREE 10pk CD-R when you buy CD/DVD Printer

- Prints directly onto CD or DVD
- No need for labels
- Includes 10pk TDK speed x CD-R media



ExVat **£65.52**
IncVat **£76.99**
Order SA35111

Classic USB2 CD-RW

- Buy one and move this portable peripheral from desk to desk. Take it home or share it with friends.
- Multitread capable
- Integrated headphone connection with volume control.



ExVat **£61.27**
IncVat **£71.99**
Order SA56810



USB2.0 CD-RW 52x24x52

The Iomega CD-RW is a powerful complement to any computer. It reads, writes or rewrites most types of CD formats, making it an ideal solution for copying and distributing files in a cost-effective way.



- For the fastest, easiest way to save and share music, photos and more.
- High speeds let you burn a 60min CD in less than 3 minutes!!
- Simple plug and play functionality, buffer under-run protection, and Iomega HotBurn Pro software for easy CD customisation.

ExVat **£93.62**
IncVat **£110.00**
Order SA70257



CD-R Media

Code	Brand	Speed	Quantity	Pack	Price Ex.VAT Inc.VAT
SA15819	Maxell	24x	10 pack	Jewel	3.99 4.69
SA15904	TDK	48x	10 Pack	Jewel	3.55 4.17
SA15906	TDK	48x	10 pack	Jewel	3.20 3.76
SA15988	Maxell	32x	10 pack	Jewel	5.10 5.99
SA15627	Sony	48x	10 pack	Jewel	3.85 4.52
SA48215	Plextor	48x	10 pack	Slim Case	3.99 4.69
SA15935	Maxell	48x	25 pack	Spindle	7.49 8.80
SA15763	Imation	48x	25 pack	Spindle	7.35 8.64
SA15873	Sony	48x	25 pack	Jewel	8.35 9.81

CD-RW Media

Code	Brand	Speed	Quantity	Pack	Price Ex.VAT Inc.VAT
SA35085	TDK	48x	50 pack	Cakebox	10.99 12.91
SA35025	Imation	48x	50 pack	Spindle	14.99 17.61
SA15820	Maxell	48x	50 pack	Spindle	14.25 16.74
SA15954	Sony	48x	50 pack	Spindle	13.99 16.44
SA48216	Plextor	48x	50 pack	Spindle	11.99 14.09
SA35099	Maxell	48x	100 pack	Spindle	33.99 39.94
SA15950	Imation	48x	100 pack	Jewel	42.00 49.35
SA35110	Simply	52x	50 pack	Spindle	12.49 14.68

Code	Brand	Speed	Quantity	Pack	Price Ex.VAT Inc.VAT
SA15382	Imation	up to 4x	single	Jewel	0.54 0.63
SA15282	Maxell	up to 4x	single	Jewel	0.50 0.59
SA15318	Sony	up to 4x	single	Jewel	0.79 0.93
SA15776	TDK	up to 12x	single	Jewel	0.80 0.94
SA35112	TDK	up to 4x	10 pack	Jewel	7.25 8.52
SA15955	Sony	up to 10x	10 pack	Jewel	7.99 9.39

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VD Dual Format Drives

Sony DRU-510A

Writing Speed: 4x DVD+RW,
4x DVD-R, 2x DVD-RW,
4x DVD-R, 10x CD-RW,
10x CD-R
ATAPI Interface
8MB Buffer

ExVat **£191.00**
IncVat **£224.43**
Order SA49259



TDK Dual Format

Writing Speed: 4x DVD+R,
4x DVD+RW, 4x DVD-R,
4x DVD-RW, 16x CD-R,
10x CD-RW
Internal E-IDE (ATAPI)

ExVat **£164.00**
IncVat **£192.70**
Order SA49249



Plextor PX-708A

Writing speeds: 8x DVD+R, 4x
DVD+RW, 4x DVD-R, 2x DVD-RW, 40x
DVD-R, 24x CD-RW, 12x DVD-ROM, 40x
CD-ROM
ATAPI Interface

ExVat **£191.00**
IncVat **£224.43**
Order SA49500



Pioneer DVR-A06

Writing Speeds: 4x DVD+R,
4x DVD+RW, 4x DVD-R,
4x DVD-RW
Internal E-IDE Interface

ExVat **£159.00**
IncVat **£186.83**
Order SA49487



Teac DV-W50DK

Writing speeds: 4x DVD+R,
4x DVD+RW, 4x DVD-R,
4x DVD-RW, 16x CD-R, 10x
CD-RW
ATAPI Interface
8MB buffer.

ExVat **£149.00**
IncVat **£175.08**
Order SA49490



DVD Media

Disc Type	Code	Brand	Size	QTY	Pack	Price	
						Ex.VAT	Inc.VAT
	SA15760	Maxell	4.7GB	single	AC*	2.75	3.23
	SA35053	TDK	4.7GB	single	Jewel	2.50	2.94
	SA35038	Imation	4.7GB	5 pack	Jewel	8.99	10.56
	SA35003	Sony	4.7GB	5 pack	Jewel	9.75	11.46
	SA35036	Imation	4.7GB	5 pack	Jewel	9.25	10.87
	SA35109	Maxell	4.7GB	5 pack	AC*	14.99	17.61
	SA35004	Sony	4.7GB	5 pack	Jewel	9.75	11.46
	SA35104	TDK	4.7GB	5 pack	Jewel	9.65	11.34
	SA35037	Imation	4.7GB	5 Pack	Jewel	15.99	18.79
	SA35105	Maxell	4.7GB	5 pack	AC*	16.99	19.96
	SA35001	Sony	4.7GB	5 pack	Jewel	18.49	21.73
	SA35106	TDK	4.7GB	5 pack	Jewel	16.75	19.68
	SA35039	Imation	4.7GB	5 pack	Jewel	15.99	18.79
	SA35107	Maxell	4.7GB	5 pack	AC*	25.50	29.96
	SA35002	Sony	4.7GB	5 pack	Jewel	18.49	21.73
	SA35108	TDK	4.7GB	5 pack	Jewel	15.49	18.20
	SA15895	Imation	4.7GB	single	Cartridge	5.25	6.17
	SA15823	TDK	4.7GB	single	Cartridge	7.99	9.39
	SA15408	Maxell	5.2GB	single	Cartridge	9.99	11.74
	SA15881	TDK	9.4GB	single	Cartridge	10.89	12.80

*Amaray Case.



FireWire Ethernet Disk, Network storage



- Share data amongst users
- Independent stand alone storage unit
- Huge opportunities for expansion
- Backup function with scheduler
- Easy administration through web browser.



Code	Product	Ex Vat	Inc Vat
0197	80GB Ethernet Disk, 7200rpm hard drive, 19" rack	398.30	468.00
6007	PocketDrive 40GB inc FireWire & USB2 cables	143.83	169.00
0639	PocketDrive 80GB inc FireWire & USB2 cables	258.72	304.00
0723	PocketDrive 40GB USB2 bus powered	118.30	139.00
0310	USB2 CDRW 52x24x52x + s/w + cables + media	78.29	91.99
0742	FireWire & USB2 DVD-/RW 4x24x12 & CDRW	193.19	227.00

Omega Storage



Code	Product	Ex Vat	Inc Vat
62233	Zip 250MB USB-Powered Drive	65.52	76.99
66237	Zip 750MB USB 2.0 Ext. Drive	81.69	95.99
70374	Zip 750MB + FREE USB2.0 4-Port PCI Card Starter Kit	97.87	115.00
15961	Zip 750MB 10Pk Disks	73.18	85.99
63752	40x12x48x Ext. FireWire CD-RW Drive	111.49	131.00
63959	20GB USB 2.0 Mobile	101.28	119.00
63960	40GB USB 2.0 Mobile	119.15	140.00
63961	40GB FireWire Mobile	123.40	145.00
63962	80GB USB 2.0 Desktop	117.45	138.00
63963	120GB USB 2.0 Desktop	148.94	175.00
63964	120GB FireWire Desktop	148.94	175.00
655766	Zip 750MB FireWire External Drive	92.77	109.00
655767	Zip 750MB Atapi Internal Drive	91.91	108.00

USB Personal Storage

The must-have storage of the
21st century!

- Store important files, MP3, video, pictures, presentations, documents and take it with you
- Ideal for carrying files between home and office, Mac or PC
- 32MB to 1GB available
- Read/Write protection via Keysafe
- File management via MyKey
- Now available as USB2 (256MB/512MB/1GB).



Disgo	Ex Vat	Inc Vat
SA63343 32MB USB	24.67	28.99
SA63344 64MB USB	35.74	41.99
SA63345 128MB USB	48.50	56.99
SA63870 256MB USB	80.84	94.99
SA66405 512MB USB	157.45	185.00
SA66720 256MB Pro USB2	111.49	131.00
SA66721 512MB Pro USB2	184.68	217.00
SA66722 1GB Pro USB2	277.45	326.00

Firelite Portable Hard Drives

- Bus powered drives - power from your USB port for true mobile computing
- FireWire or USB2.0 connectivity includes cables
- Fast 40mb/sec peak transfer rate (FireWire)
- Available from 20GB to 60GB.



SmartDisk	Ex Vat	Inc Vat
SA70386 FireLite USB2.0 40GB 2.5" DD Bus Powered	122.55	144.00
SA70387 FireLite USB2.0 60GB 2.5" DD Bus Powered	166.81	196.00
SA56800 80GB USB2.0 hard drive	105.53	124.00
SA56801 120GB USB2.0 hard drive	138.72	163.00
SA56802 80GB FireWire hard drive	128.51	151.00
SA56803 120GB FireWire hard drive	144.68	170.00
SA70582 Black USB Floppy Drive 2x Speed	30.63	35.99
SA70920 64MB USB Flash Drive	23.82	27.99
SA70921 128MB USB Flash Drive	39.14	45.99
SA70922 256MB USB Flash Drive	54.46	63.99
SA70923 512MB USB Flash Drive	124.26	146.00



DVD+/-RW Firewire & USB2

- Includes MyDVD Authoring Software
- High speed burning for data backup, archiving, DVD creation
- Stylish d2 design, rack, stack
- Cables and media included.

Order SA70742
ExVat **£193.19**
IncVat **£227.00**



FX-50 DVD+/-RW Drive

- Compile, save and share your movies, music, data and photos
- Connects to USB-2 & FireWire/i.LINK
- Buffer under run prevention and Active Write Control (AWC)
- Including complete Video editing and DVD authoring software suite

Order SA56351
ExVat **£243.40**
IncVat **£286.00**



DVD+/-RW Internal Drive

- DVD+RW 4x2.4x12x
- DVD-RW 4x2x12x
- CD-RW 16x10x40x
- Record and archive up to 4.7GB of data files on a DVD
- Imation HotBurn Pro software included

Order SA70666
ExVat **£144.68**
IncVat **£170.00**



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RADEON™ 9800 Series is the world's fastest and most visually advanced 3D performer, powering cinematic rendering and animation with 128MB DDR memory and an advanced, 8-pixel pipeline architecture and DX9.0 support.

Connect 3D	Ex Vat	Inc Vat
SA48319 9800 Pro 128MB DDR + DVI + TV	279.00	327.83
SA49247 9600 Pro 128MB DDR DVI TV	119.00	139.83
SA49248 9600 128MB DDR DVI TV	CALL	
SA48165 9500 Pro 128MB DDR TV-Out + DVI	166.00	195.05
SA48314 9500 64 MB DDR + DVI + TV	139.00	163.33
SA48315 9500 128 MB DDR + DVI + TV	106.00	124.55
SA48323 9200 64MB DDR + DVI + TV	46.99	55.21
SA48324 9200 128MB DDR + DVI + TV	50.99	59.91
SA48316 All-in-Wonder 9700 Pro 128MB DDR	276.00	324.30
SA48317 All-in-Wonder 9000 Pro 64MB DDR	98.99	116.31

MSI Graphics

- MSI GeForce FX5600
- Powered by nVIDIA GeForce FX 5600 GPU
- T.O.P Tech Cooler - ultra cooled and silent fansink
- Dual VGA output
- Supports AGP 8X
- Microsoft DirectX 9.0 and OpenGL 1.4 optimisation and support.

MSI	Ex Vat	Inc Vat
SA49294 FX5600-VTD8 256MB DDR 8XAGP TV OUT DVI-I	112.00	131.60
SA48186 Ti4800SE-VTD8x 128MB DDR TV Out Video In DVI	126.00	148.05
SA48187 Ti4200-VTD8x 128MB DDR TV Out Video In DVI	106.00	124.55
SA48188 MX440-TD8x LITE 64MB DDR TV Out DVI	55.99	65.79
SA48189 MX440SE-T 64MB DDR TV Out	37.99	44.64

GAINWARD

Gainward GeForce4 PowerPack!

	Ex Vat	Inc
SA48301 Ultra/750-8x XP 128MB "Golden Sample" Firewire	128.00	150
SA48302 Ultra/750-8x XP 128MB "Golden Sample"	126.00	148
SA48021 Ultra/650-8x XP 128MB "Golden Sample"	126.00	148
SA48150 Ultra/650-8x TV/DVI 128MB	72.99	85
SA48108 Pro/600-8x XP 64MB "Golden Sample"	62.99	74
SA48110 Pro/600-8x XP 64MB	59.99	70
SA48111 Pro/600-8x TV/DVI 64MB	46.99	55

Sapphire Graphics

RADEON 9800 ATLANTIS Pro boasts a host of high end features, including:

- 128MB of DDR memory
- Cinematic Rendering clock speeds
- Dual-display configuration including VGA, DVI-I and s-video connectors.

Sapphire	Ex Vat	Inc Vat
SA48133 Radeon 9800 Pro Atlantis 128MB DDR DVI 8xAGP	256.00	300.80
SA49233 Radeon 9700 Pro Atlantis 128MB Ultimate DDR DVI 8xAGP	279.00	327.83
SA49235 All In Wonder Radeon 9700 Pro 128MB DDR DVI TV 8xAGP	279.00	327.83
SA49236 Radeon 9500 Pro Atlantis 128MB DDR DVI TV Out 8xAGP	121.00	142.18
SA49237 Radeon 7500LE 128MB SDR DVI TV Out	39.99	46.99

Sparkle GeForce4 FX5200

The nVIDIA GeForce FX family of GPUs ushers in a new era of graphics and gaming. With a GeForce FX powering your graphics experiences, you can run applications and games at higher resolutions and at speeds never before possible!

Sparkle	Ex Vat	Inc Vat
SA49231 GeForce4 FX5200 128MB DDR	86.99	102.21
SA62123 32MB PCI RIVA TNT2 M64	26.99	31.71
SA62125 32MB AGP RIVA TNT2 M64	24.99	29.36
SA63939 64MB AGP GeForce2 MX400	29.99	35.24
SA63942 64MB AGP GeForce MX440 DDR TV	46.99	55.21

Matrox Video Editing

- Edit your films, make professional looking DVD's and have fun with this award-winning package.
- Capture and record to DV, S-VHS and VHS tapes.
- Realtime Effects - NO RENDERING!
- Includes Full Adobe Premiere Pro and necessary software and cables.



Matrox Video Editing Suites	Ex Vat	Inc Vat
SA49523 RTX10 Xtra - SOHO user	359.00	421.83
SA49524 RTX10 Xtra - Professional user	689.00	809.58
SA62636 RTX200 - Professional user	556.00	653.30

Studio Deluxe

- Drag and drop editing
- Create DVD style menus
- Create video and photo slideshows
- Add music from CD or MP3
- Share your movies.



Pinnacle	Ex Vat	Inc Vat
SA66250 Studio DV V.8	56.99	66.96
SA66248 Studio Deluxe V.8	129.00	151.58
SA84440 InstantCopy	17.86	20.99
SA84484 InstantCD/DVD	30.99	36.41
SA63895 DV500 DVD	343.00	403.03

PINNACLE SYSTEMS

Hauppauge DEC2000-t

- Stand-alone box converts analogue TVs to receive digital terrestrial channels
- Widescreen TV, sharper sound and more choice
- Upgradable to digital VCR functions through USB port.



Hauppauge	Ex Vat	Inc Vat
SA48350 DEC* 1000 T	65.99	77.54
SA48224 DEC* 2000 T	84.99	99.86

Adaptec New VideoOh! DVD Media Centre

VideoOh!™ DVD Media Center is an all-in-one solution for watching, controlling and recording TV on your PC. The solution easily converts analog and digital media into MPEG files. As a personal video recorder (PVR), Media Center can record TV shows, time-shift and burn to DVD or video CD.



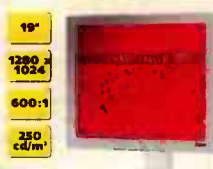
- Watch & control live TV on your PC
- MPEG-2 Hardware Encoding for Highest Video Quality

- Enhance your Video with Sound, Titles and Special Effects
- Burn TV, Home Movies & Photos to DVD & Video CD.

Adaptec	Ex Vat	Inc
SA49493 VideoOh! DVD Media center 2410 PCI kit	93.99	110
SA49494 VideoOh! DVD Media center 2310 USB 2.0 Kit	104.00	122
SA64958 VideoOh! DVD	93.99	110
SA48016 VideoOh! CD	39.99	46
SA48017 VideoOh! PCI	79.99	93
SA64959 XHub for Notebooks 4 Port USB 2.0 Hub	23.99	28
SA48360 DuoConnect for Notebooks	129.00	151
SA48361 SATAConnect Host Controller Kit	31.99	37.5

Digital 19" TFT LCD

- AS4821DT
- MVA TFT LCD
- Features: DVI-I, USB, removable base, economy mode, sRGB
- TCO-99
- 3 year on-site UK warranty.



ExVat £634.89
IncVat £746.00
Order SA65060

iiyama

Super Flat 17" CRT

- PR705F
- Trinitron CRT
- TCO 99 compliant
- Visual flatness with no image distortion or reflection
- Ultra-high contrast tube produces stronger colours.



CTX

ExVat £89.36
IncVat £105.00
Order SA53385

L1710B 17" LCD

LG's 17" LCD Monitor features DVI-I digital input, a high resolution of 1280x 1024 and an extremely fast response time of 16ms. In addition, the monitor has an integrated power block and can be easily wall mounted.



LG

ExVat £286.01
IncVat £337.00
Order SA65116

High Performance 15" LCD

- Ultra-thin 1" panel
- Full 90 degree tilt
- Wall mounting brackets included
- Analogue Interface.



ExVat £194.89
IncVat £229.00
Order SA65374

SAMSUNG

Great Value SM753S 17" CRT

- FST CRT
- Natural Colour TM software helps users synchronise one screen colour with printed colour.



ExVat £69.78
IncVat £81.39
Order SA65175

SAMSUNG

109540 19" Monitor

- LightFrame™ 3 - 2 x Normal Brightness
- Flat square High Contrast CRT with 0.27mm pitch
- World's shortest 19-inch conventional monitor with maximum depth of only 441mm/17.3"
- Multimedia Base and USB Hub option
- TCO99 certified.



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LightFrame™

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- MVA Panel
- 25ms response time
- 170° viewing angles
- DVI interface
- Pivot screen**
- 3 year on-site warranty*
- UK & Ireland
- ** Pivot software included.

ExVal **£321.70**
IncVal **£378.00**
Order SA65174

Wireless Mouse & Keyboard

Comes in
stylish black
and silver to
match your
display.



ExVal **£33.18**
IncVal **£38.99**
Order SA65504

17" EX700F PLUS CRT

- Black and Silver Bezel
- 0.25 Dot Pitch
- High Contrast Screen
- 110MHz
- TCO'99
- 3 year on-site warranty*
- * UK and Ireland.



ExVal **£93.62**
IncVal **£110.00**
Order SA65453

ProLite E430S 17" TFT LCD



- Features: Removable base/VESA compliant mounting plate, Kensington lock
- TCO-99 compliant
- 3 year on-site UK warranty.

ExVal **£299.57**
IncVal **£352.00**
Order SA65322

ProLite E380S-B 15" TFT LCD

- Features: OPQ mode, removable base/VESA compliant mounting plate, Kensington lock
- TCO-99
- 3 year on-site UK warranty.



ExVal **£188.09**
IncVal **£221.00**
Order SA65376

iiyama

8.1" TFT Photon Monitor



- VGA and DVI to ADC connections
- Base and wall mount options
- Colour calibration optional
- MAC & PC, Plug and play
- Photon 20.1" also available.

ExVal **£494.47**
IncVal **£581.00**
Order SA70057

Great Value L1811S 18.1" LCD

LG's 18.1" LCD monitor combines an analogue input with superior image quality and a slim-line design that can be free standing or wall-mounted. An extra wide viewing angle, high resolution and a vivid range of colours makes the monitor perfect for any working environment.



