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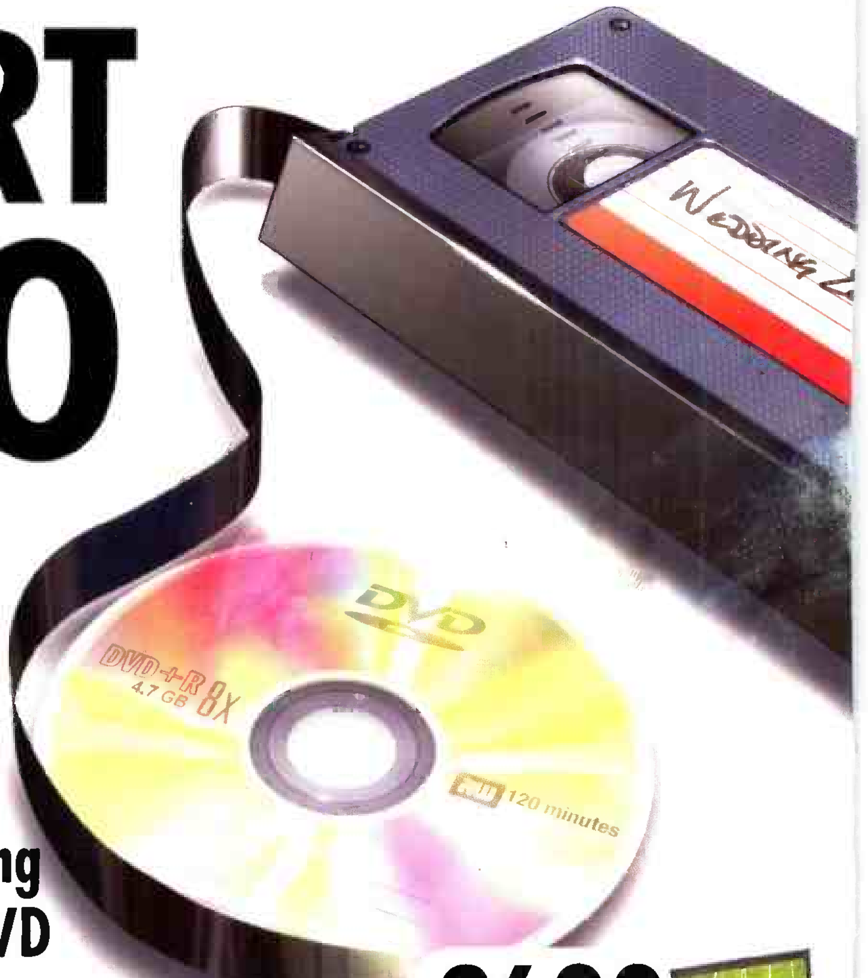
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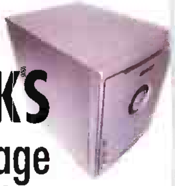

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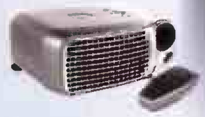

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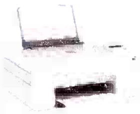

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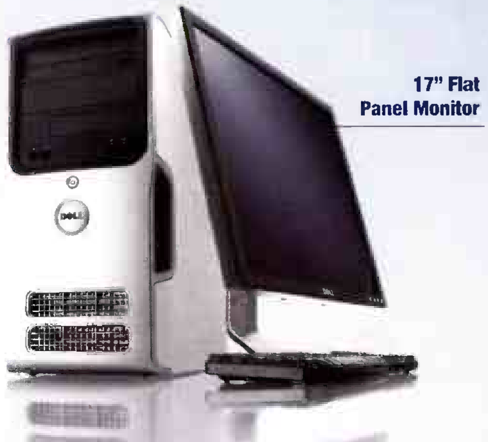