ExVal **£348.94**
IncVal **£410.00**
Order SA65549

LG

Displays for all the family **NEW**

W Series LCDs

- Stylish "Floating" design ideal for surfing, working and gaming
- Internal power supply
- Backlight control (high/medium/low)
- Single analogue RGB (HD15) input
- 3 Megapixel resolution (1280x1024) / 0.7 Megapixel (1024x768) - (S53)

- 170 degrees (160 on S53 & S73) maximum horizontal viewing angle / 170 degrees (150 on S53 & S73) maximum vertical viewing angle
- Advanced digital smoothing
- Available in Navy, Grey and White
- Swivel stand supplied.

SONY	Ex Val	Inc Val
SA65550 SDM-S53	205.11	241.00
SA65551 SDM-S73	336.17	395.00
SA65552 SDM-S93	557.45	655.00



15" 1024 x 768 400:1 250 cd/m²

19" 1280 x 1024 250 cd/m²

Professional Range



- Designer slim bezel (SDM-P82) and wide-screen LCD (SDM-P232W)
- High contrast and brightness
- Triple input flexibility with DVI-I and two HD15
- ECO mode for 25% power consumption savings
- High resolution.

ExVal **£590.64**
IncVal **£694.00**
Order SA65005

SONY

Multimedia and Gaming LCDs

- Incredible new displays from Sony
- Amazing anti-reflective screen
- Super fast graphics processor delivers consistently high quality images and video
- High quality stereo speakers
- Adjustable height - Ergostand
- Triple input flexibility with DVI-D and two HD15 connectors
- Three inch sizes, two colours.

Sony	Ex Val	Inc Val
SA65516 SDM-X53 15" LCD	267.23	314.00
SA65517 SDM-X73 17" LCD	409.36	481.00
SA65518 SDM-X93 19" LCD	510.64	600.00



19" 1280 x 1024 400:1 250 cd/m²

150P4CS 15" XGA LCD



- LightFrame™ for the brightest, sharpest and most vivid images ever!
- DVI Digital and VGA analogue interfaces
- Embedded universal AC power supply
- sRGB compliance
- Adjustable viewing height
- Adjustable tilt function
- Auto adjustment optimises picture quality.

ExVal **£239.15**
IncVal **£281.00**
Order SA65466

PHILIPS

Stylish 192V 19" LCD

- Exceptional performance at a price that won't break the bank
- Slim Silver bezel
- 140 degrees maximum horizontal viewing angle / 120 degrees maximum vertical viewing angle
- 25 ms Response Time
- Analogue Interface
- 3 year warranty.

ExVal **£415.32**
IncVal **£488.00**
Order SA65462

SAMSUNG



19" 1280 x 1024 300:1 250 cd/m²

Monitors

15" LCD MONITORS	ExVal	IncVal
SA67203 ADI 15" A600	182.98	215.00
SA65183 ADI 15" S500 BLK	209.36	246.00
SA55110 ADI 15" S600s SLVR/BLK	280.00	329.00
SA65524 CTX S501A MM Beige	165.96	195.00
SA65525 CTX S501AB MM Black	169.36	199.00
SA65526 CTX S521A MM Blk/Silver	177.87	209.00
SA65004 CTX 15" S530	216.17	254.00
SA53989 CTX 15" PV520A	202.55	238.00
SA65375 Iiyama 15" ProLite E380S	188.09	221.00
SA65376 Iiyama 15" ProLite E380S-B	188.09	221.00
SA54943 LG 15" L1510S	173.62	204.00
SA65218 Mitac 15" 15VCE	154.89	182.00
SA53469 NEC 15" 1550V	214.47	252.00
SA65312 Philips 15" 1505AFG	168.51	198.00
SA65466 Philips 15" 150P4CS	239.15	281.00
SA65455 Samsung SM152V 15" IVORY	168.51	198.00
SA65456 Samsung SM152V 15" SILVER	168.51	198.00
SA65516 Sony 15" SDM-X53 IVORY	267.23	314.00
SA65550 Sony 15" SDM-S53 IVORY	205.11	241.00
17" LCD MONITORS		
SA65117 ADI 17" A700	336.17	395.00
SA53399 CTX 17.1" PV720A	298.72	351.00
SA65195 CTX 17" S700	229.79	270.00
SA65445 CTX 17" S730	279.15	328.00
SA65174 CTX 17" P722I	321.70	378.00
SA65284 CTX 17" P722E	361.70	425.00
SA65322 Iiyama 17" ProLite E430S	299.57	352.00
SA65323 Iiyama 17" ProLite E430S-B	299.57	352.00
SA65208 Mitac 17" 17ABS	286.81	337.00
SA65460 Samsung SM172V 17" IVORY	246.81	290.00
SA65461 Samsung SM172V 17" SILVER	246.81	290.00
SA65551 Sony 17" SDM-S73	336.17	395.00
SA65517 Sony 17" SDM-X73	409.36	481.00

Iiyama Vision Master Pro 413

- 17" (16" viewable) DiamondTron M²
- Horizontal sync: 30-96kHz
- Max resolution: 1600 x 1200 @ 75Hz or 1280 x 1024 @ 87Hz
- TCO-99
- 3 year on-site UK warranty.

Order SA65431
ExVal **£147.23**
IncVal **£173.00**



iiyama

18" - 22" LCD MONITORS

SA70057 Lacie 18" Photon18 Blue	494.47	581.00
SA54096 CTX 18.1" PV880C MM	518.30	609.00
SA65179 Iiyama 18.1" AS4612UT	505.53	594.00
SA65180 Iiyama 18.1" AS4612UT/BK	508.94	598.00
SA65253 CTX 19" P922E	454.47	534.00
SA65060 Iiyama 19" AS4821DT/BK	634.89	746.00
SA65552 Sony 19" SDM-S93	557.45	655.00
SA70058 Lacie 20.1" Photon20 Blue	989.79	1163.00
SA65190 LG 20" L2010P	967.66	1137.00
SA65177 Iiyama 20.1" AU5131DT	963.40	1132.00
SA65427 Samsung 21" 210T	1085.11	1275.00
SA65429 Samsung 24" 243T	1758.30	2066.00
15" - 17" CRT MONITORS		
SA65226 ADI 15" P55	70.63	82.99
SA67115 CTX 15" VL500	62.12	72.99
SA65000 Iiyama 15" VM1352	74.89	87.99
SA65227 ADI 17" P77	85.96	101.00
SA65146 Iiyama 17" LS704U G	84.25	98.99
SA67117 CTX 17" VL700	68.08	79.99
SA53386 CTX 17" EX710F	98.72	116.00
SA55263 CTX 17" MS700	91.91	108.00
SA55200 Iiyama 17" VM1413	124.26	146.00
SA65122 Philips 17" 107T41	91.06	107.00
SA65175 Samsung 17" SM753S	69.78	81.99
18" - 22" CRT MONITORS		
SA53389 CTX 19" VL950T	110.64	130.00
SA65150 Iiyama 19" VM454	228.09	268.00
SA65223 Iiyama 19" VM506	386.38	454.00
SA65123 Philips 19" 109S40	119.15	140.00
SA53394 CTX 21" PR1400F	498.72	586.00
SA65118 Iiyama 22" Pro 513	339.57	399.00
SA51853 Sony 24" GDM-FW900	1134.47	1333.00

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Keyboards & Mice

ACCURATUS MICE		ExVat	IncVat
SA53927	Accuratus 1320 Mouse Wht	4.25	4.99
SA53928	Accuratus 1320 Mouse Blk	6.80	7.99
SA52595	Accuratus 4D Roller Mouse	7.65	8.99
SA52596	Accuratus 3 Button Mouse	17.86	20.99
ACCURATUS KEYBOARDS			
SA51857	Accuratus 280 M/Media	16.16	18.99
SA33365	ACC210 Standard	17.86	20.99
SA34372	ACC298 Standard	27.23	31.99
SA51858	Accuratus Mini Keyboard	47.65	55.99
BELKIN KEYBOARDS			
SA66738	ClassicKeyboard Black, PS/2	8.50	9.99
SA66739	ClassicKeyboard Black, USB	8.50	9.99
SA67003	ClassicKeyboard USB	22.97	26.99
BELKIN MICE			
SA66729	3 Button Mouse PS/2 Black	3.40	3.99
SA66730	3 Button Mouse USB Black	4.25	4.99
SA66732	3 Button Mouse USB White	4.25	4.99
SA66726	2 Button Wheel USB/PS/2 Blk	5.95	6.99
SA66727	2 Button Wheel PS/2 Black	4.25	4.99
SA66728	2 Button Wheel PS/2 White	4.25	4.99
SA66736	MiniScroller 2 button USB/PS/2	16.16	18.99
KENSINGTON MICE			
SA67922	Mouse-in-a-box Optical	11.91	13.99
SA67025	Mouse-In-a Box Scroll	12.76	14.99
SA52330	Mobile Optical Pocket Mouse	11.06	12.99
SA66475	PocketMouse Pro Wireless	24.67	28.99
LOGITECH MICE			
SA66408	Mini Mouse Optical	13.61	15.99
SA66412	Marble Mouse	15.31	17.99
SA66411	MX 300 Optical Mouse	23.82	27.99
SA66410	MX 500 Optical Mouse	24.67	28.99
SA66610	Cordless MouseMan Optical	31.48	36.99
SA66409	MX 700 Cordless Optical	39.99	46.99
LOGITECH KEYBOARD			
SA68471	Deluxe Access Keyboard	8.50	9.99
SA66417	Internet Navigator Keyboard	15.31	17.99
SA66416	Cordless Desktop Deluxe	31.48	36.99
SA66415	Cordless Desktop Navigator	51.91	60.99
SA66413	Cordless Desktop Optical	58.71	68.99
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SA68286	Opti-Glo Mouse USB	16.16	18.99
SA68318	Opti-Pro Mouse USB	17.86	20.99
SA66406	Opti-Freestyle Mouse USB	26.37	30.99
MICROSOFT KEYBOARDS & MICE			
SA34621	Basic Mouse	6.80	7.99
SA23592	Intellimouse 3.0	8.50	9.99
SA86276	Wheel Mouse Optical v1.1	13.61	15.99
SA61613	Trackball Optical	18.71	21.99
SA86287	Notebook Optical Wht Mouse	15.31	17.99
SA86377	Notebk Optcl Wht Mouse Blk	16.16	18.99
SA86269	Optical Mouse Blue	19.57	22.99
SA67168	Intellimouse Optical	20.42	23.99
SA53754	Intellimouse Explorer 3.0	24.67	28.99
SA86268	W'less Optical Mouse Blue	25.52	29.99
SA86289	W'less Optical Mouse Black	26.37	30.99
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SA86376	W'less Optical Mouse Ice	26.37	30.99
SA86267	Internet Keyboard P/s 2	11.06	12.99
SA52646	Office Keyboard	22.97	26.99
SA86266	Natural Multimedia Keyboard Pro	27.23	31.99
SA53101	Wireless Intellimouse Expl	30.63	35.99

Mouse Mats & Keyboard Drawers

SA67470	Gel Mouse Wrist Pillow-Bk	7.65	8.99
SA67471	Gel Keyboard Wrist Pillow-Bk	7.65	8.99
SA68550	Gel Height Adjustable Wristrest-Blue	9.35	10.99
SA67956	Underdesk keyboard Drawer	18.71	21.98
SA67957	Desktop Keyboard Drawer	17.86	20.99
SA67973	Mouse Tray	9.35	10.99

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SA66525	Nisis EasyPen G2 6x4.5	22.12	25.99
SA66526	Nisis EasyPen G3 6x4.5	28.08	32.99
SA66528	Nisis EasyPen G5 6x4.5	60.42	70.99
SA66529	Nisis EasyPen G6 6x4.5	62.97	73.99

Optical Pilot Wheel Mouse

- Optical precision and performance
- Records motion optically without a ball
 - Smooth and precise
 - Fits right or left hand
 - 3-year guarantee
 - Plugs into USB or PS/2 port.

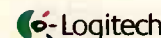


Logitech	Ex Vat	Inc Vat
SA66609 Pilot Wheel Mouse	9.35	10.99
SA66608 Optical Pilot Wheel Mouse	12.76	14.99

Marble Mouse

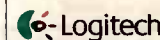
- Comfortable fit with optical performance
- Fits like a mouse, works like a trackball
 - Accurate and precise optical technology
 - No need for regular cleaning
 - Comfortable for left or right hand
 - USB and PS/2 connection
 - 3-year guarantee.

ExVat £15.31
IncVat £17.99
Order SA66412



Cordless Wheel Mouse

- Easy scrolling with cordless freedom
- Cordless comfort and control in a sleek shape that feels good in either hand
 - WebWheel™ provides scrolling and fast, easy Internet use.



Logitech	Ex Vat	Inc Vat
SA34247 Cordless Wheel Mouse	14.46	16.95
SA66607 Cordless Optical Mouse (USB-PS/2)	27.23	31.95

ValuMouse

- Quality benefits, branded value
- As an economical replacement for your original mouse, the Kensington® ValuMouse® is in a class by itself. Fits comfortably in either hand.

Kensington

	Ex Vat	Inc Vat
SA60414 2 button PS/2	3.40	3.99
SA60415 3 button PS/2-Serial	4.25	4.99
SA60416 2 button & scroll wheel PS/2-USB	4.25	4.99

Mouse-in-a-Box Optical™

- Optical Technology at an economical price
- 3 button (including Scroll Wheel) Optical Mouse
 - Metallic top with cool translucent base
 - Ultra high-speed Optical Sensor gives you smooth accurate movement on almost any surface.



ExVat £11.91
IncVat £13.99
Order SA67922

Mini-Wireless USB Optical Mouse

- The Belkin Mini Optical mice features a compact and light design ideal for mobile users.

Belkin	Ex Vat	Inc Vat
SA66796 Wireless USB Optical Mouse		CALL

CTX Wireless Keyboard & Mouse

- Unique A-Shape key structure. Allows hands, wrist and forearms to rest in a natural position when typing.



ExVat £33.18
IncVat £38.99
Order SA65504



Belkin Wireless Keyboard and Mouse Bundle

- Features digital radio frequency technology
- Works 6 feet from receiver
- Keyboard features 9 multimedia and Internet access keys
- Mouse works with both right and left-handed users
- Belkin Lifetime Warranty.



ExVat £22.97
IncVat £26.99
Order SA66740



Gel Wrist Supports

- Gel filling provides superior support and comfort
- Alleviates the strain of repeated hand motion
- Transparent coverings are easy to clean



Fellowes	Ex Vat	Inc
Blue Purple		
SA68407 SA68413 K'board wrist rest	7.65	8.99
SA68408 SA68414 Mouse mat	7.65	8.99
SA68409 SA68415 Flex rest	7.65	8.99

Microsoft Wheel Mouse

- Easy to set up and use
- Ambidextrous design
- Faster wheel scrolling
- 3 Customisable buttons
- PS/2 connection.



ExVat £6.80
IncVat £7.99
Order SA33841

Microsoft Optical Mouse

- Accurate and adaptable optical sensor
- How adaptable? Ever so! PC or Mac, USB or PS/2, left or right handed use, you can even pick your colour!
- Available in blue and special edition red.

ExVat £13.61
IncVat £15.99
Order SA86358

Microsoft Wireless Optical Mouse

- Wireless freedom combined with optical technology
- Ergonomic design for left or right handed use
- Available in blue and special edition Ice white wheel mouse.

ExVat £26.37
IncVat £30.99
Order SA86289



Microsoft Multimedia Keyboard

- Maximise the Digital Experience!
- With one touch buttons to surf the web, enjoy music & video and more.

ExVat £17.86
IncVat £20.99
Order SA86283



Microsoft Wireless Optical Desktop

- All in one Wireless Desktop Solution
- Stylish Design
- One touch desktop features



ExVat £47.65
IncVat £55.99
Order SA86285

Microsoft Wireless Optical Desktop Special Edition

- Wireless freedom in a new exciting ice-white colour for maximum performance and style on the desktop.

ExVat £56.16
IncVat £65.99
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1200
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Colour
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IncVat **£47.99**
Order SA70824

An attractive and affordable scanner that will get you started in no time at all. One-touch buttons provide automatic scanning and colour imaging.

HP ScanJet 3530



1200x
1200
dpi
48-bit
Colour
USB

The stylish 3530c comes in a sleek metallic case making it easy on the eye, as it is to use. One-touch scan, copy and e-mail.

ExVat **£54.46**
IncVat **£63.99**
Order SA63987

HP ScanJet 3670



1200
dpi
48-bit
Colour
USB
2.0

Stylish Scanner offering real versatility and value for money. One-touch scan, copy and Instant Share designed for Home Users.

ExVat **CALL**
IncVat **CALL**
Order SA73016

ScanJet 3690



1200
DPI
48-bit
Colour
USB
2.0

ExVat **CALL**
IncVat **CALL**
Order SA73017

This scanner has been designed for the active Home User's needs. Bundled imaging software. Ability to scan film slides/negatives.

HP ScanJet 3970



2400
dpi
48-bit
Colour
USB
2.0

Designed for Home Users for use with high quality photo projects. Ability to scan 35mm slides/negatives, with easy to use one-touch buttons.

ExVat **CALL**
IncVat **CALL**
Order SA73018

HP ScanJet 4570c



2400
dpi
48-bit
Colour
USB
2.0

This impressive scanner comes with 35mm slide and negative, Instant on performance and 5 shortcut buttons, it has an A4 flatbed, and is fast and versatile.

ExVat **£121.70**
IncVat **£143.00**
Order SA66464

CanonScan Lide 20

Easy-to-use, portable scanner that the "one-touch" feature makes books, magazines easy to scan as single sheets of paper. It also has Canon's powerful "fast multi photo mode" that scans many photos in one.

600x
1200
dpi
48-bit
Colour
USB
2.0

ExVat **£41.69**
IncVat **£48.99**
Order SA66205

CanonScan Lide 30



you can
Canon

1200x
2400
dpi
48-bit
Colour
USB
2.0

Compact Stylish Design, 3 one touch EZ scanning buttons - scan, copy, e-mail. One Pass Multi Photo Mode scans multiple photos collectively.

ExVat **£57.01**
IncVat **£66.99**
Order SA66204

CanonScan LIDE 50



1200
dpi
48-bit
Colour
USB
2.0

Beauty, speed and quality, that's what you get with the Lide 50.4 "EZ" buttons to make regular scanning tasks easier. The extensive software package including Adobe Photoshop Elements.

ExVat **£78.29**
IncVat **£91.99**
Order SA66573

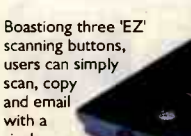
CanonScan N640PEX

As fast, lightweight LIDE technology to create superior quality scans. Whether you're scanning photos to email or to place documents, the scanner's input ensures great reproductions.

600x
1200
dpi
48-bit
Colour
USB
2.0

ExVat **£51.06**
IncVat **£59.99**
Order SA63347

CanonScan D1250U2



1200x
2400
dpi
48-bit
Colour
USB 1.1
&
USB 2.0

Boasting three "EZ" scanning buttons, users can simply scan, copy and email with a single press of the button. The D1250U2 easily accommodates the scanning of books and magazines.

ExVat **£83.40**
IncVat **£97.99**
Order SA63346

CanonScan 3000F



1200x
2400
dpi
48-bit
Colour
USB
2.0

Here's a scanner that provides high quality images of your films or documents whether your a power user of a first time user. Advanced CCD Technology, allows the output to be clear, sharp and true to the original.

ExVat **£61.28**
IncVat **£72.00**
Order SA66554

EPSON Perfection 1260 PHOTO

The perfect scanner for the busy time user. Packed with advanced features designed to make the whole process as straightforward as possible. The EPSON Perfection 1260 achieves amazing quality scans at an exceptional price. It also features a transparency unit as standard.



1200x
2400
dpi
48-bit
Colour
USB

ExVat **£58.71**
IncVat **£68.99**
Order SA66210

EPSON Perfection 1660 PHOTO

Ideal high quality scanner for the advanced home user. Fast scanning, simple to install and use. Built-in 35mm x 6 frame Transparency Unit can be used to scan multiple 35mm slides and negatives.



1600x
3200
dpi
48-bit
Colour
USB

ExVat **£88.51**
IncVat **£104.00**
Order SA66212

EPSON

EPSON Perfection 3200 PHOTO

The ultimate flatbed film-scanning solution for the photography enthusiast. Large built-in 4" x 9" Transparency Unit supports all common film formats. Dust & scratch removal with new SilverFast ACR.



3200x
6400
dpi
48-bit
Colour
USB

ExVat **£257.87**
IncVat **£303.00**
Order SA66553

EPSON Perfection 2400 PHOTO

Exceptional quality, ultra high-speed scanner for the advanced user. Built in 35mm x 6 frame Transparency Unit. RINT Image Matching compatible.



2400x
4800
dpi
48-bit
Colour
USB
2.0

ExVat **£146.38**
IncVat **£172.00**
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SCANMAKER 4900

Slimmest CCD Scanner on the market.

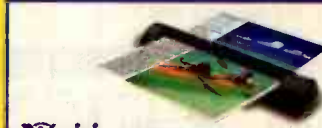
- A4 48-bit
- 2400 x 4800 dpi
- USB
- 7 Smart Buttons for automatic Scan, Copy and e-mail.



Order SA66481
ExVat **£91.06**
IncVat **£107.00**

MICROTEK

STROBE XP - Mobile Scanning



visioneer.

Order SA66454
ExVat **£108.94**
IncVat **£128.00**

- 600 dpi Optical
- 36-bit Internal Colour
- 10 seconds per page
- USB Powered.

The smallest flatbed scanner in the world



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• 36-bit colour
*Free carry case while stocks last.

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IncVat **£88.99**

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		ExVat	IncVat
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SA66554	CanonScan 3000F	61.28	72.00
SA66477	CanonScan 5000F	141.28	166.00
SA66476	CanonScan 8000F	152.34	179.00
HP			
SA63988	ScanJet 3570c (USB)	67.23	78.99
SA66464	ScanJet 4570c (USB 2.0)	121.70	143.00
SA66448	ScanJet 5550c (USB 2.0)	210.21	247.00
SA50929	HP Support Pack - ScanJets	34.03	39.99
MICROTEK			
SA63693	ScanMaker 4800 USB Photo	77.44	90.99
SA66542	ScanMaker 5900 inc TMA	135.32	159.00
SA66714	ScanMaker 6800	279.15	328.00
UMAX			
SA66462	Astra 4700 USB 2.0	64.67	75.99
SA66463	Astra 6700 USB2.0	107.23	126.00
VISIONEER			
SA66449	One Touch 5800 USB	39.99	46.99
SA66786	One Touch 6600 USB	43.40	50.99
SA66450	One Touch 8700 USB	60.42	70.99
SA66452	One Touch 9000 USB	67.23	78.99
SA66453	One Touch 9020 USB	81.69	95.99
SA66451	One Touch 8920 USB	93.62	110.00
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SA62581	CanonScan FS4000US	416.17	489.00
SA63121	Microtek FilmScan 35	99.57	117.00
SA63522	Microtek FilmScan 1800	187.23	220.00
SA63968	Microtek FilmScan 3600	369.36	434.00
SA63113	Minolta Dimage Scan Elite II	388.94	457.00
SA66468	Minolta Dimage Scan Dual III	212.77	250.00

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- PDF input and output
- Corporate Edition for concurrent licence management.

ABBY		ExVat	IncVat
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SA83478	FineReader 6.0 Pro Upgrade	38.29	44.99

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Kodak

2.0 MEGA PIXELS

Kodak CX4230



ExVat £123.40
IncVat £145.00
Order SA66246

SA66780	Shotz Imaging	79.99	93.99
SA66245	Kodak CX4210	94.47	111.00
SA66693	Olympus C150	98.72	116.00
SA66385	Fujifilm FinePix A202	102.13	120.00
SA66699	Konica KD-220Z	116.60	137.00
SA66246	Kodak CX4230	123.40	145.00
SA66387	Fujifilm FinePix A204 Zoom	138.72	163.00
SA66769	Sony DSC-P32	142.98	168.00
SA66759	Nikon Coolpix 2100	151.49	178.00
SA66702	EX52DDA Digital Camera	158.30	186.00
SA66580	Sony DSC-U20 Cybershot	169.36	199.00
SA63458	Sony Mavica MVC-FD200	254.47	299.00
SA70820	Oregon DS8228	76.59	89.99

3.0 MEGA PIXELS

OLYMPUS MJU300



ExVat £247.00
IncVat £291.00
Order SA66091

SA66769	Sony DSC-P32 Digital Camera	142.98	168.00
SA66247	Kodak DX4330 Digital Camera	168.51	198.00
SA66694	Olympus C350Z	171.06	201.00
SA66781	Kodak DX6340 Digital Camera	182.98	215.00
SA66395	Konica KD-3000Z	214.47	252.00
SA66787	Olympus C720UZ	220.43	259.00
SA66700	Konica KD-310Z	227.23	267.00
SA66703	Casio EX53DDA	234.04	275.00
SA66425	Casio QVR3 Digital Camera	246.81	290.00
SA70709	Canon IXUS II	254.47	299.00
SA66771	Sony DSC-P8	251.06	295.00
SA66704	Casio EX23DDA	264.68	311.00
SA66377	Kyocera Finecam S3X	279.15	328.00
SA66396	Konica KD 300Z	308.94	363.00
SA66399	Fujifilm FinePix F601 Zoom	337.02	396.00
SA70685	Oregon DS9300	182.98	215.00
SA70821	Kyocera L3V	228.94	269.00

4.0 MEGA PIXELS

NIKON Coolpix 2500



ExVat £214.47
IncVat £252.00
Order SA63226

SA70823	Kodak DX6440 - NEW	225.53	265.00
SA66372	Kodak LS443	257.87	303.00
SA66221	Olympus C-4000Z	254.47	299.00
SA66709	Photosmart 850	258.72	304.00
SA66426	Casio QVR4 Digital Camera	277.45	326.00
SA66376	Konica KD-400Z	264.68	311.00
SA66695	Olympus MJU400	294.47	346.00
SA66788	Olympus C-750UZ	338.72	398.00
SA66711	Canon Powershot S50	359.15	422.00
SA66465	Olympus C-50Z	360.00	423.00
SA70686	Kyocera Finecam S5	273.19	321.00
SA66757	Sony MVC-CD500	382.98	450.00
SA66177	Nikon Coolpix 4500	409.36	481.00
SA66706	Casio QV5700DDA	414.47	487.00
SA66370	Olympus C-5050Z	438.30	515.00
SA66772	Sony DSC-F717	509.79	599.00

DIGITAL CAMERA ACCESSORIES

HP			
SA53615	Hp Support Pack-Photosmart	47.65	55.99
KODAK			
SA66530	Kodak EasyShare docking station II	39.99	46.99

Photo Printers

HP PHOTO PRINTERS			
SA55112	Photosmart 130	98.72	116.00
SA55781	Photosmart 230	108.09	127.01
SA54804	Photosmart 7150	114.89	135.00
SA55782	Photosmart 7550	186.38	219.00
CANON PHOTO PRINTERS			
SA55341	BJ-S330 Printer	51.91	60.99
SA55468	I550	86.81	102.00
SA54758	BJ-S820 Colour Inkjet Printer	168.51	198.00

PC Web Cams

SA63726	Creative Labs Webcam USB	17.01	19.99
SA66206	Creative Labs Webcam Pro	27.23	31.99
SA66697	Creative Webcam Pro EX	39.99	46.99
SA66698	Creative PC-Cam 550	47.65	55.99
SA66214	Creative PC Cam 300	59.57	69.99
SA66521	Nisus Quickpic OP1 Digital	24.67	28.99
SA63062	Philips PCVC730K ToUcam	35.74	41.99
	Fun USB Camera		
SA63061	Philips PCVC740K ToUcam	34.89	40.99
	Pro USB Camera		
SA63063	Philips PCVC750K Scanning Webcam Pro 3D 60FPS	57.86	67.99

Continuous Shooting Mode

Lets you take a short burst of pictures so you can capture a moving object more easily.

Flash

LCD Screen

Frame your shot or just view your picture before taking the photo.

Optical - Digital Zoom

Digitally enlarge a selected area of your image with Digital Zoom. With Optical Zoom you can get up close but wont lose any image quality.

FUJIFILM



ExVat £245.96
IncVat £289.00
Order SA66219

Resolution - Mega Pixels
The higher the Mega Pixel resolution the bigger and better you can make your photos.

Memory
Whether it's removable memory or internal, in order to get as many great snapshots as those precious moments, is where you can store your memories.

Connection / Docking
This will allow a quick and easy link to your PC in order for you to download all your photos.

FUJIFILM FinePix A202

Stylish, compact entry-level camera with metallic finish body offering excellent value for money. Program auto exposure and 5 flash modes for great images in all conditions.



2.0 Mega Pixels
2.5x Optical Zoom
16MB xD Card
1.5" LCD Screen

ExVat £102.13
IncVat £120.00
Order SA66385

FUJIFILM FinePix A203 Zoom

Slim, stylish pocket-sized design marks this mid-range model out as exceptional. A 3X optical zoom lens delivers results that are sharp and lifelike whilst the program auto exposure mode makes taking great photos easy.



2.0 Mega Pixels
2.5x Optical Zoom
1.0x Optical Zoom
16MB xD Card

ExVat £148.94
IncVat £175.00
Order SA66386

FUJIFILM FinePix A204 Zoom

The FinePix A204 Zoom combines 2.0 Megapixel performance and long battery life (up to 250 shots, LCD off, 50% flash use). It's Multimedia features Movie mode (20-sec clips at 320x240 pixels) - no sound, and also Webcam and video conferencing.



2.0 Mega Pixels
2.5x Optical Zoom
3.0x Optical Zoom
16MB xD Card

ExVat £138.72
IncVat £163.00
Order SA66387

FUJIFILM FinePix A303 Zoom

Perfect mid-range camera that combines sleek styling with 3.2 megapixel resolution. Easy operation ensures perfect pictures at the press of a button. Supplied FinePix Viewer software makes image download and management equally simple.



3.2 Mega Pixel
3.2x Optical Zoom
3.0x Optical Zoom
16MB xD Card

ExVat £203.40
IncVat £239.00
Order SA66388

FUJIFILM FinePix S602 Zoom

At the heart of the FinePix S602 Zoom lies a 3G Super CCD sensor, delivering an output resolution of 6 million recorded pixels. It boasts better colour reproduction, lower levels of noise and class-leading, ultra-high sensitivity for the ultimate in richly detailed, high resolution images.

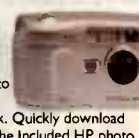


3.1 Mega Pixels
4.4x Optical Zoom
6.0x Optical Zoom
16MB 5M

ExVat £418.72
IncVat £492.00
Order SA63700

HP PhotoSmart 320

Enjoy Solid performance with the 320. Get great results for sharing photos and capture the action using the video-clip feature. Auto exposure and auto flash gives you great looking pictures without the guesswork. Quickly download new photos to your PC using the Included HP photo imaging software.



2.1 Mega Pixel
4.0x Optical Zoom
8MB Int & SD Slot

ExVat £75.74
IncVat £88.99
Order SA66173

HP PhotoSmart 850

Create exceptional photos with this easy to use SLR type, big zoom camera. Features include a range of manual features, 5cm LCD and Video and Audio recording.



3.3 Mega Pixel
4.0x Optical Zoom
3.0x Optical Zoom
16MB Int & SD Slot

ExVat £258.72
IncVat £304.00
Order SA66709

HP PhotoSmart 635

For families or individuals seeking optical zoom flexibility to capture detail from a distance.



2.1 Mega Pixel
8.0x Optical Zoom
3.0x Optical Zoom
16MB Int

ExVat £102.13
IncVat £120.00
Order SA70988

HP PhotoSmart 935

Get picture perfect photos using the HP PhotoSmart 935. The 5.3MP ensures your photos will be extremely sharp - delivering beautiful enlargements up to 20 x 30 inches. You can even record memories in motion and sound using the video clip with audio feature.



5.3 Mega Pixel
7x Optical Zoom
32MB Int & SD Slot

ExVat £288.51
IncVat £339.00
Order SA66707

HP's TOP SELLING CAMERA...

HP PhotoSmart 735

The HP Photosmart 735 digital camera delivers outstanding digital snapshots with its Pentax precision lens giving clear, crisp photo prints. One touch, fully automatic technology delivers great shots with manual overrides for adding creative touches. Record memories using the video clip feature with audio oradl real-life audio clips to still photos or video.



2.1 Mega Pixel
4.0x Optical Zoom
8MB Int & SD Slot

ExVat £141.28
IncVat £166.00
Order SA66708

HP PhotoSmart 230

Preview your pictures on the 230's 4.5cm LCD screen, then print directly from your camera or digital memory card.



ExVat £108.09
IncVat £127.01
Order SA53781

business partner



Canon CP-300

To print a photo on the CP-300, connect direct to a Canon digital camera via the camera's standard USB cable. A simple menu on the camera allows print size, type and quantity to be selected. Within approximately 85 seconds of selecting 'print', the process for a superb postcard size print is complete.



ExVat £154.89
IncVat £182.00
Order SA70549

you can
Canon

Philips Webcam

- Superior picture quality
- USB
- Capture high quality video streaming
- No need for a separate mic for recording.



PHILIPS

ExVat £34.89
IncVat £40.99
Order SA63061

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SONY DCS-P32

Sony's DCS-P32 Cyber-shot compact digital still camera hands you the power to take great pictures under a variety of conditions. A 3.2 megapixel resolution provides excellent image quality allowing more light to pass to each pixel.



ExVat **£142.98**
IncVat **£168.00**
Order SA66769

SONY DSC-P8

Ultra compact camera equipped with 3.2 Megapixels, the Sony DSC-P8 is the successor of the P7 with innovations to please any amateur. With 8 presettings, it provides better ISO sensibility and MPEG VX films of high quality.



ExVat **£251.06**
IncVat **£295.00**
Order SA66771

SONY DSC-P72

Looking for a compact digital still camera that gives you the power to take great pictures under a variety of conditions? Put the power of Sony digital photography in the palm of your hand with the Cyber-shot DCS-P72.



ExVat **£218.72**
IncVat **£257.00**
Order SA66756

SONY DSC-P10

The latest 5.0 megapixel technology, 3x optical zoom, a compact slim body and, the way you pick it up, a for spotting a great photo, the Sony DSC-P10.



ExVat **£323.40**
IncVat **£380.00**
Order SA66770

SONY DCR-TRV145

Sony DCR-TRV145 NEW! Compact design Digital8 camcorder with 2.5" colour LCD, built-in light & 20x optical / 560x digital zoom.



ExVat **£258.72**
IncVat **£304.00**
Order SA70949

SONY DCR-TRV245

NEW! Compact design Digital8 camcorder with 2.5" colour LCD, USB streaming, built-in light & 20x optical / 700x digital zoom.



ExVat **£276.60**
IncVat **£325.00**
Order SA70952

SONY DCR-TRV19

NEW! Sony DCR-TRV19 Mini DV, 800k Pixel CCD, 2.5" LCD Screen



ExVat **£412.77**
IncVat **£485.00**
Order SA70957

SONY

SONY DCR-PC103

This new, ultra compact DV Handycam is called 'Pocket Compact' because of its lightweight and easy to handle characteristics. The DCR-PC103 comes with 10x optical and 120x digital zoom lenses from Carl Zeiss. It includes Super SteadyShot, which enables users to shoot stabilized images.



ExVat **£553.19**
IncVat **£650.00**
Order SA70958

CANON Powershot A300

For the first time buyer looking for a camera for all the answers, the PowerShot A300 is the answer. Comes with software you need for editing photos and sharing them with friends.



ExVat **£141.20**
IncVat **£166.00**
Order SA66712

CANON IXUS 400

Canon's smallest 4.0 Megapixel zoom camera, the digital IXUS 400 is packed with features yet doesn't compromise on style. Purposeful, cutting edge the IXUS 400 gives you photographic freedom and definitive design in one.



ExVat **£302.13**
IncVat **£355.00**
Order SA66713

CANON Powershot A70

If your looking to explore the world of digital photography, the compact PowerShot A70 offers alot of camera for the money. Using the same DIGIC processor as top-of-the-line Canon digital cameras, images are always crisp and clear.



ExVat **£205.96**
IncVat **£242.00**
Order SA66696

CANON Powershot S45

Amazing features and great design combine to make the PowerShot S45 the most function-rich pocket-size digital camera in the PowerShot range.



ExVat **£321.70**
IncVat **£378.00**
Order SA66434

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CANON Powershot G3

Combining a host of advanced Canon digital technologies, the Powershot G3 delivers outstanding image quality and flexibility in every shooting situation.



ExVat **£417.87**
IncVat **£491.00**
Order SA66433

CANON MV600

Digital technology for everybody on a compact, easy to use digital camcorder. The MV600 lets you edit your own day films on an ordinary computer, watch them on TV or e-mail them to your friends and family.



ExVat **£307.23**
IncVat **£361.00**
Order SA66688

CANON MV600i

The MV600i camcorder also has the benefit of an Analogue-Digital convertor and DV and Analogue in option.



ExVat **£378.72**
IncVat **£445.00**
Order SA66689

CANON MV650i

The MV650i comes with all the above plus the facility of taking XGA still images. As well as the Night Mode offered in all the series, MV650i also has Super Night Mode for shooting colour in almost zero lux.



ExVat **£515.74**
IncVat **£606.00**
Order SA66690

HYPERTEC Flash Memory

Hypertec Flash memory provides you with non-volatile, high capacity, solid state storage and is available in various formats for a vast range of devices.



Hypertec

Compact Flash

	Ex Vat	Inc Vat
SA66484 16MB	12.76	14.99
SA66485 32MB	16.16	18.99
SA66486 64MB	22.12	25.99
SA66487 128MB	46.80	54.99
SA66488 256MB	79.14	92.99
SA66489 512MB	147.23	173.00
SA66483 CF PC Card Adapter	6.80	7.99
SmartMedia Cards		
SA66490 32MB	15.31	17.99
SA66491 64MB	24.67	28.99
SA66492 128MB	44.25	51.99

Ex Vat

Inc Vat

Hypertec

Multimedia Cards

	Ex Vat	Inc Vat
SA66493 32MB	19.57	22.99
SA66494 64MB	32.33	37.99
SA66495 128MB	58.71	68.99
Secure Digital Cards		
SA66496 32mb	29.78	34.99
SA66497 64mb	35.74	41.99
SA66498 128mb	55.31	64.99
SA66499 256mb	147.23	173.00
SA66500 512mb	376.17	442.00

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Order SA84096

ExVat **£19.57**
IncVat **£22.99**

Digital Video Cameras

	ExVat	IncVat
CANON SA66216 MV5	521.70	613.00
SA66218 MV5Ihc	634.89	746.00
SONY SA66444 Sony DCR-IP7	849.36	998.00
SA66445 Sony DCR-TRV18	449.36	528.00

Media Readers & Writers

BELKIN SA63599	USB Reader/Writer for MM Card and Secure Digital	11.91 13.99
SA63596	USB Reader/Writer for CompactFlash I and II	11.91 13.99
SA63597	USB Reader/Writer for Smart Media	11.91 13.99
SA66025	USB Reader/Writer for Memory Stick	11.91 13.99
SA43591	USB 8-in-1 Media Reader/Writer	17.01 19.99

Belkin USB 8-in-1 Media Reader/Writer



Compatible with:
• CompactFlash
• CompactFlash II
• SmartMedia
• Secure Digital
• MultiMedia
• IBM Microdrive
• Memory Gate
• Memory Stick.

Order SA43591
ExVat **£17.01**
IncVat **£19.99**



OMNIFLASH

SA66011	Uno Compact Flash USB Reader	13.61 15.99
SA66012	Uno Smart Media USB Reader	13.61 15.99
SA66013	Uno Memory Stick USB Reader	13.61 15.99
SA66014	Uno SD / MMC USB Reader	13.61 15.99
SA66015	Uno Multi Format USB Reader	42.54 49.98
SA66016	Int Multi Format USB Reader	43.40 51.00

ANTEC

SA61487	PhotoChute 3 USB Digital Film Reader	29.78 34.99
SA63985	Imation FlashGo USB Memory Card Reader/Writer	23.82 27.99

Flash Memory

COMPACT FLASH CARDS

SA62084	Sandisk 32MB	11.06 12.99
SA62085	Sandisk 64MB	14.46 16.99
SA62086	Sandisk 128MB	24.62 28.99
SA63132	Sandisk 256MB	48.50 56.99
SA63134	Sandisk 512MB	93.62 110.00
SA31820	Memory Plus 64MB	18.71 21.99
SA60863	Memory Plus 128MB	27.23 31.99
SA63723	Memory Plus 256MB	57.86 67.99
SA63724	Memory Plus 512MB	136.17 160.00

SECURE DIGITAL CARDS

SA63212	Sandisk 64MB	21.27 24.99
SA63213	Sandisk 128MB	38.29 44.99
SA66035	Sandisk 256MB	64.67 75.99
SA66674	Memory Plus 64MB	28.08 32.99
SA66675	Memory Plus 128MB	50.20 58.99
SA66676	Memory Plus 256MB	110.64 130.00

Pocket Digital Video Camera

- Colour LCD screen for preview & playback of your still and movie images
- Can be used as a webcam and a still camera
- 1.3 million pixels
- Accepts CompactFlash memory cards up to 512MB - enabling you to record up to 2 hours in movie mode.