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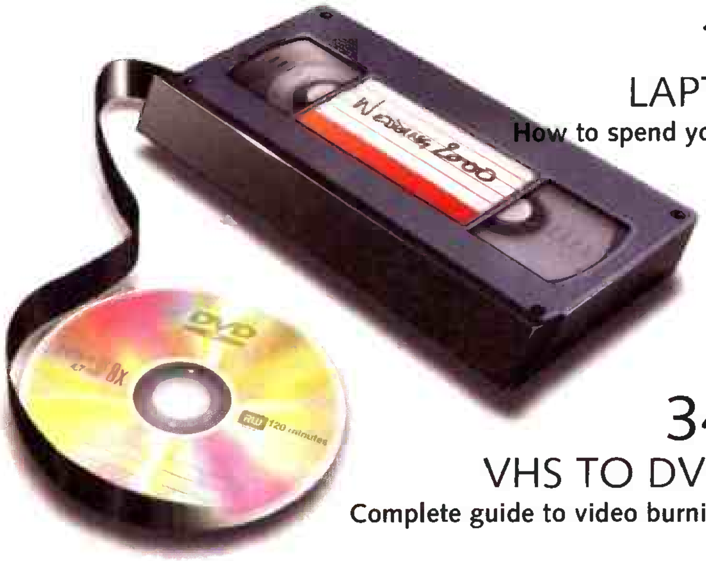
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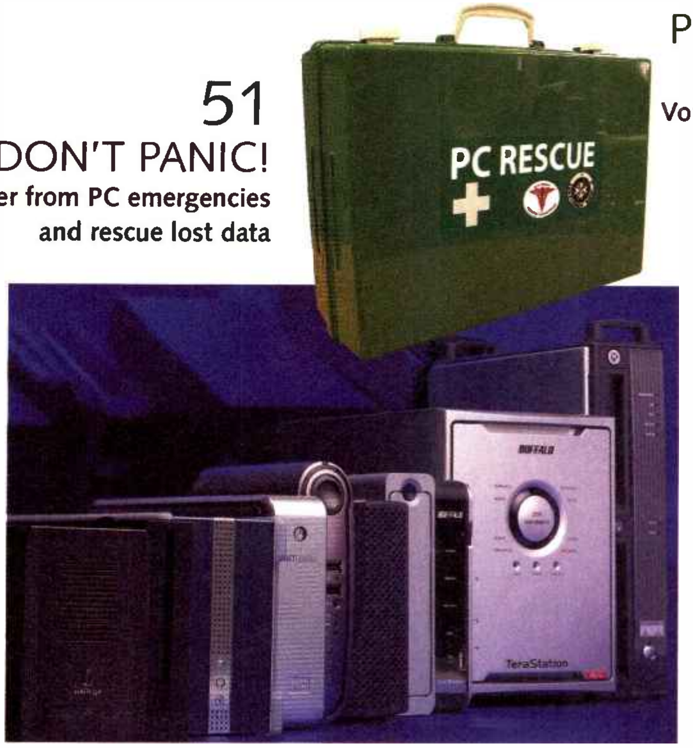

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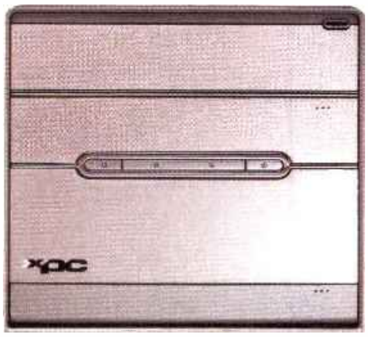

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ASUS recommends Windows® XP Tablet PC Edition

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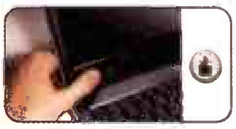

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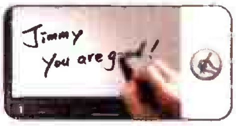

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Editorial

Community websites are fun, but are they worth big bucks?

Analysts over-hyped the 1990s' dot-com industry. Are they making the same mistake again? asks Dylan Armbrust

I happened upon a news item on the wires today that estimated the community website Myspace (**www.myspace.com**) to be valued at $15bn. As an IT industry watcher, I naturally paid attention to this. The story outlined how one Wall Street media analyst, RBC Capital's Jordan Rohan, felt that given the overwhelming growth of Myspace in terms of users and usage, the figure was entirely possible.

I don't know about you, but when a story claims that any website – let alone a community website – could be valued at $15bn, my instant reaction is one of incredulity: not because it isn't possible, but because of past experience of internet hype.

Many of us remember the dot-com boom of the late 1990s, when silly money was spent on anything associated with the net. Who can forget the famous case of Boo.com? This was the fashion site launched by Ernst Malmsten, Kajsa Leander and Patrik Hedelin, which managed to burn through $120m (although some reports claim the figure was about $160m) in less than two years. Now that was a lot of other people's money to lose. And, of course, there are other famously over-hyped net ventures, such as Beenz.com. Or how about global publishing house Future, which renamed itself Futurenet on the back of the boom, only to return to Future again.

The fact is that the dot-com boom, for all its follies, taught us a good lesson: you need to have something that everyone wants, such as books, and a good business model to back it up. In other words, the product needs to be profitable. Today we know this is possible because several web ventures, Amazon for example, prevailed and have become incredible success stories.

'The fact is, web advertising is incredibly uncompelling and easy to ignore'

But I worry that we may be seeing the beginnings of another over-hyped chapter in web history. With the advent of what is called Web 2.0, we're seeing new kinds of web phenomena come to the fore, the biggest being social networking sites, such as Myspace, or video sites such as Youtube. While these sites have been drawing remarkable traffic and membership sign-ups (Myspace claims 25,000 new members a day in the UK alone), the question is: are they really worth $15bn?

When Lastminute.com was launched, it was valued at more than £700m, which was more than Debenhams at the time. Yet it can't come close to claiming that today.

I suppose the viewpoint of the Wall Street and London City money-men is that sites like these give you access to, and data on, the millions of people who sign up to them. Information such as a user's age, geographical region and site viewing patterns is a powerful commodity nowadays. And I suppose there's the fact that a lot of the people who join these sites are young people who are less interested in traditional media, such as newspapers and television. Advertisers love to go after the young, and finding the medium where they are most likely to congregate is manna from heaven for them.

But I have to question the overall value of sites such as these. Not to the user of course, because they are great fun. One can spend hours going through Youtube videos or meeting like-minded people on Myspace. But what is the real value to advertisers, or even of advertisers, on a site like this? The fact is, web advertising is incredibly uncompelling and easy to ignore.

I am glad to see a phenomena such as Myspace develop, and long may they continue, but we shouldn't mistake popularity for big money. And really, $15bn? I think not. **PCW**

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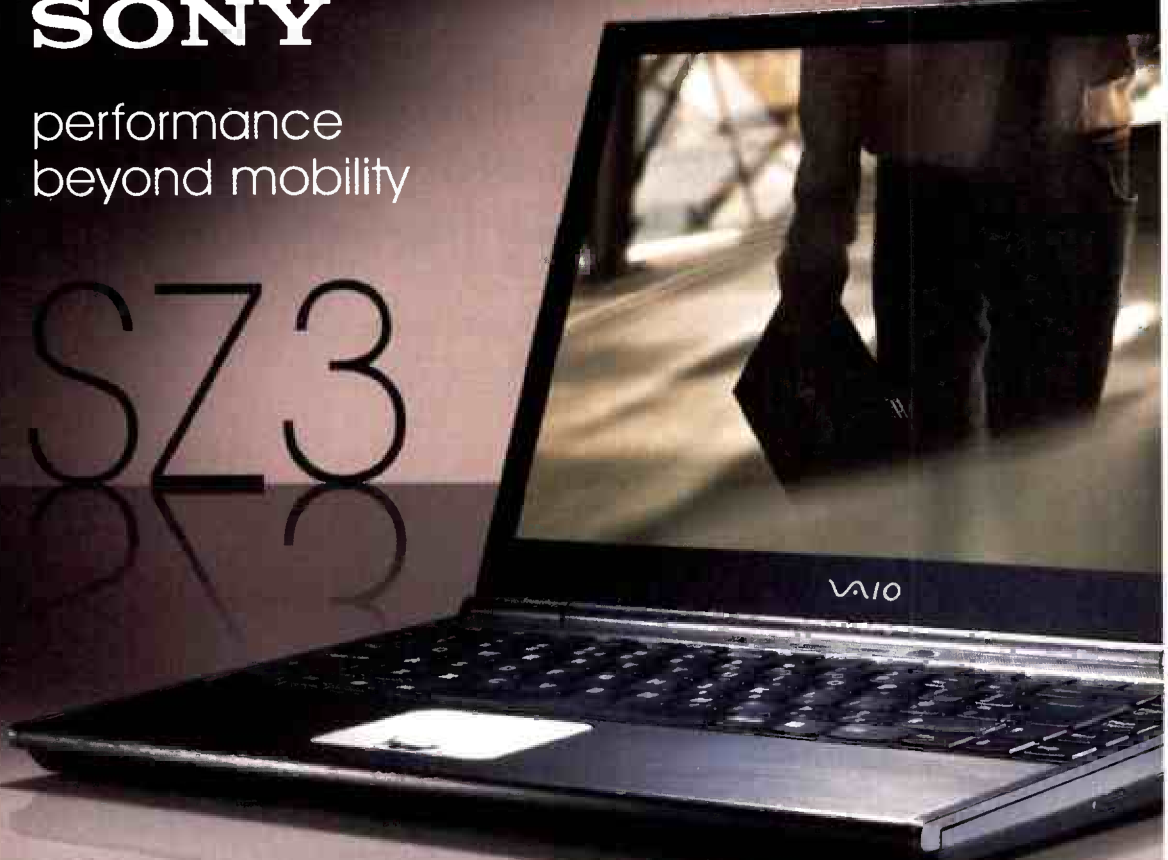