	Ex Vat	Inc Vat
Nisis SA66519 DV Digital Video Camera	28.93	33.99
SA66520 DV2 Digital Video Camera	59.57	69.99

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Canon Inkjet Cartridges

	ExVat	IncVat
SA57809 BC-01 Black	13.61	15.99
SA57812 BC-02 Black	11.06	13.00
SA16120 BC-05 Tri Colour	14.46	16.99
SA16685 BC-06 Photo Colour	12.76	14.99
SA16069 BC-10 Black Printhead	19.57	22.99
SA16070 BCI-10Bk Black	8.50	9.99
SA16045 BCI-11e Colour	22.12	25.99
SA16046 BCI-11Bk Black	5.10	5.99
SA16047 BCI-11C Colour	10.20	11.99
SA16041 BC-20 Black	17.01	19.99
SA57841 BC-21e Tri Colour	25.52	29.99
SA57842 BCI-21Bk Black	4.25	4.99
SA57843 BCI-21C Colour	8.50	9.99
SA16687 BC-22e Photo Colour	15.31	17.99
SA36711 BC-23 Black	17.01	19.99
SA58333 BCI-24Bk Black	5.10	5.99
SA58334 BCI-24C Colour	9.35	10.99
SA36854 BC-30e Tri Colour	18.71	21.99
SA36855 BC-31e Tri Colour	21.27	24.99
SA36856 BC-32e Tri Colour	20.42	23.99
SA57252 BC-33e Colour	28.08	32.99
SA57253 BC-34e Photo	26.37	30.98
SA57974 BCI-3eBk Black	7.65	8.99
SA57975 BCI-3eC Cyan	5.10	5.99
SA57976 BCI-3eM Magenta	5.10	5.99
SA57977 BCI-3eY Yellow	5.10	5.99
SA57980 BCI-3ePbk Black	5.10	5.99
SA57981 BCI-3ePC Cyan	5.10	5.99
SA57982 BCI-3ePM Magenta	5.10	5.99
SA57988 BCI-6Bk Black	5.10	5.99
SA57991 BCI-6C Cyan	5.95	6.99
SA57990 BCI-6M Magenta	5.95	6.99
SA57989 BCI-6Y Yellow	5.95	6.99
SA36390 BC-60 Black	17.86	20.99
SA36391 BC-61 Colour	19.57	22.99
SA36713 BC-62 Photo	28.08	32.99
SA36712 BCI-61 Colour	12.76	14.99
SA57845 BJI-201Bk Black	4.25	4.99
SA57817 BJI-201C Cyan	4.25	4.99
SA57819 BJI-201M Magenta	4.25	4.99
SA57820 BJI-201Y Yellow	4.25	4.99
SA57811 BJI-642 Black	7.65	8.99
SA57813 BJI-643Bk Black	11.06	13.00
SA57816 BJI-643C Cyan	14.46	16.99
SA57814 BJI-643M Magenta	14.46	16.99
SA57815 BJI-643Y Yellow	14.46	16.99

EPSON Inkjet Cartridges

	ExVat	IncVat
SA36549 S020187 Black	11.91	13.99
SA57188 C135020193 Colour	10.20	11.99
SA36861 T001011 Colour	14.46	16.99
SA57254 T007401 Black	11.91	13.99
SA51266 T008401 Colour	98.72	116.00
SA57255 T009 Colour	13.61	15.99
SA58278 T026401 Black	15.31	17.99
SA58279 T027401 Colour	12.76	14.99
SA58449 C13T033140 Black	7.65	8.99
SA58450 C13T033240 Cyan	7.65	8.99
SA58451 C13T033340 Magenta	7.65	8.99
SA58452 C13T033440 Yellow	7.65	8.99
SA58453 C13T033540 Light Cyan	7.65	8.99
SA58454 C13T033640 Light Magenta	7.65	8.99
SA58455 C13T034140 Black	7.65	8.99
SA58456 C13T034240 Cyan	8.50	9.99
SA58457 C13T034340 Magenta	8.50	9.99
SA58458 C13T034440 Yellow	8.50	9.99
SA58459 C13T034540 Light Cyan	8.50	9.99
SA58460 C13T034640 Light Magenta	8.50	9.99

EPSON Paper

	ExVat	IncVat
SA58005 Photo inkjet A4 (S041061) 100	8.50	9.99
SA58394 Photo glossy A4 (S041126) 20	10.20	11.99
SA58301 Photo 4x 6" (S041134) 20	10.20	11.99
SA58746 Photo 100 x 150mm (S041255) 20	3.40	4.00
SA58747 Photo 200 x 300mm (S041254) 10	7.65	8.99
SA57291 Photo A4 (S041287) 20	6.80	7.99
SA58393 Photo A4 (S041622) 50	11.06	13.00
SA58748 Glossy Photo 100 x 150mm (S041706) 20	9.35	10.99

HP Photosmart 7150

Families who want to print photos themselves. The HP Photosmart 7150 prints spectacular photos using up to six inks. The easy-access front USB port allows quick connection to an HP digital camera with direct printing capability and direct photo printing without a PC/Mac.



	ExVat	IncVat
HP SA58721 56 Black Cartridge	11.91	13.99
SA58448 57 Tri-colour cartridge	18.71	21.99

	ExVat	IncVat
SA58721 56 Black Cartridge	£114.89	£135.00
Order SA54804		

Photosmart 7550

- A powerful photolab with a colour LCD that allows to preview, select and modify and print photos
- HP's most complete photo printer, offering also the speed and flexibility of an HP Deskjet
- HP's best print quality, with up to 7-ink printing and HP Photorec IV precision technology.



	ExVat	IncVat
HP SA58721 Black Cartridge	11.91	13.99
SA58448 57 Tri-colour cartridge	18.71	21.99
SA58827 58 Photo Inkjet cartridge	15.31	17.99

	ExVat	IncVat
SA58721 Black Cartridge	£186.3	£219.00
Order SA55782		

Stylus Photo 830U

The EPSON Stylus Photo 830U is a 6 colour, A4 home photo inkjet printer offering unbeatable value.

	ExVat	IncVat
SA70305	£71.48	£83.99
Order SA70305		



Stylus Photo 950

A4 Photo printer with high resolution, individual ink cartridges and flexible paper handling including direct CD printing.

	ExVat	IncVat
SA54543	£251.06	£295.00
Order SA54543		



	ExVat	IncVat
EPSON SA58449 Black ink cartridge	7.65	8.99
SA58450 Cyan cartridge	7.65	8.99
SA58451 Magenta cartridge	7.65	8.99
SA58452 Yellow Cartridge	7.65	8.99

Stylus Photo 915

A4 dedicated Photo printer with built-in intelligence capable of printing your photos without any need for a computer!



	ExVat	IncVat
EPSON SA58601 Black cartridge	12.76	14.99
SA58602 Twin black cartridge	20.42	23.99
SA58603 Tri-colour cartridge	11.91	13.99

Bubble Jet i950

Canon introduces even higher print resolution and smaller ink droplet size, setting new standards for professional photo printing.

	ExVat	IncVat
SA56405	£214.47	£252.00
Order SA56405		



	ExVat	IncVat
Canon SA57988 Black Ink Tank	5.10	5.99
SA57991 Cyan Ink Tank	5.95	6.99
SA57990 Magenta Ink Tank	5.95	6.99
SA57989 Yellow Ink Tank	5.95	6.99

Bubble Jet i450

The Canon i450 delivers crisp, professional quality photo prints and sharp monochrome text. It gives increased speed performance - a truly breakthrough product for its price.

	ExVat	IncVat
SA70465	£75.74	£88.99
Order SA70465		



	ExVat	IncVat
Canon SA57974 Black cartridge	7.65	8.99
SA57975 Cyan cartridge	5.10	5.99
SA57976 Magenta cartridge	5.10	5.99
SA57977 Yellow cartridge	5.10	5.99

Bubble Jet i470D

The Canon 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.

	ExVat	IncVat
SA70238	£129.36	£152.00
Order SA70238		



	ExVat	IncVat
Canon SA58333 Black cartridge	5.10	5.99
SA58334 Colour cartridge	9.35	10.99

High Quality Photo Paper

Instead of printing your photos on ordinary paper, use photo paper for highest quality and maximum life. Pay attention to the 'gsm' rating - the higher it is, the better quality your pictures will be.

	ExVat	IncVat
SA58530 Canon 20shots 270gsm	CALL	
SA58614 EPSON 20shots 141gsm	CALL	
SA58283 EPSON 20shots 255gsm	9.35	10.99
SA58487 HP 50shots 200gsm	13.61	15.99
SA57145 HP 20shots 236gsm	8.50	9.99

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Don't forget your printer cables...

Not all printers come with a printer cable to connect to your computer. Purchase either a USB cable, which is quicker, or a parallel cable, which supports older computers.



	ExVat	IncVat
SA28506	£3.40	£3.99
Order SA28506		

	ExVat	IncVat
SA28511	£3.40	£3.99
Order SA28511		

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IncVat **£192.00**
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Out Now! ExVat **£55.31**
IncVat **£64.99**
Order SA70838

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HP	Ex Vat	Inc Vat
SA58728 Black cartridge	17.86	20.99
SA58730 Tri-colour cartridge	26.37	30.99

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dpi USB &
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Stylus C44UX Colour Inkjet

ink and easy to use for
un home printing

ExVat **£44.25**
IncVat **£51.99**
Order SA70718



**11ppm
Black 2800
dpi USB**

Stylus C62 Colour Inkjet

High Performance Inkjet for the
Advanced Home User.

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IncVat **£68.99**
Order SA55171



**14ppm
Black 5760
dpi USB &
Par**

Stylus C82 Colour Inkjet

High performance home and small office 6-
colour printer - producing high-speed, high
quality prints even on plain or recycled paper.

ExVat **£76.59**
IncVat **£89.99**
Order SA55248



**22ppm
Black 5760
dpi USB &
Par**

EPSON	Ex Vat	Inc Vat
SA5899 Black cartridge	5.10	5.99
SA58700 Colour cartridge	7.65	8.99

EPSON	Ex Vat	Inc Vat
SA58528 Black cartridge	18.71	21.99
SA58529 Colour cartridge	16.16	18.99

EPSON	Ex Vat	Inc Vat
SA58244 Black cartridge	19.57	22.99
SA58592 Cyan cartridge	9.35	10.99
SA58593 Magenta cartridge	9.35	10.99
SA58594 Yellow cartridge	9.35	10.99

Bubble Jet i250

Whether you're choosing your
printer or it's time for a
change, Canon makes
everything easier
and more
affordable.

ExVat **£38.99**
IncVat **£44.99**
Order SA70895



**2/9
ppm 4800
dpi USB**

BubbleJet i350



Canon	Ex Vat	Inc Vat
SA58333 Black cartridge	5.10	5.99
SA58334 Colour cartridge	9.35	10.99

Bubble Jet i850

The Canon i850 Bubble Jet Printer
sets a new performance standard
for delivering superior quality
and breakthrough speed
simultaneously.

ExVat **£114.89**
IncVat **£135.00**
Order SA56238



Canon	Ex Vat	Inc Vat
SA58333 Black cartridge	5.10	5.99
SA58334 Colour cartridge	9.35	10.99

Power Surge Protection

Protect your PC,
printer & household
appliances.

ExVat **£6.80**
IncVat **£7.99**
Order SA44758



Paper

Make your work look its best with premium
inkjet paper - no smudges, sharper text and
better colour for photos.

	Ex Vat	Inc Vat
SA58004 Canon A4 Paper 250shts	26.37	30.99
SA57283 Canon A4 Brilliant White Paper 250shts	5.10	5.99
SA58992 EPSON Quality Inkjet A4 Paper	7.65	8.99
SA57148 HP Premium A4 Inkjet Paper	9.35	10.99

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The world's first
intelligent software for
using optimum efficiency
when printing - saving
you money every time
you print.

ExVat **£3.40**
IncVat **£3.99**
Order SA28506

EPSON Inkjet Cartridges

	ExVat	IncVat
SA58461 C13T034740 Light Black	10.20	11.99
SA58462 C13T034840 Matte Black	7.65	8.99
SA16920 S020089 Colour	15.31	17.99
SA16653 S020093 Black	11.91	13.99
SA16921 S020108 Black	15.31	17.99
SA58527 C135020138 Colour	11.91	13.99
SA36550 S020189 Black	15.31	17.99
SA36862 S020191 Colour	14.46	16.99
SA36835 T003011 Black	17.86	20.99
SA36836 T005011 Colour	20.42	23.99
SA58099 T013401 Black	10.20	11.99
SA58373 T014401 Colour	13.61	15.99
SA58098 T018401 Colour	15.31	17.99
SA58100 T019401 Black	17.01	19.99
SA58101 T020401 Colour	14.46	16.99
SA58297 T028401 Black	17.86	20.99
SA58298 T029401 Colour	16.16	18.99
SA58244 T032140 Black	19.57	22.99
SA58262 T032240 Cyan	9.35	10.99
SA58263 T032340 Magenta	9.35	10.99
SA58264 T032440 Yellow	9.35	10.99
SA58501 C13T036140 Black	9.35	10.99
SA58502 C13T037040 Colour	12.76	14.99
SA58528 C13T040140 Black	18.71	21.99
SA58529 C13T041040 Tri Colour	16.16	18.99
SA58592 T042240 Cyan	9.35	10.99
SA58593 T042340 Magenta	9.35	10.99
SA58594 T042440 Yellow	9.35	10.99

HP Inkjet Cartridges

	ExVat	IncVat
SA16075 51629A Black 40ml	17.01	19.99
SA16077 51645A Black 42ml	17.01	19.99
SA36991 C1823D Tri Colour 30ml	17.86	20.99
SA57274 C6615D Black 25ml	17.01	19.99
SA57273 C6625A Tri Colour 15ml	17.01	19.99
SA57292 C6628A Black 30ml	17.86	20.99
SA16076 51649A Tri Colour 22.8ml	17.01	19.99
SA57057 C6614DE Black 28ml	17.01	19.99
SA57902 C1816A Tri Colour 23ml	17.86	20.99
SA57903 C4584A Photo Colour Kit	22.12	25.99
SA57149 C6578D Tri Colour 19ml	19.57	22.99
SA58074 C6578A Tri Colour 38ml	34.89	40.99
SA6924 51640A Black 42ml	17.01	19.99
SA36438 C4800A Black Printhead	20.42	23.99
SA36439 C4801A Cyan Printhead	20.42	23.99
SA36440 C4802A Magenta Printhead	20.42	23.99
SA36441 C4803A Yellow Printhead	20.42	23.99
SA36444 C4841A Cyan 28ml	19.57	22.99
SA36446 C4842A Yellow 28ml	18.71	21.99
SA36445 C4843A Magenta 28ml	19.57	22.99
SA36443 C4844A Black 69ml	19.57	22.99
SA58075 C4810A Black Printhead	17.86	20.99
SA58076 C4811A Cyan Printhead	17.86	20.99
SA58077 C4812A Magenta Printhead	17.86	20.99
SA58078 C4813A Yellow Printhead	17.86	20.99
SA58063 C4836A Cyan 28ml	18.71	21.99
SA58064 C4837A Magenta 28ml	18.71	21.99
SA58065 C4838A Yellow 28ml	19.57	22.99
SA36510 C3844A Photosmart Cart	18.71	21.99
SA36511 C3845A Photosmart Cart	19.57	22.99
SA58272 C5011AE Black 23ml	12.76	14.99
SA58273 C5010AE Colour 19ml	17.01	19.99
SA58498 C6656A Black 19ml	12.76	14.99
SA58499 C6657A Tri Colour 17ml	17.86	20.99
SA58500 C6658A Photo 17ml	14.46	16.99

Epson Paper

	ExVat	IncVat
SA58283 Glossy photo A4 (S041287) 20	9.35	10.99
SA58392 Glossy photo A4 (S041624) 50	17.86	20.99
SA58309 Glossy photo roll 100mmx8m (S041303)	9.35	10.99
SA58312 Semigloss Photo (S041332) 20	10.20	11.99
SA58749 Semigloss Photo roll 100mm x 8m (S01330)	13.61	15.99
SA58755 Matte heavy weight A4 (S041256) 50	10.20	11.99
SA58296 Double-sided Matte A4 (S041569) 50	11.06	12.99

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Inkjet Paper and Film

CANON		ExVat	IncVat
SA58612	Matte Photo paper A4 50	7.65	8.99
SA58613	Photo Paper Glossy A4 20	8.50	9.99
SA57999	Cutsheet Paper (A3) 200	34.89	40.99
SA57938	Cutsheet Paper (A4) 200	16.16	18.99
SA58003	Film (A4) 50	27.23	31.99
SA58004	Paper (A4) 250	26.37	30.99
SA57260	Glossy Photo Paper A4 20	5.10	5.99
SA57261	Glossy Photo Film A4 10	10.20	11.99
SA57284	Glossy Photo Cards 4x6" 20	5.10	5.99
SA57285	BubbleJet Paper A4 200	12.76	14.99
SA57286	BubbleJet Paper A3 20	17.86	20.99

EPSON		ExVat	IncVat
SA58296	A4 Dble-side matte paper 50	11.06	12.99
SA16930	A3+Photo Inkjet Paper 100	23.82	27.99
SA58314	A3+Semigloss Photo 20	25.52	29.99
SA58282	A4 Photo Glossy Paper 20	6.80	7.99
SA57291	A4 Photo Paper 20	6.80	7.99
SA58371	A4 Matte Paper 50	7.65	8.99
SA58005	A4 Photo Inkjet Paper 100	8.50	9.99
SA58748	Glossy Photo Paper 20	9.35	10.99
SA58283	A4 Glossy Photo Paper 20	9.35	10.99
SA58392	A4 Glossy Photo Paper 50	17.86	20.99
SA58308	A3 Glossy Photo paper 20	20.42	23.99
SA58309	Glossy Photo Paper Roll	9.35	10.99
SA58310	Glossy Photo Paper Roll	23.82	27.99

HP		ExVat	IncVat
SA58481	Bright white A4 250	3.40	3.99
SA16515	Bright white A4 500	5.10	5.99
SA58480	Bright white A3 200	9.35	10.99
SA58021	Premium coated A4 200	11.06	12.99
SA58482	Premium coated A3 100	13.61	15.99
SA57148	Premium h/wght A4 100	9.35	10.99
SA57890	Premium glossy A4 10	6.80	7.99
SA6992	Premium glossy A4 50	25.52	29.99
SA57915	Premium trspcy film, A4 20	11.06	12.99
SA58485	Colorfast A4 20	13.61	15.99
SA57145	Prem plus pht glossy, A4 20	8.50	9.99
SA57146	Prem plus pht mte A4 20	10.20	11.99
SA36717	Premium photo A4 15	5.10	5.99
SA58487	Prem photo glossy, A4 50	13.61	15.99
SA58488	Premium photo A3 20	20.42	23.99
SA58023	Two-sided photo A4 20	5.10	5.99
SA58489	Photo-quality A4 25	5.95	6.99

KODAK		ExVat	IncVat
SA58846	Premium Picture Paper 50	17.01	19.99
SA58847	Picture Paper 75	15.31	17.99
SA58848	Bright White 500 ream	5.95	6.99
SA58849	Ultima Glossy/Satin 15	7.65	8.99
SA58850	EveryDay 100	18.71	21.99
SA58851	Ultima small 4x6 20	5.95	6.99
SA58852	Ultima small 5x7 20	6.80	7.99

TDK		ExVat	IncVat
SA58395	Photo Paper Glossy (A4)	5.95	6.99
SA58396	Photo Paper Glossy (A3)	17.01	19.99
SA58397	Photo Paper Glossy (A4)	4.25	4.99
SA58398	Photo Paper Glossy (A5)	4.25	4.99
SA58399	Photo Paper Glossy (A6)	4.25	4.99
SA58400	Photo Paper SatinMatt A4	4.25	4.99
SA58401	Photo Paper SatinMatt A5	4.25	4.99
SA58402	Photo Paper Glossy (A4)	4.25	4.99
SA58403	Photo Paper Glossy (A6)	4.25	4.99
SA58404	Coated Paper SatinMatt A4	4.25	4.99
SA57054	Colour Inkjet A4 Transp	12.76	14.99
SA15510	Premium Glossy CD Inserts	6.80	7.99
SA57055	Premium Glossy CD Inserts	98.72	116.00

3M TRANSPARENCY FILMS		ExVat	IncVat
SA57942	Multipurpose	32.33	37.99
SA36870	HP Colour LaserJet	12.76	14.99
SA36871	Other col laser printers	14.46	16.99
SA57944	Pro Colour Laser	24.67	28.99
SA36868	EPSON/Canon Other	16.16	18.99
SA36869	HP Deskjet	17.01	19.99
SA57943	Pro Quality Inkjet	32.33	37.99
SA36872	Most mono laser printers	7.65	8.99
SA36873	Paper-back laser film	8.50	9.99
SA57214	Transparency Protectors	30.63	35.99
SA57218	Transparency Protectors	34.03	39.99
SA58092	Professional Flip-Fram	39.14	45.99

PRESSIT LABELS		ExVat	IncVat
SA58405	CD Labelling Kit (Pro)	11.91	13.99
SA58406	eBusiness Card Kit	15.31	17.99
SA58407	Mini CD Labelling Kit	9.35	10.99
SA58414	CDDestroyer	7.65	8.99
SA58408	Refill pack 50 cards	29.78	34.99
SA58409	Refill pack 120 labels	5.95	6.99
SA58410	CD White Label pack 50	4.25	4.99
SA58411	CD Inserts 25 Photoglossy	15.31	17.99
SA58412	CD Wallets Label pack 25	5.95	6.99
SA58413	Mini CD Label pack 30	4.25	4.99

LaserJet 1000W

Perfect if you require a reliable and basic laser printing solution to produce a range of high quality, laser sharp documents quickly, easily and cost-effectively.