SONY PRICE CORRECTION

Sony VAIO SZ3VWP
The printed price of the Sony VAIO SZ3VWP on page 19 of the "Experts Guide to Mobility supplement" included within this magazine are shown as incorrect.

At Sony, we are committed to our quality of customer care and service and would like to apologise for any inconvenience caused in relation to this pricing error. All due care and attention is taken to printed prices being correct at time of print.

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Quad-cores presage terascale

Intel will ship its first quad-core processor in November, at least six months ahead of the expected release of rival AMD's quad-core Opteron. The Core 2 Extreme quad-core, targeted at gamers, will be 67 per cent faster than its dual-core stablemate, said Intel chief executive Paul Otellini at the bi-annual Intel Developer Forum in San Francisco.

AMD claimed that Intel had stuck two dual-cores on a single die so that it could claim to be the first on the market. The next-generation Opteron, scheduled for release in mid-2007, will be native quad-core with faster internal links and more power efficient, it said.

Intel is generally seen to have regained the technological initiative recently, but AMD's hypertransport bus and processor-based memory controller give it some advantages. An AMD spokesman said: "As long as Intel sticks to an old frontside bus architecture it will not be able to overcome the inherent disadvantages that come with it, like limited scalability and performance."

A quad-core Xeon 5300 will ship late this year, followed by the 50W Xeon L5310 for low-drain blade servers. Quad-cores for mainstream desktops will ship early next year.

Quad-core Core 2 Extreme processor

Otellini said Intel was on course to deliver, within five years, a processor capable of performing a trillion floating-point operations a second (teraflop), ushering in a new age of terascale computing. He showed a prototype of the processor in the form of a tiny die with eighty 3.1GHz cores.

These cores are specialist processing units rather than general-purpose processors, as on the quad-core Extreme, making the architecture rather like the PS3's Cell (see page 18). Otellini said the chip will be used in data centres, and will enable new services such as real-time speech translation from one language to another.

Processing at these speeds will require commensurate improvements in memory bandwidth and interconnect speeds. Intel is working on stacking 20MB of memory and a processor onto a single chip, and terabit photonic links (see page 17).

"We are talking about a fundamental change in the way that the whole computing infrastructure is built," Intel chief technology officer Justin Rattner said.

About 13 PC manufacturers have said they will have quad-core Extreme systems available when the chip, called the QX6700, ships in November. Each of its dual-cores has 4MB of cache, giving it a total of 8MB, and they shared a front-side bus.

Intel says it has gone for performance rather than trying to save power. The QX6700 draws 130W and the mainstream quad-core will draw 100W. Future generations will move towards the 80W and 65W of Core 2 Extreme and Duo processors. The chips will run in existing Conroe motherboards, although these may need a Bios update.

First versions will be use a 65nm die, but that will shrink to 45nm next year.

Otellini said that 45nm processors will deliver 20 per cent better performance and a fivefold reduction in leakage current – a key cause of inefficiency. Intel expects to release 32nm processors in 2009

● Rob Jones at IDF – special report P17

Programmable matter creates 3D clones

Researchers are developing programmable matter called Claytronics that can take any shape or colour to look and even move like any person or object.

The research, inspired by ideas long explored in sci-fi, centres on assemblages of tiny units called Catoms that are the Claytronic equivalent of cells in organisms.