10 ppm 1200 dpi USB

Free USB Cable!



HP		ExVat	IncVat
SA57941	HP 1000W Black toner cartridge	34.89	40.99
SA28506	USB A-B cable	3.40	3.99

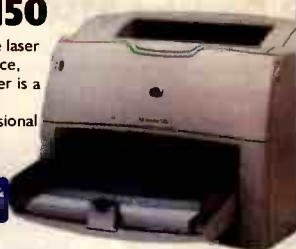
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LaserJet 1150

Fast personal monochrome laser printing at an affordable price, the HP LaserJet 1150 printer is a reliable, compact, desktop printer designed for professional results in any size office or at home.

17 ppm 1200 dpi USB & Par



HP		ExVat	IncVat
SA58892	HP 1150 toner	36.59	42.99
SA28506	USB A-B cable	3.40	3.99

ML-1210

The Samsung ML-1210 laser printer saves your valuable time in document printing with its powerful 12ppm engine and controller. It also saves your printing cost with 'Toner Save Button, N-up Mode and etc. Samsung ML-1210, it's suitable printer for small office users or personal users.

12 ppm 600 dpi USB



Samsung		ExVat	IncVat
SA58388	Black toner cartridge	35.74	41.99

ML-1510

The standard printer for personal, SOHO users combining small size and superior price with superior paper handling.

14 ppm 600 dpi USB



Samsung		ExVat	IncVat
SA58856	Black toner cartridge	45.10	52.99
SA28506	USB A-B cable 1.8m	3.40	3.99

EPL-5900L

The new EPSON EPL-5900L is the ideal laser printing solution for the PC or Mac user, offering high speed black and white laser printing at speeds up to 12 PPM. EPSON's advanced resolution technologies such as EPSON RiTech which produces crisp and sharp text output, and EPSON MicroGray 1200 for high quality images, ensures exceptionally high quality 1200 dpi class output for professional business documentation.

12 ppm 1200 dpi USB & Par



EPSON		ExVat	IncVat
SA58606	Black toner	62.12	72.99

AcuLaser C900

The new AcuLaser C900 is a compact colour and mono laser printing solution specifically designed for the needs of the home or small office. Whether you are upgrading from a low cost inkjet printer, or thinking about replacing your existing mono laser printer it will give at least comparable costs plus the obvious quality benefits of a colour laser.

16/4 ppm 2400 dpi USB & Par



Epson		ExVat	IncVat
SA56134	EPSON AcuLaser C900N	535.32	629.00
SA58739	Black toner	30.63	35.99
SA28506	USB A-B cable 1.8m	3.40	3.99

HL-1230

If you are a dedicated Windows user and looking for a printing solution that focuses on providing maximum performance against investment, the Brother HL-1230 laser printer is the answer for you.

12 ppm 600 dpi Par



Brother		ExVat	IncVat
SA57192	Black Toner	26.37	30.99
SA28511	Parallel Printer Cable	3.40	3.99

SAVE 25%!

HL-5030

For business quality printing, whether you're at home or in the office - let Brother introduce you to the HL-5030. Quick and easy to install, the HL-5030 printer has state-of-the-art interactive animations to help you get the most from this machine. And that 'most' includes an impressive 4MB of memory, up to 16ppm print speed, 250 sheet paper capacity and software that automatically prints out your emails.

16 ppm 600 dpi USB



Brother		ExVat	IncVat
SA58857	Black Toner	28.08	32.99
SA28506	USB Cable	3.40	3.99

USB Switch

Share your printer between up to four different computers



ExVat **£19.57**
IncVat **£22.99**
Order SA42887

Shredder

Make your personal information safe from prying eyes

V-12t straight cut shredder. Compact design, perfect for the home or small office.



ExVat **£28.08**
IncVat **£32.99**
Order SA67868

Printer Stand

Don't squeeze your printer where you can't use it - give it a stand. Fully mobile with storage for paper. Easily supports most personal laser printers.



ExVat **£49.35**
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5C 1205

HP 5C 1205 is a compact and easy to use all-in-one offering photo quality printing, superb flatbed scanning, fast, standalone copying, at a real value money price.

at £75.74
at £88.99
Order SA56459

Small, economical
& easy to use



10 ppm 4800 dpi USB 36-bit colour 2400 dpi

	Ex Vat	Inc Vat
721 Black cartridge	11.91	13.99
448 Tri-colour cartridge	18.71	21.99

PSC 2110

Designed for creative home users who want to print photo quality images and require high-quality scanning and copying.



ExVat £114.89
IncVat £135.00
Order SA55228



14/10 ppm 4800 dpi USB 48-bit colour 1200 dpi

	Ex Vat	Inc Vat
SA58721 Black cartridge	11.91	13.99
SA58448 Tri-colour cartridge	18.71	21.99

OfficeJet 6110

Ideal for home office users needing high quality printing, faxing, scanning and copying at a competitive price.

ExVat £219.57
IncVat £258.00
Order SA56353



19/15 ppm 4800 dpi USB 48-bit colour 2400 dpi

	Ex Vat	Inc Vat
SA58498 Black cartridge	12.76	14.99
SA58448 Tri-colour cartridge	18.71	21.99

Whatever you're
printing, we have
a printer for you

HP 3420C

SAVE 40%

10/3 ppm
2400 dpi
USB

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IncVat £34.99

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Print directly from your camera while on the move with new dye sublimation technology

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IncVat £182.00

A3+ Printing

EPSON Stylus Colour 1160. The perfect printing solution for home offices requiring PhotoReal colour on A3 format.

9.5/9.2 ppm
1440 dpi USB

Order SA50668
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IncVat £215.00

Mono Laser

The sexiest desktop laser there is!

20 ppm
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USB + Par

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4800 dpi
USB
48bit colour
1200 dpi

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IncVat £215.00

HP Invent

AF CLEANING PRODUCTS

SA58532 Laptop-Clene	2.54	2.99
SA16562 Multi-purpose Cleaning Kit	13.61	15.99
SA58336 Screen case & keyboard kit	9.35	10.99
SA16593 CD Restore Kit	4.25	4.99
SA36043 Notebook Cleaning kit	6.80	7.99
SA36078 Refill Notebook Clean Kit	5.10	5.99
SA57937 Floppyclene 3.5 Drive 10	10.20	11.99
SA16594 CD-Lensclene	6.80	7.99
SA57109 CD-Clene Anti-stat wipe 25	3.40	3.99
SA58391 DVD Lensclene	6.80	7.99

K3200

Cost-saving product with printing, printing and standalone copying - perfect for a range of home and office activities.

ExVat £95.32
IncVat £112.00
Order SA56732

4 ppm 5760 dpi USB 48-bit colour 600 x 1200 dpi

	Ex Vat	Inc Vat
SA528 Black cartridge	18.71	21.99
SA529 Colour cartridge	16.16	18.99

CX5200

The EPSON Stylus CX5200 is a new All-in-One: a one-stop home or home office printing and copying solution.

ExVat £133.62
IncVat £157.00
Order SA56458

22 ppm 5760 dpi USB 48-bit colour 2400 dpi

	Ex Vat	Inc Vat
SA58528 Black cartridge	18.71	21.99
SA58529 Colour cartridge	16.16	18.99

EPSON

L-P2500

SAVE £150!

Easy to operate, economical to run! Offers crisp, clear print outs. Copying and scanning are provided for at only a small extra cost. As well as cost saving you can save space on your desktop with this All-in-One device.

12 ppm 600dpi for PSC USB + Par
ExVat £89.36
IncVat £105.00
Order SA70843

	Ex Vat	Inc Vat
SA7193 Black cartridge	39.99	46.99

brother

SCX4016

Laser print quality and automatic document feeder for high resolution scanning and standalone copying make this the ultimate home office solution.

ExVat £174.47
IncVat £205.00
Order SA70300

16 ppm 600 dpi USB + Par 256 Level Grayscale 600 dpi

	Ex Vat	Inc Vat
SA57193 Black cartridge	39.99	46.99

SAMSUNG

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500 sheets of crisp white paper ideal for important documents in the office or homework for school.

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WIRELESS NETWORKING

Wireless?

The term 'Wireless' refers to a network of two or more devices connected without the use of cables. With 802.11 'Wireless' you are free to roam around a home or office and still be connected using Handheld devices (PDA's) and Notebook PCs.

- An Access Point is the "hub" of a wireless network and can also connect to a fixed wired (cables) network.
- The Access Point transmits and receives data between the wireless users who communicate via a Wireless Desktop USB Adapter, Wireless Notebook PC Card or Wireless Desktop PCI Card.
- 54Mbps is currently the fastest wireless speed - up to 5 times faster than that of 11Mbps.
- Wireless Security, also known as Wired Equivalent Privacy (WEP), is a wireless security protocol that encodes and encrypts all network traffic before transmitting it over the internet. WEP encryption works in two strengths: 64-bit (standard-strength encryption) or 128-bit (stronger encryption).

54Mbps Broadband Bundle

- 54Mbps Wireless Broadband Router
- 54Mbps Wireless Notebook Adaptor.



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IncVat **£129.00**

Wireless Networking

D-LINK		ExVat	IncVat
SA43535	D-Link 22Mbps Access Point	57.86	67.99
SA43904	D-Link Wireless ADSL Router/4-Port Switch	148.94	175.00
SA43569	D-Link 22Mbps USB Adaptor	39.99	46.99
SA43531	D-Link 22Mbps PC Card	30.63	35.99
SA43532	D-Link 22Mbps PCI Adaptor	33.18	38.99
LINKSYS			
SA44625	Linksys 54Mbps Access Point	85.11	100.00
SA44721	Linksys 54Mbps PCI Adaptor	45.10	52.99
SA42285	Linksys 11Mbps Access Point	58.71	68.99
SA43890	Linksys 11Mbps Cable/DSL Router	88.51	104.00
SA42291	Linksys 11Mbps USB Adaptor	38.29	44.99
SA42289	Linksys 11Mbps PC Card	39.14	45.99
SA42288	Linksys 11Mbps PCI Adaptor	58.71	68.99

3Com 54Mbps Wireless

Wireless Access Point

- Ideal for home offices that run audio, video and multimedia applications.

Order SA45127
ExVat **£59.57**
IncVat **£69.99**



Wireless Notebook PC Card

- High-speed, economical, and reliable 54Mbps 802.11g PC Card for notebook users.

Order SA45128
ExVat **£37.44**
IncVat **£43.99**



Wireless Cable/DSL Gateway

- Super-fast 54Mbps speeds with secure Broadband Internet access up to 100 meters

Order SA45134
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Go Wireless with NETGEAR

802.11g 54Mbps Wireless PC Card

ExVat **£43.40**
IncVat **£50.99**
Order SA44675



WG511 54g Notebook Card

- Share broadband Internet access and resources
- Works with both IEEE 802.11b and draft 802.11g (both 2.4 GHz)
- 5 x faster than 11Mbps (802.11b).

802.11g 54Mbps Wireless Access Point

ExVat **£73.18**
IncVat **£85.99**
Order SA44674



WG602 54g Access Point

- Freedom to move from room to room with your notebook connected
- Works with both IEEE 802.11b and draft 802.11g (both 2.4 GHz).

NETGEAR 802.11b and 802.11g Wireless

		MFR No	Ex Vat	Inc Vat
SA44687	802.11g 54Mbps Wireless Cable/DSL Router	WGR614	85.11	100.00
SA45074	802.11g 54Mbps Wireless PCI Adapter	WG311	46.80	54.99
SA45075	802.11g 54Mbps Wireless Ethernet Bridge	WGE101	CALL	
SA44973	802.11b 11Mbps Wireless ProSafe Access Point	ME103	97.87	115.00
SA45071	802.11b 11Mbps Wireless CardBus Adapter	MA521	28.08	32.99

LINKSYS 54g Wireless

Notebook PC Card

- Wireless-G (draft 802.11g) connectivity for your notebook computer
- Incredible data rates up to 54Mbps in the 2.4GHz radio band
- Also interoperates with Wireless-B (802.11b) networks at 11Mbps.



ExVat **£45.10**
IncVat **£52.99**
Order SA44626

Broadband Router

- All-in-one Internet-sharing Router, 4-port Switch, and Wireless-G (draft 802.11g) Access Point
- Shares a single Internet connection and other resources with Ethernet wired and Wireless-G clients.



ExVat **£90.21**
IncVat **£106.00**
Order SA44722

LINKSYS 54g Wireless

ADSL Modem/Router & Wireless PC Card BUNDLE

- 11Mbps wireless speed.



ExVat **£109.79**
IncVat **£129.00**
Order SA45224

54g Wireless

54g Wireless Cardbus Card

- Features wireless 64- and 128-bit WEP Encryption
- Works with Windows 98, 98 SE, 2000 Me and XP.



54g Wireless Cable/DSL Gateway Router

- 6 months of FREE Parental Control Web Content Filtering
- Securing your home PC from harmful Internet Sites
- Belkin Easy Install Wizard - Online in under 3 minutes.

ExVat **£34.03**
IncVat **£39.99**
Order SA44766

54g Wireless PCI Adapter

- Installs with Plug-and-Play convenience
- Works with Windows 98, 98 SE, 2000 Me and XP
- Offers interoperability with all 802.11b 2.4GHz wireless devices.



ExVat **£85.11**
IncVat **£100.00**
Order SA44769

Wireless Access Point

- Connect to the ethernet network
- Wireless speeds up to 11Mbps
- Connectivity at up to 300 feet indoors.



ExVat **£59.57**
IncVat **£69.99**
Order SA42739

Wireless PC Card

- Connect to the Internet via Wireless Access point or Cable/DSL Router
- Wireless speeds at up to 11Mbps
- Technically excellent affordable product.



ExVat **£26.37**
IncVat **£30.99**
Order SA44777

Bluetooth

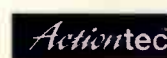
Bluetooth covers a range of up to 10m. It is a technology for short range wireless links between mobile PCs, mobile phones and other handheld devices, and connectivity to the Internet.



Belkin		Ex Vat	Inc
SA43986	Belkin Bluetooth Adaptor, 100m Range	36.59	42.99
SA44789	Belkin Bluetooth Adaptor, 10m Range	21.27	24.99
SA43988	Belkin Bluetooth PCMCIA Card	51.91	60.99
SA43987	Belkin Bluetooth PDA Adaptor Card	51.91	60.99
SA43996	TDK Bluetooth PC Card	79.14	92.99
SA43995	TDK Bluetooth USB Adaptor	56.16	65.99

Wireless USB Adapter

- Connect any PC with a USB port
- Share internet access without wires
- Wireless speeds at up to 11Mbps.
- Award winning design
- Simple Plug and Play Installation.



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IncVat **£31.99**
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RP614 - ADSL Router with Integrated DSL Modem
• Integrated DSL Modem
• Ultra fast 10/100Mbps Ethernet Ports
• Simple, easy to use Web browser-based setup.

**TOP
SELLER**



ExVat **£36.59**
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RP614 - Cable/DSL Web Safe Router with Content Filtering
• Unique Smart Wizard and Install Assistant make setup a breeze
• Lightning fast cable/DSL Internet sharing with integrated 4-port switch
• NAT Firewall with VPN pass-through protects against hackers.

ExVat **£55.31**
IncVat **£64.99**
Order SA43542

DM602 ADSL Modem
• ADSL modem and NAT router
• Use 10Mbps port, USB port or simultaneously.

at **£75.74**
at **£88.99**
SA42613



NETGEAR 802.11g 54Mbps Wireless Broadband Offer

With a DM602 ADSL Modem Router and a WG602 54Mbps Wireless Access Point and claim a free WG311 Wireless Card or WG311 Wireless PCI Card*
(See the bottom of the page for product redemption details)

**GREAT
ON-LINE
GAMING
SOLUTION**

Four Products in One: ADSL Modem, Wireless Access Point, Switch, Firewall

DG824M - Integrated DSL Modem & 802.11b Wireless Router



• Built in ADSL Modem & Access Point
• Easy, Web browser-based setup
• Free ADSL phone filter.

ExVat **£136.17**
IncVat **£160.00**
Order SA43759

BROADBAND (CABLE / ADSL)

ADSL is an always on high speed internet access technology that is ideal for the home user who will usually only require very fast download speeds

There are various types of products available for connecting the PC to Broadband Internet.

- USB modems are simple to install. They require software to be installed onto the PC
- PCI Modems are suitable for use with desktop PCs. PCI modems are installed into the PC
- Ethernet Modems do not have drivers. Are suitable for use with PCs, Macs and a broad range of operating systems
- Single port ADSL routers are great for use in environments with an existing hub
- Multi-port ADSL routers allow connection to multiple PCs/laptops/Macs.

For Cable access - a Cable / DSL Router can be linked to the Cable Modem to prevent hackers, increase security protection and to connect other PCs to the Internet.

LINKSYS High Speed Broadband Internet Access!

Cable/DSL Router with 4-Port Switch



Connects to a Broadband Modem
Built in 4-Port 10/100 Switch
Connect All of Your PCs to the Internet
• NAT Firewall to Protect Your PCs From Outside Intruders.

ExVat **£43.40**
IncVat **£50.99**
Order SA42278

Instant Broadband Cable/DSL Firewall Router with 4-Port Switch

• Perfect solution for connecting PCs to a high-speed broadband Internet connection or a 10/100 Ethernet network.
• For enhanced protection against intruders from the Internet, the Router features an advanced Stateful Packet Inspection firewall.
• Built in 4 Port Switch.



ExVat **£42.54**
IncVat **£49.99**
Order SA44567

USB 2.0 10/100 Network Adapter



• Connect to any 10/100 Ethernet network without having to open your PC
• USB 2.0 10/100 Network Adapter draws power from the PC - requiring no external power cord
• Connects at a full 100Mbps via USB 2.0, up to 8 times faster than a USB 1.1 adapter.

ExVat **£17.01**
IncVat **£19.99**
Order SA45059

ADSL Microfilter

With ADSL service, phone lines are used to send and receive voice and data on the same line. The Microfilter enables simultaneous use of Internet and voice by isolating the noise caused by analog telephone devices such as telephone, answering machine, fax machine, cable/satellite.

**Cut out
Phone Noise**

Order SA43592
ExVat **£6.80**
IncVat **£7.99**

Actiontec Broadband Technology Made Easy!

DSL USB Modem



• External ADSL USB Modem
• Up to 8 Mbps
• Easy Installation
• 1 FREE Microfilter.

ExVat **£34.03**
IncVat **£39.99**
Order SA44003

Home ADSL USB/Ethernet Modem

• USB + Ethernet Router Modem
• Web Site Blocking
• 1 FREE Microfilter.



ExVat **£45.10**
IncVat **£52.99**
Order SA44004

4 Port Wireless Cable Broadband Router



• Up to 100Base-T speed
• 11Mbps Wireless
• 128 & 64bit WEP Security Encryption
• Easy Connectivity.

ExVat **£74.89**
IncVat **£87.99**
Order SA43230

DSL Modem

Up to 8Mbps High performance supports G.dmt full rate and G.lite
Auto-handshake for different ADSL lines
Standard 10Base-T Ethernet port
Windows-based GUI for easy setup



D-Link
Building Networks for People

ExVat **£55.31**
IncVat **£64.99**
Order SA44435

ADSL Modem

U.S. Robotics
• Plug and Play
• Includes 2 FREE Microfilters.



ExVat **£51.91**
IncVat **£60.99**
Order SA43094

US Robotics

SA43314 USR Sureconnect ADSL Router & 2 FREE Microfilters

ExVat **79.99**
IncVat **93.99**

Internet Phone

Turn your PC into a fully featured internet phone
• Full duplex handset
• Free unlimited PC to PC calls
• Includes software.



**FREE
Phone
Calls!**

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IncVat **£34.99**
Order SA44386

Networking

ROUTERS / FIREWALL		ExVat	IncVat
SA42798	Allied Telesyn ADSL Modem Router	77.44	90.99
SA43759	Netgear Wireless DSL Modem/Router + 4-Port Switch	136.17	160.00
SA43414	Netgear Cable/DSL Firewall/Print Server	104.68	123.00
SA43315	Netgear Cable/DSL Firewall	102.98	121.00
SA43314	USR ADSL Modem Router	79.99	93.99
MODEMS			
ADSL			
SA44004	Actiontec ADSL Modem-Ethernet	45.10	52.99
SA43739	Dynalink Connexant PCI ADSL Modem	40.84	47.99
SA43343	Dynamode ADSL PCI Modem	22.97	26.99
SA43094	USR Sureconnect USB ADSL	51.91	60.99
INTERNAL (56K & ISDN)			
SA41405	Dynamode V.92 Internal CNR (Auto Mode)	11.06	12.99
SA41406	Dynamode V.92 Internal AMR Modem	10.20	11.99
SA42625	MRI V.92 Internal 56K Modem	11.91	13.99
SA42935	Swann Internal (Conexant) 56k V.92	13.61	15.99
SA42064	USR ISDN PCI Card T/A	37.44	43.99
SA40988	Zoom Accura V.92 PCI Int	40.84	47.99
EXTERNAL (56K)			
SA40734	Dynalink V.92 56Kbps	28.08	32.99
SA40783	Dynamode 56k (Conexant)	36.59	42.99
SA40989	Hayes Accura V.92	51.91	60.99
SA40729	USR 56K USB V.92	32.33	37.99

This offer is valid to 30 September 2003 while stocks last

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SA68229 BT Diverse 4016 Classic	65.52	76.99
SA68230 BT Diverse 4016 Exe	90.21	106.00
SA68227 BT Diverse 4010 Classic	43.40	50.99
SA68009 BT On-Air 1800	110.64	130.00
SA43953 BT Studio Twin Pack	74.89	87.99

ANSWERING MACHINES		
	ExVat	IncVat
SA41683 BT Response 123 plus	18.71	21.99
SA41449 BT Paragon 400	37.44	43.99

TWO WAY RADIO		
	ExVat	IncVat
SA68454 Motorola Talkabout Twin Pack & Charger Black	66.37	77.99

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SA31410 USB 1.1 2 Port PCI Card	18.71	21.99
SA41134 USB 1.1 4 Port PCI Card	21.27	24.99
SA42879 USB 2.0 2 Port PCI Card	24.67	28.99
SA41333 USB 2.0 5 Port PCI Card	31.48	36.99

USB HUBS		
	ExVat	IncVat
SA42923 USB 1.1 7 Port Hub	27.23	31.99
SA42881 USB 2.0 4 Port Economy Hub	17.86	20.99
SA41334 USB 2.0 4 Port Hub	26.37	30.99
SA43586 USB 2.0 3 Port Pocket Hub	20.42	23.99

Power Surge Protection

The SurgeMaster Home Series is the perfect choice for protecting home PCs, printers, kitchen and other household electrical appliances.

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Belkin	Data Rec Warranty	Ex Vat	Inc Vat
SA44756 4 Way SurgeMaster	£50,000	12.76	14.99
SA44757 4 Way SurgeMaster	£50,000	12.76	14.99
SA44758 4 Way SurgeMaster	£25,000	6.80	7.99
SA44759 4 Way SurgeMaster	£25,000	5.95	6.99
SA44760 1 Way MasterCube	£35,000	9.35	10.99
SA44761 1 Way SurgeCube	£35,000	5.10	5.99

SURGE PROTECTION		
	ExVat	IncVat
SA67231 Belkin Pro Gold Series	60.42	70.99
SA67232 Pro Gold Series 425VA	68.08	79.99
SA67233 Pro Gold Series 625VA	90.21	106.00

APC		
	ExVat	IncVat
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SA41718 Back-UPS 500CS	55.31	64.99
SA32529 Back-UPS 650VA	79.99	93.99

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Power protection for the small office or home office user. No more concerns about surges, spikes, blackouts and lightning.



Order SA41303
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IncVat **£59.99**

Omniscube KVM Switch

The New Omniscube lets you use 2 PCs with one keyboard, one mouse, one monitor. Saves you time, saves you space AND saves you money.



Order SA45166
ExVat **£25.52**
IncVat **£29.99**

FREE Surge Strip!

Belkin USB

USB 2.0 now offers ultrafast speeds of up to 480Mbps (with USB 2.0 devices). The Belkin Gold series offers 24K gold-plated connectors and contacts for optimum conductivity and error-free transmission. All the cables here can be used with USB 1.1.



USB Switch



The ideal solution for sharing a printer or any USB device, with up to four USB computers.

ExVat **£19.57**
IncVat **£22.99**
Order SA42887

Belkin FireWire

FireWire is the ultrafast connectivity standard offering 400Mbps, giving you rapid data transfer for large files. With automatic configuration you can also connect FireWire computers using Peer-to-Peer technology without fear. All FireWire technology is compatible with IEEE1394 and Sony iLink.



FireWire 4 Port Hub

- Connect 3 additional FireWire devices
- Bus powered for storage and multimedia devices



ExVat **£41.69**
IncVat **£48.99**
Order SA67307

Belkin CAT5 Cables

What is a Category 5e patch cable? Think of it as the street that links the houses on your block and all the destinations in town. In actuality, it's a cable used to connect all the hardware destinations in a Local Area Network (LAN). The RJ45 Cat 5e patch cable is perfect for use with 10/100 Base-T networks. A selection of colours are available for identifying the different parts of your network.

Length	Grey	Blue	Red	Green	Black	Ex Vat	Inc Vat
0.5m	SA31290	SA31300	SA31295	SA31305	SA31315	1.69	1.99
1.0m	SA31291	SA31301	SA31296	SA31306	SA31316	2.54	2.99
2.0m	SA31292	SA31302	SA31297	SA31307	SA31317	2.54	2.99
3.0m	SA42914	SA42916	SA42915	SA42917	SA42918	3.40	3.99
5.0m	SA31293	SA31303	SA31298	SA31308	SA31318	3.40	3.99
10.0m	SA31294	SA31304	SA31299	SA31309	SA31319	5.10	5.99
15.0m	SA42413	SA43977	SA43976	SA43978	SA43979	8.50	9.99

10/100 PCI Network Card

- Quick one-step installation
- Auto-sensing 10/100Mbps RJ-45 Ethernet interface.



ExVat **£8.50**
IncVat **£9.99**
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Home Networking at a Low Price

NETGEAR

Get a 5 Port 10/100 FS105 Switch with 2 FREE PCI Network Cards and cables to get your network started

Netgear	Ex Vat	Inc Vat
SA40613 FA311 10/100 Network Card	8.50	9.99
SA44406 FS605 10/100 5 Port Switch	24.67	28.99

5 Port 10/100 Switch

- 5 x 10/100 ethernet ports
- Plug and play.



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IncVat **£24.99**
Order SA41925

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Microsoft	Ex Vat	Inc Vat
SA82260 MS Windows XP Home	145.53	171.00
SA82261 MS Windows XP Home Upgrade	71.48	83.99

*For full Windows family see line listing

Linux 8.2

Why use Linux?

No longer the preserve of the technical elite, SuSE Linux 8.2 brings the power of Linux to your desktop.

1. Easy to install and setup - installs itself alongside your existing operating system, and gives you all the software you need as soon as you boot up.
2. Secure with automatic security updates from the internet
3. Configurable as either a server, a firewall, a games machine, or whatever you want it to be.

SUSE



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Have MORE than one Operating System

HyperOs 2003

It is HyperOS? More software your Windows installation becomes slower and less reliable. HyperOS, you can have multiple installations of Windows that you can move between quickly easily - speeding up your computer and making it more reliable. Releases 2, 3 and 4 can have up to 10 Windows installations. Release 2 supports Win95/OSR2 and 98; Releases 3 and 4 support these and Me, NT, 2000 and XP.



HyperOs	RAM	Hyperdrive Options	Ex Vat	Inc Vat
SA84088 H2003 R2	Yes		89.36	105.00
SA84089 H2003 R3	No		89.36	105.00
SA84090 H2003 R4	Yes		135.32	159.00

One Windows system is simply not enough anymore!

PartitionMagic®

Award winning PartitionMagic® can resize, split, merge, delete, undelete, and convert partitions -- all without destroying data -- and it only takes a few minutes!

- Create different partitions to run different versions of Windows
- Put games on to their own drive to increase performance
- Keep large files such as MP3's and digital images on their own drive to increase reliability in Windows



PowerQuest	Ex Vat	Inc Vat
SA84035 Partition Magic 8	31.48	36.99
SA84033 Upgrade	39.99	46.99

Protect your system from viruses and hackers



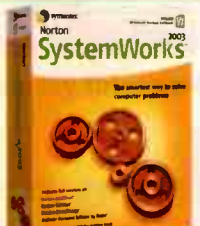
Norton Internet Security™ 2003 provides essential protection from viruses, hackers, and privacy threats. Included are full versions of Norton AntiVirus™ and Norton™ Personal Firewall, which efficiently defend your PC from the most common Internet dangers. You also get Norton™ Spam Alert to block unwanted email, and Norton™ Parental Control to protect your children online. AntiVirus.

Symantec	Ex Vat	Inc Vat
SA84668 Internet Security 2003	36.59	42.99
SA84669 Upgrade	23.82	27.99



symantec™

Norton SystemWorks™ 2003 is the smartest way to solve computer problems. It includes award-winning Symantec products and additional utilities that help you protect your PC from virus threats, optimize performance, fix and prevent problems, recover from system failures, clean out Internet clutter, and keep dial-up connections active when you're online.



Symantec	Ex Vat	Inc Vat
SA83666 System Works 2003	40.84	47.99
SA83983 Upgrade	27.23	31.99

Diskeeper

Just "Set It and Forget It"™ and Diskeeper does the rest. 200% or more increase in computer performance. Maintenance of peak system performance without further attention from you. The fastest defragmenter ever built. National Software Testing Lab (NSTL) proven 300-500% faster and far more thorough than "built-in" defragmenters. Designed for Microsoft Windows XP, Windows 2000, Windows NT, Windows Me and Windows 98 and Windows 95.

Executive Software	Ex Vat	Inc Vat
SA84463 Diskeeper Home Edition	15.31	17.99
SA83974 Undelete 3.0	29.78	34.99



SystemSuite™ 4.0

The Complete Solution for PC Maintenance and Security.

VCOM SystemSuite 4.0 is a comprehensive collection of essential PC utilities designed to maintain and protect your PC to keep it running just like the day you bought it. With VCOM SystemSuite you can improve system performance, protect your system against viruses and from hackers, diagnose computer problems, recover lost data, and much, much more!

ExVat	£39.99
IncVat	£46.99
Order	SA84474



Remember to back up!

Retrospect Backup



Backup your system and then have one-step restore - return part of your hard disk, or even the whole thing, to the way it was before in just one simple step. With Retrospect Backup, you can backup any drive (removable or fixed) to any medium - CD, DVD or even the internet!

Can you afford not to?

ExVat	£63.82
IncVat	£74.99
Order	SA84508

Drive Image

Every computer is vulnerable to data loss caused by viruses, faulty software or hard drive failure. PowerQuest's Drive Image provides a complete backup solution, saving you hours of frustration when inevitable failures happen. With your operating system, programs and settings as part of one backup file, you can have your computer up and running again in a matter of minutes.

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IncVat	£45.99
Order	SA84615



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SA84465 Acrobat 6.0 Win	216.17	254.00
SA83436 Photoshop 7.0 Win	488.51	574.00
SA84276 Photoshop Album	31.48	36.99
SA82971 Photo Deluxe Home V4.0	33.18	38.99
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SA84404 AutoCAD LT 2004	642.55	755.00
SA83234 AutoSketch 8	108.94	128.00
SA83236 Autodesk QuickCAD v8.0	50.20	58.99
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SA83664 Graphics Suite 11.0	300.43	353.00
SA83669 WordPerfect Family Pack 4	55.31	64.99
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SA84003 Crystal Reports 9.0 Std	109.79	129.00
SA84004 Crystal Reports 9.0 Pro	270.64	318.00
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SA84388 Preferred v7	95.32	112.00
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SA84467 IBM Via Voice Pro v10	62.97	73.99
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SA84340 Lotus Organizer CD 6.0	65.52	76.99
SA84341 Lotus 1-2-3 Millennium Edition 9.7 Win 98/2000/NT/ME/XP	137.87	162.00
SA84342 Lotus 1-2-3 Millennium Edition 9.7 Upg	104.68	123.00
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SA84023 McAfee Firewall v4.0	17.86	20.99
SA84024 McAfee QuickClean v3.0	17.86	20.99
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SA82650 MS Publisher 2002	85.11	100.00
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SA81748 Office XP Pro UPG	216.17	254.00
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Intuit

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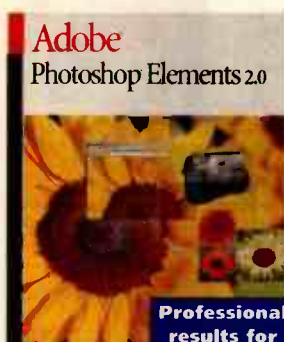
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SA84097 DVD Workshop	119.15	140.00
SA84392 DVD PictureShow 2	23.82	27.99
SA84391 DVD MovieFactory 2	22.97	26.99
SA84030 Photo Impact V8.0	55.31	64.99

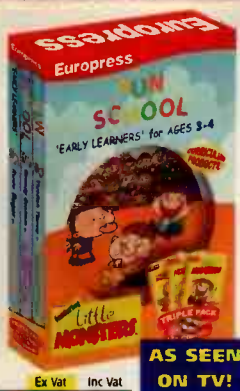
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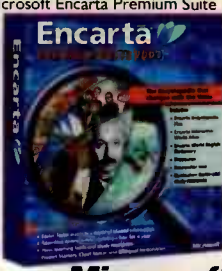


Microsoft	Ex Vat	Inc Vat
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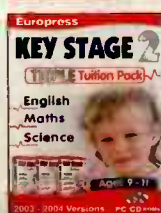
Key Stage 1 (Ages 5-7)

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4814 KS1 Tuition 5-6	8.50	9.99
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4816 KS1 Tests	8.50	9.99



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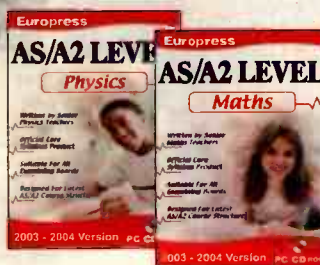
Microsoft	Ex Vat	Inc Vat
SA84823 GCSE English Maths German	12.76	14.99
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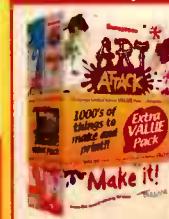
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SA84051 Xara Webstyle	44.25	51.99
SA84052 Xara Webstyle Retail Box	46.80	54.99
SA84053 Xara3D	22.97	26.99

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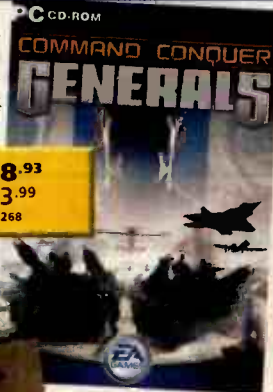
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ANSI Lumens is a measure of the brightness from a projector. The higher the rating the brighter the projector.

Resolution refers to the number of pixels or dots the projector uses to make up an image. It is measured as horizontal dpi against vertical dpi (dots per inch). SVGA, XGA and SXGA are standard resolutions. SVGA has a resolution of 800 x 600 dpi XGA has a resolution of 1024 x 768 dpi SXGA has a resolution of 1280 x 1024 dpi

Contrast Ratio is the ratio between white and black. The larger the contrast ratio the greater the ability of a projector to show subtle colour details and tolerate extensive room light.

Keystoning is when your image appears wider at the top or bottom due the projector being positioned somewhere other than the center of the screen. **Keystone correction**, or lens shift, corrects this rectangular distortion.

Projectors

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SA66265 Sony VPL-CS5 SVGA	964.26	1133.00
SA66266 Sony VPL-CX5 XGA	1448.51	1702.00
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SA65125 Infocus LP250 XGA	1149.79	1351.00
SA63539 Infocus LP500 SVGA	1024.68	1204.00
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SA65232 Mitsubishi XL1XU XGA	1233.19	1449.00
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SA65279 Philips bSure SV2 SVGA	1094.47	1286.00
SA65281 bSure SV1 Impact SVGA	1360.00	1598.00
NEC		
SA65211 NEC VT460 SVGA	984.68	1157.00
SA65213 NEC VT560 XGA	1394.89	1639.00
SA63081 NEC LT752 SVGA	1398.30	1643.00
TOSHIBA		
SA65263 Toshiba TLP-S30	984.68	1157.00
SA63783 Toshiba TLP-260 SVGA	1107.23	1301.00
SANYO		
SA65054 Sanyo Z1 Home Cinema 700 Lumens Contrast 800:1	1066.38	1253.00
SA63088 Sanyo PLC-SW20 SVGA	898.72	1056.00
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SA65454 EPSON S1 Projector 1200 Lumens	825.53	970.00
SA65109 Epson EMP-53 SVGA 1700 Lumens Micro Portable	1211.91	1424.00

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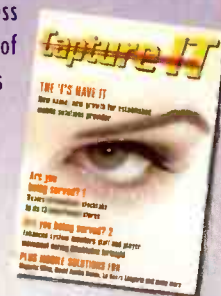


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C8727A Black Ink Cartridge	£13.39		
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BC-06 Photo Ink Cartridge	£16.59	£13.49
BC-20 Mono Ink Cartridge	£22.49	£12.59
BC-21e Colour Ink Cartridge	£33.69	
BC-22e Photo Ink Cartridge	£20.89	
BC60 Black Ink Cartridge	£25.59	
BC61 Colour Ink Cartridge	£25.09	
BC62e Photo Ink Cartridge	£37.49	
BC121Bk Black Ink Tank	£4.89	£2.49
BC121C Colour Ink Tank	£12.49	£2.49
BC124Bk Black Ink Tank	£4.79	£2.49
BC124C Colour Ink Tank	£9.99	£3.99
BC13eBk Black Ink Tank	£7.99	£3.99
BC13e Cyan, Magenta, Yellow	£6.49	£3.49
BC13ePBk Photo Black Ink Tank	£6.99	£3.49
BC13ePM Photo Magenta Ink Tank	£6.99	£3.49
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LC-301BP Banner Paper (50)	£4.49
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12A1990 Photo Ink Cartridge	£19.99	-
10N0016 Black Ink Cartridge	£19.99	-
10N0026 Colour Ink Cartridge	£21.49	-
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BC02 Black	BJ200/200e/220e/220ex/230/BJC150/210/240/250/1000	£ 9.35	£ 8.23	£ 1.50
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BC06 Photo	BJC240/BJC250/BJC1000	£13.75	Top Up Kits refill carts up to 3 times	1.50
BC20 Black	BJC2000/Z100/2110/4000/4100/4200/4300/4400/4550/4650/5000/5500	£11.99		
BX02 Black	FAX B320/3410	£ 9.99		.50
BX03 Black	FAX B100/110/MP10	£ 9.99		.50
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BJC3000/6000 Black		£ 4.49		
BJC3000/6000 Each Individual Colour		£ 4.49		

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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

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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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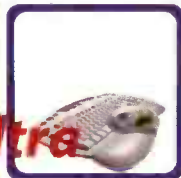
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Tomb Raider: The Angel of Darkness

The long-awaited sixth installment covers familiar territory



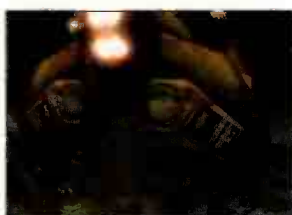
ability to engage characters in conversations that can initiate alternative routes through the story, but it's never exploited to its full potential and has been done much better before.

The levels are very well designed and backdrops vary from modern and claustrophobic to ancient and vast. The puzzles are less oblique than past episodes, and the graphical overhaul fits neatly with previous incarnations, creating a great atmosphere. To top it all, the music, recorded by the London Philharmonic, is a thrilling score of epic proportions.

Despite being hobbled by its own ambitions, The Angel of Darkness is still an entertaining game, and typical – rather than classic – Tomb Raider at heart. But unless you're already familiar with Tomb Raider's idiosyncrasies, it probably isn't the best introduction to Lara.

Andy Stewart

LOADING...