Each packs a microprocessor, and they can talk to each other, take on any colour or texture, and 'stick' to neighbouring Catoms using electrostatics or tiny electromagnets – or unstick, if needs dictate. The same process enables assemblages of Catoms to move.

Power is passed from one Catom to another so they do not need individual energy sources.

Intel, which is collaborating on the project with researchers at Carnegie Mellon University, says the aim is to create 3D replicas that look indistinguishable from the real thing.

The Claytronic models would be created using 3D images of what they represent in a process called Dynamic Physical Rendering. The research was unveiled at IDF shortly before *PCW* went to press but we will write more on it next month.

If you can't wait that long check out Rob Jones' story at **www.pcw.co.uk/2164982**, where there are links to a video and more information

Deep answer to HD format war

A technology that would allow movies in the rival HD-DVD and Blu-ray high-definition formats to be held on the same disk at different depths has been proposed by two leading engineers at Warner.

The flip side of the disk could hold conventional DVD content, allowing a movie in three formats to be sold in the same package.

The design could end confusion in the market over the rival formats, although it would probably push up production costs. Publishing the same titles in multiple formats on separate disks is also costly. An application for a US patent for the system has been filed by Warner engineers Alan Bell and Lewis Ostrover. But the jury is still out on whether the technology that has worked in the lab will translate into a commercially viable product.

In related news, a London-based company, New Media Enterprises, has announced a 'complementary' discovery that facilitates the manufacture of multi-layer disks.

NME caused a minor sensation at Cebit earlier this year (see **tinyurl.com/rgs62**) by announcing a third HD format called Versatile Multi-Layer Disc (VMD) that could store up to 40GB with cheap burners using low-cost red lasers in DVD drives.

These disks also rely on stacking layers of data. But NME is mainly targeting the Asian markets.

Conventional Blu-ray content is burned at a depth of 0.1mm, and HD-DVD is deeper at 0.6mm, so it would be feasible to stack one below the other. The Warner engineers have proposed a Blu-ray top layer transparent enough to allow a laser to scan the HD-DVD content below.

The news comes as Warner announced that it is releasing titles in both HD-DVD and Blu-ray formats.

→ **www.nmeinc.com**

Microsoft gives player unfortunate name

Microsoft has never lived down spending millions of dollars on usability research to come up with a Windows interface on which you pressed the Start button to exit. That little embarrassment will disappear with Vista, but the company seems to have done it again with its soon-to-be-released Zune media player.

It is anyone's guess how much Microsoft paid someone to come up with the name. But evidently, it didn't check around the world for embarrassing double meanings – the sort of due diligence that should be routine when a word is intended for a global brand.

It turns out that Zune is French Canadian slang for penis, and Zoons is a disease of the said member.

Despite the name, the Zune helped Microsoft upstage Apple – a rare event these days. Details of the device came after Apple disappointed its fans by announcing just a few tweaks to the iPod Nano when the launch of a portable video player had been widely expected.

The first Zune will launch on 14 November, priced at $249.99 (£133.45), with a 30GB hard disk and Wifi links. Other models will follow next year.

music
videos
pictures
radio
settings

Zune is a slang term for the male appendage in French Canadian

Jajah slashes cost of international mobile calls

A new service that claims to cut the cost of mobile international calls by up to 86 per cent has been launched by Jajah, the company that offers free calls between dial-up phones.

If you have a Symbian-based mobile, a downloadable applet will let you dial a number as usual. But the call will be routed through Jajah's gateway and a Voice over IP link to the destination where the number is called at local rates.

A Java-based applet can be used on some other phones. Failing that you can text Jajah to set up a call.

Jajah says a 10-minute call to New York from London costs £1.10, compared with £9.90 with O2, £12.90 with Vodafone, £7.00 with T-Mobile and £1.50 with Orange.

The company already offers free calls between dial-up phones in several countries via a browser form.

Enter your number and that of the person you are calling, and the system links both numbers for free.

→ **www.jajah.com**

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The publication dates for the next three issues are: 10 November, 5 December and 29 December.

Details of how to subscribe are on page 209.

NTL launches £40 quad-play

NTL Telewest, which recently bought the Virgin Mobile brand, has announced what it claims is Britain's first quad-play package, bundling Freeview TV and video on demand, 2Mbit/sec no-limits broadband, and fixed and mobile telephony for £40 a month.