Underwater action and retro fun

This month, be sure to look out for Aquanox2: Revelation, a follow-up to the first game in the Aquanox series that gave us a new spin on first-person shooters by putting the player in control of an armed submarine. Set in the year 2666, post-apocalypse, this game follows the adventures of William Drake, the young heir to a shipping magnate's empire, as he goes in search of an ominous treasure reputed to bring its finder only bad luck.

Retro gaming fans will also be pleased to hear that the second version of cult grid-based first-person action game, Tron, is due for release towards the end of August.

What a difference a year makes. Last summer a new and improved Lara Croft was limbering up to take Christmas by storm. The sixth installment was set to reinvent the Tomb Raider series and re-establish Lara's rightful place as the biggest video game character ever. Now after a prolonged production period Lara has finally limped her way into the shops six months late.

The criticism levelled at Tomb Raider: The Angel of Darkness is not without justification; the game's faults are many and varied, from misspelt subtitles to graphical glitches. The Tomb Raider games are infamous for their awkward controls and, despite having been tweaked, they're no better here. Whether you opt for keyboard or gamepad you'll still be making umpteen attempts to line up that precision jump. There's also a new camera that arcs around Lara. This creates a cinematic atmosphere, but gets frustrating as the awkward controls and wayward camera conspire

The camera arcs around Lara, creating a cinematic atmosphere

against you, making it easy to topple off an unseen ledge.

The plot – part one of a three-part story – is above average, if a tad bloated with some obscure occult references. It finds Lara on the run following the murder of her mentor Von Croy. The action takes her from Paris to Prague in pursuit of three sacred paintings and throws her into the midst of criminals and secret societies.

On top of the usual running, jumping, climbing and lever pulling are a number of new additions to the gameplay. Some are poorly executed, such as the stealth mode, which is a bit clumsy and often unnecessary.

Another new element is the

DETAILS

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CONTACT Eidos

www.eidosinteractive.com

SYSTEM REQUIREMENTS

Windows 98 or above • Pentium 4 1.5GHz • 128MB of Ram • 300MB of hard disk space

VERDICT

More of a refurbishment than a reinvention, this covers familiar Tomb Raider territory but it's not without its problems

OVERALL



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Competitions

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Gun Metal

Futuristic robot-on-robot action



Relative unknowns Yeti Studios have managed to produce the first game to exploit the benefits of DirectX 9 (DX9). However, as is so often the case with technologically advanced games, there is precious little to get excited about here, other than some rather pretty polygons.

Set against an unoriginal future backdrop where Earth has been abandoned following an annihilating war, all the action takes place on the world of Helios, where two sides of the human race battle it out for survival. Your side has built a big robot, called Gun Metal, which can transform into a plane and destroy the other side's robots. This effectively gives you two methods of kicking some serious robot booty, but there are 10 games that offer this per square yard of your local games shop.

The missions are connected only by the voice of your commander giving you instructions – there are no real cut scenes or movies to link these rather disparate missions. So, naturally, you soon find yourself a bit bored because, although the environments are well structured and varied, most of the missions just involve going somewhere, blowing

something up, and leaving; you're just performing the same task in different environments.

As you are controlling a robot, perhaps it is appropriate that it moves slowly. But given that this game is set in the distant future where technology has presumably evolved considerably, you'd expect it to be lightning fast, so it is hardly entertaining gameplay. Response times leave a lot to be desired, and just turning Gun Metal to the side seems to take an age.

We must say that the game looks stunning. Gun Metal itself is a well-designed beast and its transformation from robot to plane is impressive. But that doesn't excuse the weak gameplay, slow character response and general monotony, all of which spoil what could have been an excellent title.

Mark Walsh

DETAILS

PRICE £29.99 inc VAT

CONTACT Yeti Studios

www.yetistudios.com

SYSTEM REQUIREMENTS

To be confirmed on release

VERDICT

This game has excellent visuals but is unfortunately pretty dull to play with unimaginative missions

OVERALL



Hulk

Mean, green and on your screen



Oh goody, another Marvel game to tie in with yet another Marvel film.

However, Hulk has potential as you can play as mild-mannered wimp Bruce Banner or the mighty Hulk himself, giving you both the disguise and stealth angle as well as the ass-kicking that we all long for. Ultimately, though, Hulk has too many flaws to make it worth the asking price.

Picking up where the film left off, your former mentor coerces you into infiltrating General Ryker's military base and helping him transform into the Ravager. The rest of the plot involves you battling the Leader, the arch-villain from the comic books, but it's all just an excuse for the Hulk to beat up a lot of soldiers and the odd supervillain. Smashing your way through building after human after building gets monotonous, particularly given how few manoeuvres you have to administer punishment.

Hulk can perform three hit punch combos, grab a bad guy and throw them to the floor, and clap his hands to create a sonic boom that floors most opponents. Given your average beat 'em up gives each character over 15 moves, we became bored before the end of the first level.

When playing Bruce Banner, the aim is to sneak into facilities

and solve puzzles in stealth mode. These parts are more varied than the Hulk sections, but overall it feels like a boring cousin of Metal Gear Solid.

Another problem is the controls. Even with a control pad, it's still a disaster to control Bruce/Hulk, as the camera does not follow the character; even with a joystick, we found it very difficult to move around.

In its defence, the Hulk's surroundings and his effect on them are very realistic. Jumping onto a surface will make it crack and you can smash pretty much any part of the scenery.

Hulk certainly gave us a brief flicker of joy that only pretending to be a childhood hero can provide. But there's little innovation or entertainment here after the first few moments.

Mark Walsh

DETAILS

PRICE £29.99 inc VAT

CONTACT Universal Interactive

www.hulkgames.com

SYSTEM REQUIREMENTS

Windows 98 or later • Pentium III 700MHz • 192MB of Ram system memory • 1.5GB hard disk space • 32MB video card

VERDICT

Well laid out, but the weak plot means it is only briefly enjoyable

OVERALL





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CORSAIR 2x 256MB PC3200	
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Four of the latest multifunction devices from Brother



Is your home office cluttered with equipment and clumsy wiring? This month, *PCW* has teamed up with Brother to offer you the chance to replace your kit with an MFC-4820C multifunction device, combining seven office functions in a single unit. Encased in an ultra-compact silver shell, it copies, prints, scans, faxes, PC faxes, captures photos and records phone messages. At 39.2 x 46.2cm (w x h) and around 13cm high, the MFC-4820C is one of the most compact all-in-ones on the market today. The integrated photo capture features

allow you to read Compact Flash, Memory Stick and Smart Media memory cards without a plug-in card reader. Simply plug the card into the MFC-4820C and print an index page of thumbnails displaying all your pictures without having to go near a PC.

The MFC-4820C boasts print speeds of 13ppm mono and 11ppm colour, with high quality 2,400 x 1,200dpi resolution, and features a flatbed scanner for PC-free colour copying, at speeds of 10cpm (copies per minute) mono and 6cpm colour. Meanwhile, an integrated modem gives you

quick fax transmission and PC faxing as standard, and an indispensable 'scan-to-email' facility lets you scan documents and email them in an instant.

For a chance to win a Brother MFC-4820C simply answer the question below and follow the how to enter instructions.

Question: How many office functions does the Brother MFC-4820C offer?

- a) 3
- b) 5
- c) 7

PCW OCTOBER 2003 BROTHER COMPETITION ENTRY FORM

How many office functions does the Brother MFC-4820C offer?

.....

Name:

Address:

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PERSONAL
COMPUTER
WORLD

Rules of entry

This competition is open to readers of *PCW*, except for employees (and their families) of VNU Business Publications, Brother and Advent. *PCW* is the sole judge of the competition and the Editor's choice is final. Winners will be selected at random from all correct entries received. No cash alternative is available in lieu of prizes. VNU will use all reasonable endeavours to notify the winner(s) within 14 days of the close of the competition. Prizes will be dispatched direct by the competition sponsor(s) and the winner(s) name(s) and address(es) will be provided to the competition sponsor(s) for this purpose. No purchase of the magazine is necessary to enter the competition. VNU will use all reasonable efforts to ensure that the prizes are as described on this page. However, VNU cannot accept any liability in respect of any prize, and any queries regarding a prize should be taken up directly with the sponsor of that prize.

August winners

The winner of the Acer TM C110 Tablet PC is Huw Parry of Holyhead, Anglesey. The four winners of the Asus Mypal A620 Pocket PC are J Covadale of York, Mrs E Vare of Fareham, Hants, Mrs J Jeffries of Chesterfield and Mr R Henderson of Caiithness.

Win an Intel Centrino notebook from Advent worth £1,000



Become a mobile professional and join the wireless revolution when you take delivery of the latest Intel Centrino laptop from PC World – the Advent 7031, worth £999.99.

At the heart of the lightweight and portable Advent 7031 is a powerful Intel Pentium M 1.3GHz processor, which is coupled with 512MB of DDR Ram system memory and a 30GB hard drive. The system also features wireless Lan technology and is housed in a stylish silver and blue case.

Making use of Intel's Centrino technology, the Advent boasts battery life of more than four hours. Meanwhile, integrated wireless Lan enables you to access and share files quickly and easily across a network, without the clutter of messy cables, and you can tap into Wifi hotspots across the globe in airports or hotels.

This powerful system will handle all types of applications, and has a clear, 14in LCD TFT screen and a CD-RW/DVD-Rom combo drive, so you can listen to music or watch DVDs on the move. Microsoft

Windows XP Home edition and Works 7 software are pre-installed and ready to run.

For further details on Advent, just go to www.adventcomputers.co.uk or www.pcworld.co.uk.

For a chance to win, answer the question and follow the how to enter instructions:

Question: What is the battery life of the Advent 7031?

- a) Up to one hour
- b) Up to two hours
- c) More than four hours

How to enter

Fill in the coupon and send to the following address by 29 September 2003:

Brother or Advent 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 Brother competition, and **PCW4** for the Advent 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.**

All text entries cost 50p, plus the cost of sending a normal standard text message (contact your network provider for details). Some Pay As You Go customers may experience difficulties using this service, and it is also not currently available to Virgin Mobile customers. We may use the contact details supplied to communicate with you regarding PCW. If you do NOT wish to receive any future free promotional messages by **text message**, please email sms@vnu.co.uk. Competition open to UK residents only.

PCW OCTOBER 2003 ADVENT COMPETITION ENTRY FORM

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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

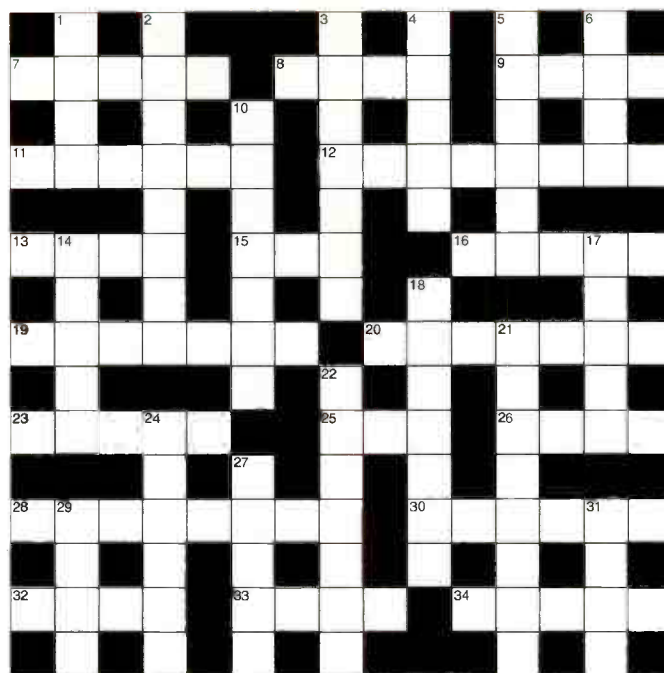
Prize crossword

ACROSS

- 7 ___ key, deleting button (5)
 8 IBM comms software used in mainframe networks (acr) (4)
 9 Tape spool (4)
 11 Append a document to an e-mail (6)
 12 Restoration of lost data (8)
 13 'Sleep/wake' PC system (acr) (4)
 15 Early computer from Commodore (3)
 16 7/8-bit coding scheme (5)
 19 Button next to Page Up (4,3)
 20 Amount of memory supplied with each computer (4,3)
 23 See 33 across (5)
 25 ___ Lovelace, Babbage's programmer (3)
 26 Nodal data structure (4)
 28 ___ chaining, problem solving technique (8)
 30 World's largest database vendor (6)
 32 Erase a file (4)
 33 & 23 across. Plain typeface (4,5)
 34 Web-based, consumer incentive system (5)

DOWN

- 1 Deflated (4)
 2 Bloodsucker (8)



- 3 Repeat (7)
 4 ___ Cadiz, wrecked oil tanker (5)
 5 Yearns for (6)
 6 Pub drink (4)
 10 Helicopter (sl) (7)
 14 Section of garlic (5)
 17 Spitting ___, TV puppet show (5)
 18 Contradiction (7)
 21 Alter tea around fast now (3,5)
 22 Racing commentator losing her hair? (7)
 24 Type of printer (6)
 27 Light modelling wood (5)
 29 Tel ___, Israeli city (4)
 31 Floor-covering material (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 October - Prize Crossword', VNU, 32-34 Broadwick Street, London, W1A 2HG, to arrive no later than 8 September 2003. Send the answers to the brainteaser to: 'PCW September - Prize Puzzle', at the address above, to arrive by 29 September 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.

August winners

The winner of August's crossword is Judi Robinson from Dorset. We had no successful entries to the Brainteaser.

SOLUTIONS

September crossword

ACROSS: 7 Octet 8 Nest 9 Obey 11 Escape 12 Contents 13 Vine 15 Dim 16 Pscs 19 Pasting 20 Abilene 23 Micro 25 Dat 26 Apic 28 Image map 30 Office 32 Blue 33 GREP 34 Motif

DOWN: 1 Acts 2 Decadent 3 Welcome 4 Stank 5 Covens 6 Left 10 Reading 14 Iraqi 17 Conti 18 J Button 21 Leapfrog 22 Adopted 24 Rugger 27 Amigo 29 Mole 31 Coin

August brainteaser

R	E	C	O	N	C	I	L	E
E	V	E	N				E	
G	E	N		A	R	O	M	A
A	R	T	I	C	U	L	A	R
I		U	N	I	T	I	N	G
N	O	R		D	V		U	
I	B	I	S		S	E	R	E
N	O	O	K		E		U	S
G	E	N	I	T	I	V	E	

Cards on the table



The 13 cards of a suit, plus two Jokers, are shuffled and dealt in a line. No two consecutive cards are adjacent and no card is in its correct position, counting Ace to King, left to right followed by two Jokers. No Joker is at either end of the row but they are separated by two cards totalling 10.

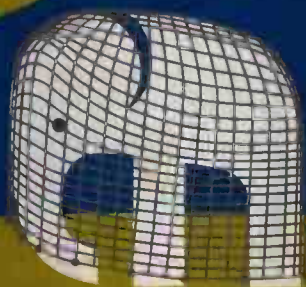
King is between 10 on the left and 6, which is somewhere left of 7; 9 is between Queen on the left and Ace, which is somewhere left of 3, which

is somewhere right of 5; Jack is somewhere left of both Jokers although not adjacent, and 4 is somewhere right of them both; 2 is somewhere right of 3.

If Ace equals 1, King equals 13, Jokers 0, and so on, the 6th card from the left is odd and the 11th is even. The left-hand card is five higher than the right-hand card. The 9th and 14th cards total 12.

Can you locate each card?

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OCTOBER 1983

'The unbeatable TI Home Computer. It's all the computers your family will ever need.' That's a pretty bold statement for a machine with only 16KB of Ram (expandable to 52KB) and for which a 'floppy disk memory system' is an optional extra. Still, 1983 was an era of both discovery and naivety, and back then a 16bit machine was the height of sophistication.

That extraordinary claim was made in an advert, while over in the reviews section we grappled with the intricacies of Sage 400, forerunner to today's Line 50, which was reviewed in last month's accounting group test. 'Most accounting packages, integrated or otherwise, quote



The Linus Write-Top, the world's first Tablet PC was very basic but a revolution in its time

prices per module that are within pounds of the figure quoted by Sage Systems Limited for its complete suite,' we gushed in the Sage 400 review. How times have changed – Sage now has one of the most expensive offerings on the market.

And who would believe that it is 20 years since the launch of the Acorn Electron? It's the subject of this month's Retro (p295), but back in 1983 we spent five pages marvelling over the no-nonsense £199 wonder. Happy days.

OCTOBER 1988

First with new technology even 15 years ago, October 1988 saw two world exclusive reviews. The first was of the new high end Amstrad PC2000 range. This saw Amstrad take advantage of the praise and huge sales of its PCW and PC1000 ranges, enhancing internal components (the PC2386, for example, ran at a huge 20MHz and had 4MB of Ram) and supplying its own VGA monitor. One welcome surprise was that the new monitor range could be used with any other PC.

But more importantly, the world's first Tablet PC, called the Linus Write-Top, saw the light of day. For those of you who are unaware, Microsoft was hardly the first to market such a thing, as various companies were trying

to launch such a device successfully even before the Linus.

Besides the 'hilarious' play on words of its name, there was very little to this device, though. It essentially resembled a feature-free notebook with some standard internal components and a rather shoddy stylus. Furthermore, joined-up handwriting was not recognised, so using it wasn't a fluid and natural experience. When you put it in context, however, and remember that Optical Character Recognition (OCR) was then the Holy Grail, this was something of a revolution.

OCTOBER 1993

October 1993 saw the first appearance of PCs equipped with PCI, the new local bus. The design separated the processor and memory from the other devices in the computer, and promised 'plug and play' allocation of card settings. Without having to share bandwidth with hard drives and video cards the processor could work without interruption. Our testing certainly bore this out, as the systems felt faster than a Pentium at a fraction of the cost. When Intel decided to make PCI an open standard, it helped to ensure its success.

The CD-Rom was starting to make its presence felt in this issue with a group test of reference works by Tim Nott. Regionalisation was an issue, as it is today, and the Hutchinson Encyclopedia won respect for covering Britain in more detail than Encarta or Grolier.

Office suites were also under scrutiny. Microsoft and Lotus are still well known for these, but Borland and Computer Associates have lost ground, despite having offered database applications as standard, unlike their competitors. The idea of a unified install process had only occurred to half the vendors, and collaboration between the different applications in a suite was not as seamless as today.

Finally, there was a look into the rivals to CRT monitors. LCD-based displays are now extremely popular, but in 1993 they were still very expensive. While Dr Alan Knapp of Philips Research Laboratories predicted that the CRT would be around for a long time, he underestimated the attractiveness of small and light display systems.

OCTOBER 1998

By late 1998, speech recognition packages had become comparatively sophisticated compared to more primitive versions that would only pick up your speech if you spoke in slow, staccato sentences. These newer packages allowed you to input information at a rate of around 140 words a minute, which was still considerably faster than the average 40 words a minute at which people type. We grouped together four of the latest packages in a comparative review. Dragon Systems' Naturally Speaking Preferred won the Editor's Choice award, winning points for speed, accuracy and ease of use.

With digital technology jostling with conventional 35mm film formats, we put 15 digital cameras through their paces in a group test. At this stage in the development of digital photography, we were still recording the resolution of the CCD in pixels rather than megapixels, and several of the units on test featured less than 1 megapixel resolution. The Kodak DC260 Zoom emerged as leader of the pack, while the most expensive camera on test was the 1.4 megapixel Olympus Camedia C-1400L at £999.99. Today you'd be more likely to see a 6 megapixel camera sporting this pricetag.

Meanwhile, in the news section, we reported on Microsoft's launch of DirectX 6, the latest version of its multimedia application programming interface, which promised features such as multi-texturing. With DirectX 10 due to launch next year, these are now features that today's generation of gamers take for granted.



The Electron was Acorn's contribution to an exploding entry-level market

From tiny acorns

An impressive machine, and well-received – so why did Acorn's Electron ultimately fail?

When Acorn launched the BBC Micro to go with the Computer Literacy Project back in 1982, it offered not one but two versions. The £235 Model A was designed to be the affordable big-seller, leaving the more sophisticated £335 Model B for enthusiasts.

Much to the surprise of Acorn marketers, the Model A found itself neglected on store shelves, while the pricier Model B literally flew off them. The BBC Model B may have been a surprise hit, but with its price later increased to £399, Acorn just didn't have a compelling proposition for the exploding entry-level market; its response in mid-1983 was the Electron, but had it misjudged the market?

Acorn Computers was founded by Chris Curry and Hermann Hauser in 1979, but the pair originally got together under a different name. Curry had previously worked with Clive Sinclair for 13 years, first on hi-fi systems, then calculators and finally computers, culminating with the launch of the MK14 kit in 1977 under Sinclair's Science of Cambridge brand. Hauser, a physics researcher at Cambridge University, also worked on the MK14 and became friends with Curry.