The offer includes 300 minutes of mobile calls and 300 texts a month, free mobile voicemail, and free unlimited landline calls to any UK number at weekends. NTL claims it will save the average home £400 a year.

But it could antagonise subscribers already getting TV, broadband and telephony from the company. They can get the Virgin deal for £10 extra a month, but they are barred from the £40 package, according to an NTL spokeswoman.

People already subscribing to the two NTL Telewest services will be eligible, however.

→ **www.ntl.com**

In brief

Cubase major upgrades

Steinberg has released two new versions of its flagship Cubase music-production software with a redesigned interface, new VST instruments, a universal sound manager, and 30 new plug-ins. Cubase Studio 4 costs €399 (£270) and Cubase 4, which adds professional features for studios, costs €899 (£607).

→ **www.steinberg.net**

AVG beta available

Free beta code of the next version (7.5) of Grisoft's AVG security software is available at **www.grisoft.com**. It protects against worms, viruses, Trojans, spam and keyloggers, the firm said.

Mobile aids hearing

IBM has developed a mobile phone system to help people with poor hearing receive public announcements at places such as railway stations and airports. The Location Aware Messaging for Accessibility (Lama) system sends the announcements as text messages, images, or even handset vibrations.

Open Office in Welsh

A Welsh version of the open-source suite Open Office 2.0 is to be made available as a free download or you can buy a disk and printed manual. You can register for email alerts on availability at **www.agored.com**

Virgin price correction

In a piece on Virgin Mobile's 'free' broadband offer last month, we said new subscribers could get a wireless router for a one-off payment of £16.99. The actual price is £69.99. We apologise for the mistake.

Copy from PVR to PC

A free utility called Copy+ will copy programmes recorded on the hard disk of a Sky set-top box PVR to a PC, thus augmenting the PVR's limited 40GB storage. It can be downloaded at **http://copyplus.artisswebdesign.co.uk**

'Smallest' SLR goes on sale

Olympus has unveiled what it claims is the world's smallest digital single lens reflex (SLR) camera. The E-400 body weighs 375g and measures 12.95x9.1x5.3cm.

It features a 10 megapixel CCD sensor and follows the Four-Thirds standard pioneered by the firm, making it compatible with lenses from several manufacturers.

The camera packs a 2.5in LCD viewing screen, a 'supersonic wave filter' for dust protection, slots for xD-Picture Card and CompactFlash memory, RAW recording, 32 shooting modes and a pop-up flash. It is available in the UK for about £850, including a 14-42mm lens and a new compact 40-150mm lens.

Meanwhile, Canon's latest range has technology that picks out faces and optimises settings to create the best image. Its four new cameras also use Canon's latest Digic image processor, which comes with noise-reduction technology to boost sensitivity to an equivalent of ISO 1600. These are the Digital IXUS i 7 Zoom, 850 IS, 900 Ti and the 10 megapixel Powershot G7, costing £249, £369, £399 and £449 respectively, and all out now.

Sanyo has launched the pocket-size Xacti VPC-CA6, a combined digital movie camera and 6 megapixel still camera that it describes as 'splash resistant'.

It records DVD-quality Mpeg-4 videos at 30fps (640x480 resolution) to either an SD or SDHC card. It comes with a 1GB SD card able to hold an hour of video.

- **Canon EOS 400D review – page 76**

→ **www.olympus.co.uk**; **www.canon.co.uk**; **www.sanyo.co.uk**

OLYMPUS
E-400

Olympus E-400 boasts 32 shooting modes and CompactFlash memory

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Home-worker printer blends in nicely

Nearly one in four people running businesses from home use their kitchen as an office, according to a survey conducted on behalf of printer manufacturer Brother. Slightly more (29 per cent) use their bedroom and 18 per cent use their garage or a garden shed.

Brother's MFC-660 CN printer can also fax and record telephone calls

Brother conducted the survey because its latest range of eight multifunction inkjet printers are targeted at Britain's home workers and businesses, with a compact design and look which the company said will blend easily into a living space.

All offer scanning, copying and printing, including features to help digital photographers. Most have a special slot for photo paper, and six have a colour LCD screen so photographs can be viewed easily before printing.

They range from the entry-level £79.99 DCP-130C to the £179.99 MFC-660CN, which also acts as a fax, telephone, answering machine, and phone recorder.

- Canon is promoting its new range of six multifunction printers as environmentally friendly, saving energy by warming up quickly and powering down more efficiently. The systems offer print speeds ranging from 26-52 pages per minute, and they support smartcard and fingerprint recognition.

USB battery eliminates need for charger

A company called Moixa has come up with a neat design for an AA battery that can be charged via a USB port. The cap of the battery comes off to reveal a USB plug that can connect to a PC or laptop and eliminates the need to carry a separate charger.

A USBCell takes about five hours to charge fully, but a 10-minute charge will often do for a few extra hours of use, according to the firm. The plug takes up space in the NiMH battery, reducing the capacity, but this is still a respectable 1,300 milliamp-hours, the firm said. A USBCell draws about 250ma when charging, about half the power available on a USB port. However, some USB ports, particularly those on hubs with no independent power supply, may not be able to supply sufficient current.

A pack of two AA cells costs £12.99 from **www.usbcell.com** and will be available soon.

USBCELL
USBCELL

Wireless USB lacks Vista driver

Products with new Wireless USB links rated at 480Mbits/sec will be available by end of this year, but they won't have native Windows driver support.

Many were on show at the Intel Developer Forum (IDF), including digital cameras and printers. The new link replaces the USB 2.0 cable with an Ultra Wideband (UWB) wireless signal rated at full speed over three metres and up to 110Mbits/sec at 10 metres.

Real data rates are likely to be rather less than the rated speeds.

Windows XP lacks driver support for the technology and Microsoft has said it won't be supported in the first release of Vista, but will be added later. This will not help the reputation of a standard already tarnished by delays. Wired USB had a similar problem when it was first released and early adopters had to rely on drivers supplied by device manufacturers.

NEC
alereon

Wireless USB hub and dongle, with cover removed

Early Wireless USB peripherals will require a Wireless USB dongle, expected to cost between £27 and £40, plugged into the host computer.

In a couple of years the receiver will be integrated into computers, eliminating the need for a dongle.

A spokesperson for Intel commented: "By the end of this year, we will see early shipments of wireless USB products. It will go mainstream next year and by that time drivers will be in place."

Alereon showed wireless USB in action at IDF, displaying pictures from an adapted Kodak Easyshare V610 camera on a nearby monitor. Chosen images appeared instantly.

NEC showed a four-port hub (pictured) with a wired connection to standard USB peripherals, such as a printer, but linked wirelessly to a PC with a dongle adapter. The port (minus the dongle) will cost about £16, the company said.

Steeley will give UMPC all-day power

The price of ultra-mobile PCs (UMPCs) will fall to between $500 and $700 (£265 and £378) in 2008, and will last a working day on one battery charge, Intel claims.

The long battery life will be possible, thanks to ultra-low power chip, Steeley, with a design vastly different from that of its predecessors, said Anand Chandrasekher, senior vice president of Intel's ultra mobility group.

Chief executive Paul Otellini said the aim was to cut processor power consumption to a 10th of that of 2005 designs, enabling seven hours of battery life.

Left: a UMPC with keyboard used to demonstrate content streaming to a Volkswagen in-car system (right)

The chip will measure one-seventh of the size of today's models. "The idea of getting all-day life out of a highly portable, highly functional, highly featured device is now upon us," said Otellini at IDF. "Developers can use this silicon development to find new opportunities for products," he said.

The Steeley chip will be able to run full desktop operating systems, including Vista.

Volkswagen is exploring how it can use handheld products, such as Ultra Mobile PCs (UMPCs), to allow in-car systems to access audio and video content on the web. It showed a system in which a UMPC connected to the web using Wimax and streamed content to the car's audio system using Wifi.

www.pcw.co.uk/2165082

Silicon laser promises terabit links

Intel gave the first public demonstration of what it says is the first electrically pumped hybrid laser to be made using a standard silicon manufacturing process.

The technology could lead to links with data rates of terabits a second within chips, inside computers, or across networks.

Mario Paniccia, director of Intel's Photonics Technology Laboratory, said: "We believe dozens, maybe even hundreds, of hybrid silicon lasers could be integrated with other silicon photonic components onto a single silicon chip."

Kevin Kahn, senior Intel fellow, said the technology would enable terascale computing which will require multiple cores working together, but he added: "The problem is bigger than that – it extends to the platform and the network."