Seeing the success of the MK14, Curry believed the natural progression was to produce a computer that ran Basic instead of just machine code. Sinclair allegedly wasn't keen, so in 1978 Curry and Hauser got together and formed their own company, Cambridge Processor Unit, or CPU for short.

CPU set up shop in one of Sinclair's Science of Cambridge's rooms, and its first big job was improving anti-theft systems on fruit machines. Then in 1979, Curry and Hauser were approached by Cambridge undergraduate Roger Wilson, who had developed a new 6502-based micro computer. Seeing its potential, Curry and Hauser took on both Wilson and his machine, and launched it as the System 1, Acorn's first computer. Curry and Hauser chose the Acorn name because they envisioned an expanding system.

Acorn's first home computer was the Atom, launched in 1980 for £170 or £120 in kit form. The Atom's successor was the Proton, which later became modified and rebranded as the BBC Micro in 1982. The cheaper BBC Model A failed to sell though, leaving Acorn without a machine for the exploding entry-level market. Curry in particular saw this as a huge opportunity, especially for buyers coming in a little later to home computing.

Acorn's answer was another cut-down version of the BBC Model B, but with better branding and more efficient manufacturing. The new machine was therefore based on the same 6502 processor running at 1.79MHz, with 32KB of Ram and a variety of graphics modes. Where the BBC Micro had three voices of sound though, the new model had one and was also missing the BBC's Mode 7.

That said, the new machine impressively supported modes up to 640 x 256 pixel resolution in two colours, and featured a full-size keyboard. Although in line with its target market, the case was almost half the size of the BBC Micro. It may have featured fewer ports as standard, but these included both TV and RGB video outputs, along with an expansion connector. The Plus-1 expansion pack offered cartridge slots and a parallel port, while the Plus-3 pack boasted a 3.5in floppy disk drive.

Continuing its atomic nomenclature, Acorn named its new baby the Electron, and launched it in August 1983 for £199. To keep manufacturing costs down, many of the Electron's features were delivered by a custom ULA (Uncommitted Logic Array) chip. Ironically, though, production problems with the ULA left Acorn severely under-stocked for the upcoming Christmas rush.

Sales of home computers in Christmas 1983 were double those of the year before and demand for Electrons far outstripped supply. Acorn missed out but, anticipating further market growth in 1984, committed to produce huge numbers of Electrons; by the following summer it had discontinued production of the BBC Model A.

Despite initial encouragement from retailers and promising market projections, the home computer market ran into trouble in the second half of 1984. Demand plummeted but, sadly for Acorn, it remained committed to manufacturing vast numbers of Electrons. Even a £4m advertising campaign couldn't turn it around, and a third of the Electrons built were never sold.

Later, Acorn would return with updated BBC Micros and the Risc-based Archimedes, but the Electron had missed its brief opportunity. Limited early supplies and lack of full BBC Micro compatibility meant little software had been developed, while fierce competition saw the budget market favour Sinclair and Commodore. Ultimately the home computer crash saw the end of the Electron, which, while an impressive machine in its own right, will forever be remembered as the cut-down BBC Micro that missed its chance.

Gordon Laing

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October Cover Disc

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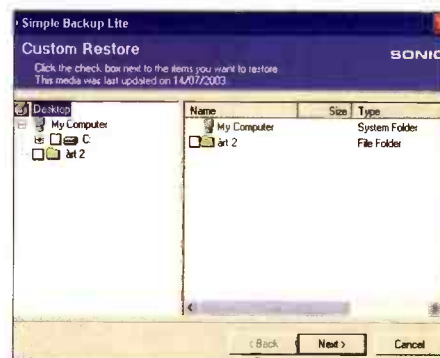
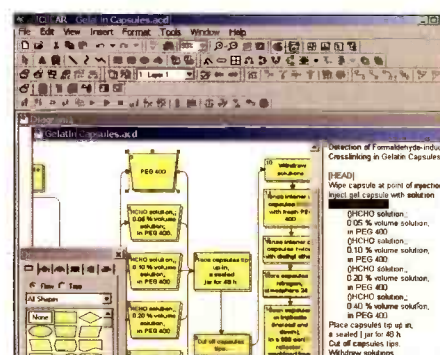
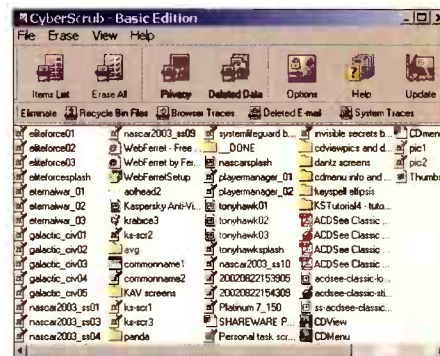
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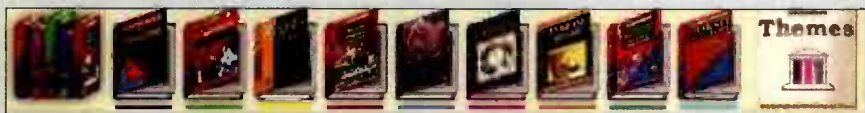
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Cablenut

www.cablenut.com

Cablenut lets you optimise your Internet connection. You can tweak a range of options that will affect speed, or you can load one of the Cablenut Custom Setting files that are included with the program to optimise your connection. Save your own settings for later use or distribution.

Sharpreader

www.sharpreader.net

Sharpreader is a news feed organiser for the .Net framework. Its interface is a combination of a web browser and email program. It has an address bar that allows you to view a feed without forcing you to first subscribe to it.

Trial versions

You'll also find trial versions and demos of some of the latest software, including trials of Swishlite & Swish 2, Easy Password Manager, Andromeda Lensdoc, Power-producer 2, PowerDVD 5, Wondertools Remov and Internet Download Accelerator.

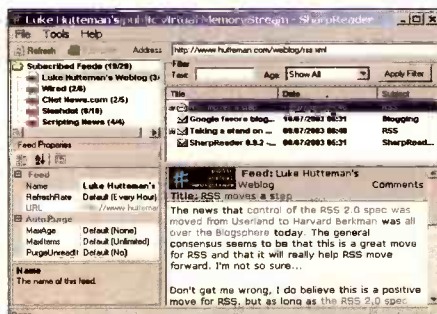
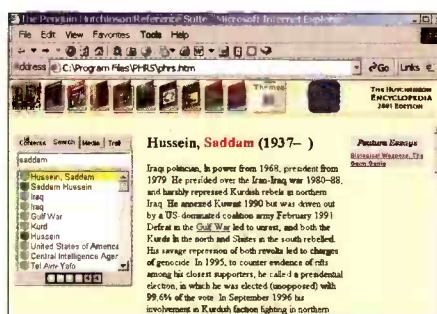
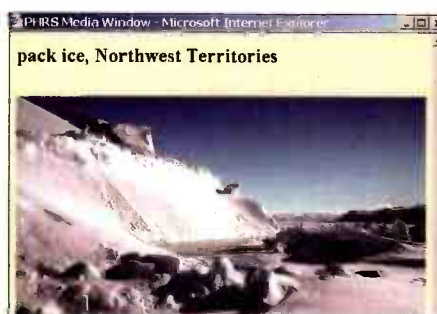
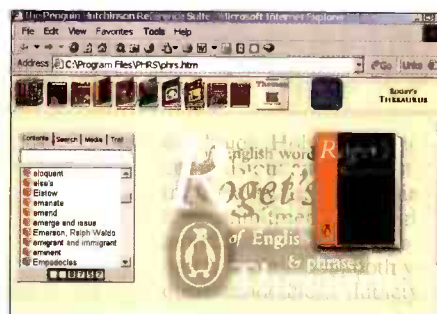
Top three pictures:

Penguin Hutchinson Reference Suite

Bottom:

4D Business Kit v2

Sharpreader



What's on the DVD

If you bought the DVD edition of *PCW*, you'll have all of what both CD-Roms has to offer, plus the programs below

Full version

Showshifter v1.55

www.showshifter.com

Watching TV on a PC is becoming increasingly popular, partly due to the falling cost of TV capture and tuner cards and the introduction of software such as Showshifter.

Designed as an all-in-one media device, Showshifter allows you to watch and record TV (Tivo style), and play back video files, DVDs and MP3s. All video formats supported by Windows Media Player can also be played in Showshifter.

Home Media Networks is offering *Personal Computer World* readers a full copy of its award-winning home media centre software, Showshifter, free on this month's DVD. Showshifter 1.55 allows you to watch, record and timeshift (pause) live TV, all through your PC. Showshifter also integrates DVD, digital video, CD and MP3 playback through its unique Farview interface, specially designed for remote control and distant use.

If you like what you see, then why not upgrade to the latest version? Showshifter 2.1 is capable of being 'skinned' and has been designed to work on any size TV or monitor, through support for multiple aspect ratios, so will look great on your cool, new widescreen TV. In addition, the music jukebox now allows you to play music video files so you can create your own music channel, and the enhanced CD player module now includes CD ripping and automatic Internet lookup of track and artist information.

Showshifter 2.1's DVD module now includes additional DVD chapter and multiple DVD Codec support, and boasts an enhanced PVR module, significantly improved realtime DivX performance and two-Pass DivX encoding for even better quality video files.

You can take advantage of the current special offer and upgrade to the latest version for only \$19.99 (usual price \$29.99). For more information on Showshifter, just visit www.showshifter.com.

Please note a TV tuner card is needed to use this software.

Playable game demos

On this month's DVD we've got 12 of the best games demos featured in the past:

Devastation The graphics and physics are worth a look, as practically everything can be used, destroyed or manipulated.

Splinter Cell Stealth is the name of the game, and you've plenty of moves, gadgets and weapons to play with.

Championship Manager version 4 Choose your club, take the reins and lead your squad to victory. But things are never that simple in this realistic management sim.

Links 2003 This popular golf sim takes you to some of the world's greatest courses, with improved graphics, six new championship courses, high-resolution 3D characters, Links Career mode and a new 3D Green Analyser.

Colin McRae Rally 3 Colin pilots his Ford Focus through numerous hazards.

James Bond: Nightfire Infiltrate towering skyscrapers, take on underwater missions and tackle assignments in space.

Fifa 2003 The latest edition of this soccer classic lets you play with all the top clubs, players and national teams.

PLUS NHL 2003, Next Generation Tennis, Need for Speed: Hot Pursuit 2, Grim Fandango, and WWE Raw.

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.

PCW workshops and product tests

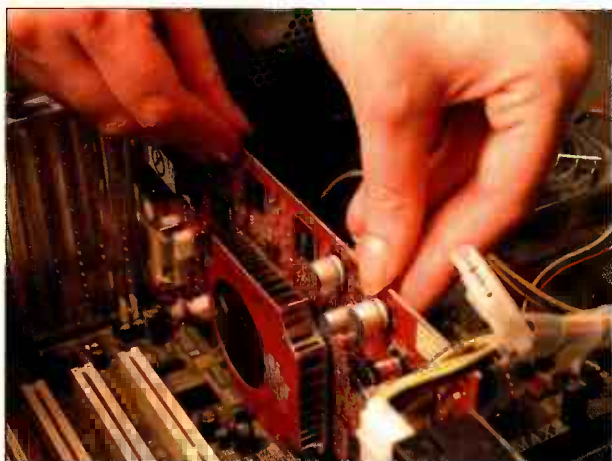
The Editorial section has a huge selection of past group tests and workshops. Two years of product tests from the pages of *PCW* include desktop PCs, anti-virus software, CD writers, databases, digital cameras, DTP software, hard drives, image editors, monitors, motherboards, PDAs and notebooks.



Top to bottom:
Showshifter v1.55
James Bond: Nightfire
Devastation
Fifa 2003
Grim Fandango

Next Month

on sale 18 September 2003



Find out how to build a PC to suit your own hobbies and needs



We find out what today's PDAs are capable of doing



Pick up some tips to improve your Powerpoint presentations

£499 PCs

Our most affordable group test ever checks out what less than £500 can get you these days. We were surprised by the results, and you will be, too. Can you afford not to read this issue?

PDAs

More sophisticated than the computers that put men on the moon, the computer in your pocket can do far more than track appointments and keep you in touch with friends. We check out 10 of the best.

Online music

Is it legal or isn't it? *PCW* investigates the digital music industry, talking to the users, the publishers and the artists themselves, and reveals who are the winners and losers in this emerging area.

Points for perfect Powerpoint

Everyone forgets some fundamental rules when it comes to producing a presentation. We'll be taking a look at some tips on how to make presentations more engaging and give them greater impact.

Build your own special PC

We tell you all you need to know about how to build your own home entertainment, super modern and silent PCs.

**There's lots more in
November's *PCW*,
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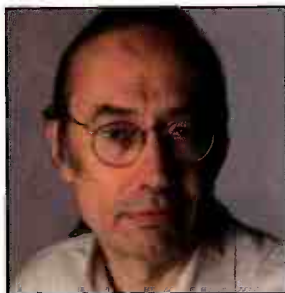
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Put technology into perspective

Modern technology should not be blamed for the way people choose to misuse it, argues Ed Henning

It is all too often that a technology gets the blame for the way people use it. In the recent case of the young girl who ran off with an American ex-soldier, some of the comments I heard or read seemed to suggest that it was the fault of the Internet.

I have, in the past, been inclined not to comment on such cases, because the end result has been tragic. But thankfully in this case she returned home unharmed.

We were told that this girl had her Internet access limited – yes, limited – to five hours a day, and that unsupervised she would stay on for up to 11 hours a day. I cannot understand why I have not seen a word of criticism of her parents. What kind of people can they be? Slumped in front of *Big Brother* all day long is the kindest guess. These people seriously need to get a life and have their computers, and probably their television, confiscated.

Around the same time there were reports of the Thai authorities closing down Internet cafes in the small hours of the morning because of young kids obsessed with some Korean online game. Again, where are parents of these kids when they are out on the town in the small hours?

My dilemma in all this is that obsession can be a very creative state, and there is a thin dividing line between single-minded determination and dangerous obsession. Many teenagers have become quite rich from computer games they have written in their homes, struggling through endless hours, determined to make the thing

work. The technology is more complex now, making this more difficult, but such obsession drives much good programming, and you don't have to be a teenager.

I have experienced this many times myself, when a particular programming problem, usually self-created, has kept me at the machine until three or four in the morning, sometimes getting me out of bed to turn on the PC when ideas and possible solutions have been keeping me awake. It can be annoying, but it works, and there is something about PCs – I am sure it is their interactive nature – that makes them particularly prone to this.

I once asked an IBM developer why it was that compilers worked best in the early hours of the morning, and he replied sensibly: 'That's when they were written.'

But it is not only modern technology that inspires this kind of obsession. One of my favourite stories of obsession or single-mindedness concerns Einstein when he needed a paperclip, and the only one he could find was bent. So he tried to find something to use to straighten it, found a brand new paperclip, and then

proceeded to bend this into the shape of a suitable tool with which to straighten the original paperclip. A very thin dividing line, indeed.

Thinking about this reminded me of a book I read about three years ago, and if you are interested in the Internet and attitudes towards modern technology then I strongly recommend it. *The Victorian Internet* by Tom Standage, is the story of the invention and early development of the telegraph, another interactive technology.

The book highlights a few interesting comparisons with the Internet. The first is that the impact on communications was much greater with the telegraph. It is easy to forget how isolated different countries were before the telegraph, when the fastest way of sending information was usually by ship, and it would take weeks.

Think of reporting on, or directing, a war on another continent with communications like that. Within a few years, the telegraph effectively shrank the world when it made long distance communications possible within minutes – messages relayed from one station to the next.

Sure, things like email have made communications cheaper and more convenient, but it does not compare to the huge leap forward with the telegraph.

As now, so then, and it appears that people thought the telegraph was a means of solving the world's problems. Thankfully, most of those Internet evangelists that made so much noise a few years ago have gone quiet – or maybe we have just become immune to their rantings. According to Standage, because

the telegraph had such a profound effect, people extrapolated this into thinking it would 'eliminate the drudgery of manual work and create a world of abundance and peace.' Substitute modern ideas and language for the Victorian, and it could be a Negraponti or Dyson speaking.

Just like the Internet, the telegraph was another tool that made certain tasks easier and enabled a few new ones. That's all.

There was then no equivalent to the chat rooms of the modern Internet, but people played games over the telegraph, governments tried vainly to regulate it, and people used it for crime, found love and even got married by means of Morse code messages.

All of this shows that we have been 'here' before, actually 100 years ago, but seem to have forgotten the lessons we learned. Hence we've lost our perspective when dealing with some of the serious issues raised by the mishandling of technologies like the Internet. When something bad happens, we should really blame ourselves (or maybe our parents) instead.

'We've lost our perspective when dealing with the issues raised by the mishandling of technologies'



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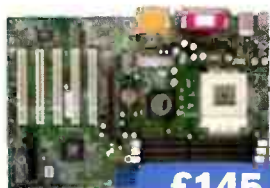
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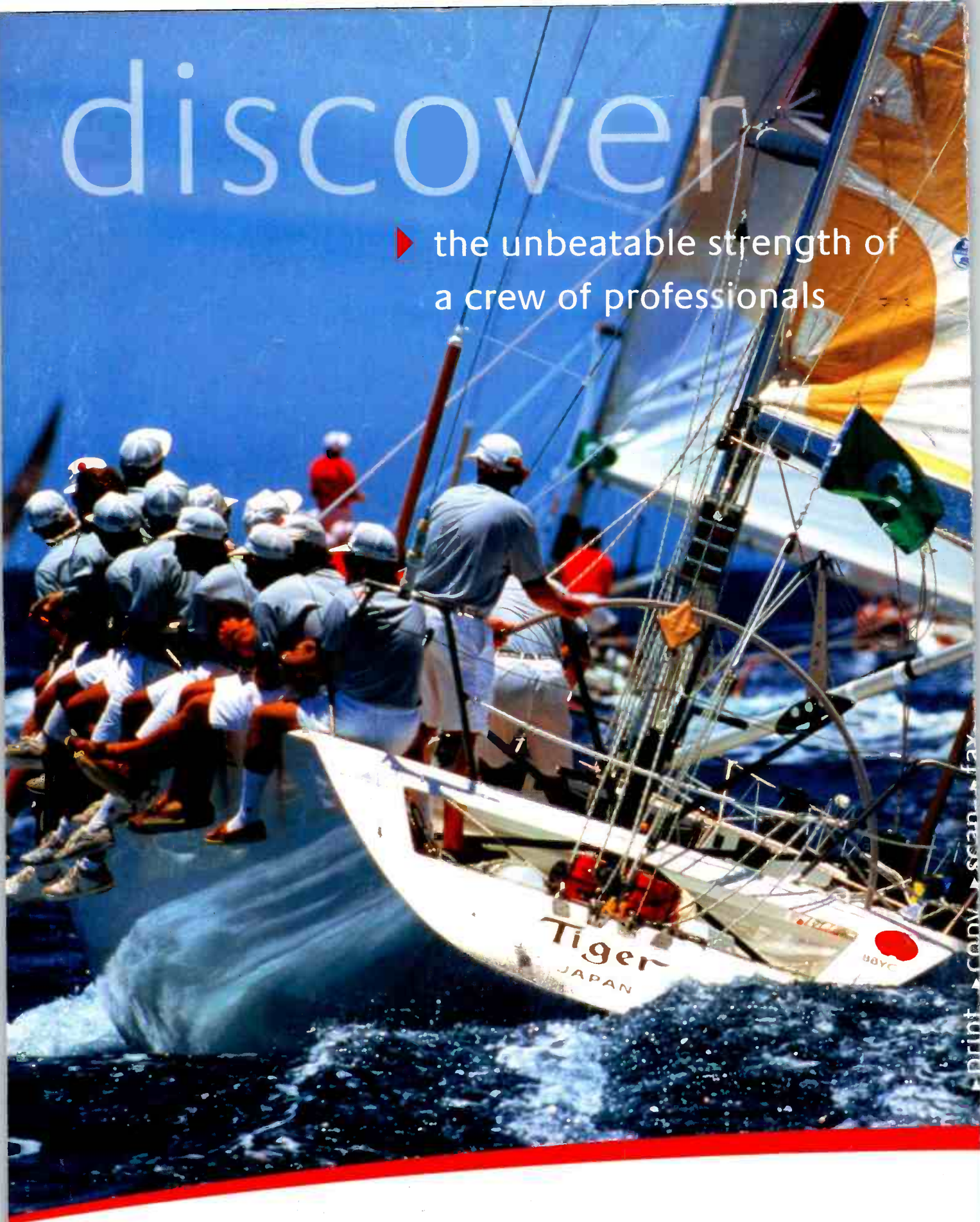
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