Kahn said he was optimistic that the work would come to fruition in four-to-six years.

In brief

New instructions

Intel is to add 50 new instructions to those used by its 64-bit processors, which are themselves an extension of the classic x86 set. The instructions will be published early to enable support by AMD chips.

Intel says they will enable programs to take better advantage of its next-generation 45 nanometre chips. The instructions will be part of what is known as SSE4, perhaps computing's only example of a nested acronym. It means the fourth update of Streaming SIMD (Single Instruction, Multiple Data) Extensions. In other words, doing the same thing to many items of data.

→ **www.pcw.co.uk/2165177**

Ring of confidence

Intel is testing products that can monitor the health of vulnerable people and send alerts to a doctor if help is needed. Forty elderly people will wear an iBracelet in a pilot scheme next year to test the idea.

RFID tags will be put on items they commonly use, such as coffee makers, cups, milk bottles and medicine bottles, to allow the bracelet to monitor their use and so check that the wearers are eating, drinking, and taking their medication.

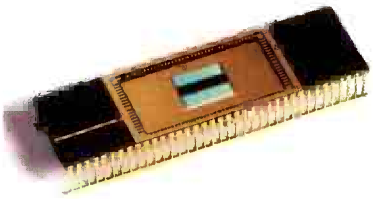
→ **www.pcw.co.uk/2164986**

Accelerator aid

Intel announced two measures to help third-party chips work with its processors. One is to allow specialist accelerators from Xilinx and Altera to connect with its front-side bus. The other is a joint initiative with IBM, codenamed Geneseo, to develop extensions to the PCI Express bus standard to speed up links with co-processors.

The moves are seen as an answer to AMD's Torrenza co-processor socket.

→ **www.pcw.co.uk/2165179**



Rival to Flash

Samsung has developed a working prototype of memory technology that it expects will replace Flash within a decade. It showed a 512Mbits/sec Phase-change Random Access Memory (PRam) module at a Seoul press conference.

Samsung claims it combines the speed of Ram with the Flash-like ability to retain data when the power is switched off. Its speed stems from the fact that it can directly overwrite data without performing an erase. It is half the size of Flash and is expected to last 10 times as long.

→ **www.samsung.com**

IBM Cell server

The first servers based on the revolutionary Cell processor used in Sony's PlayStation 3 games console were launched last month by IBM. The BladeCenter QS20 range is said to deliver supercomputer-like performance.

The QS20 is being touted for demanding applications such as 3D rendering, compression, encryption and medical imaging.

WT Hewitt, director of research computing at the University of Manchester, which already uses the QS20, said systems based on the Cell "can change the economics associated with supercomputing". It was jointly developed by IBM, Toshiba and Sony.

DIY stamps

Print-your-own postage stamps are now available online at the Royal Mail website (**www.royalmail.com**).

Customers may pay using a bank card or a pre-paid account and receive an image to print out, complete with security code.

The site provides details of the latest charges, which now depend on weight as well as size, but they will continue to be the same as offline prices.

BlueSky prints 3D landscapes

An aerial-mapping company is offering a service printing out 3D models of landscapes or buildings. Two-dimensional aerial photographs of anywhere in Britain are readily available, but BlueSky believes it is the first to offer 3D.

It also says its Contex printer is the first to offer true-colour 3D printing. The device works by laying down a powder layer four-thousandths of an inch thick, and inkjetting coloured bonding liquid onto it in the shape of the required cross-section. This is repeated until the landscape model is completed.

BlueSky already owns 3D data for the whole of Britain and selections can be directly printed into a landscape model (see picture) although this is not accurate enough for precise renditions of buildings.

"We can use software to strip out buildings and trees to produce a terrain view. Then we can superimpose accurate 3D information from architects' CAD [Computer Aided Design] models," BlueSky IT manager Andy Abbott said.

Alternatively, the company has a scanner that can be positioned at ground level to harvest accurate 3D information of a building. The 3D print service can also be used for prototyping products.

BlueSky managing director Rachel Eddy and colleagues with a computer-generated 3D model of London

The largest model that the printer can cope with is 25x35x20cm, but a bigger one can be built up by printing it in sections and sticking them together.

Print-to-order prices have yet to be decided, but will be based on the volume of the material used in the model, which can be hollow. "We can blow away any unbonded powder and reuse it," Abbott said.

So, does Abbott think the technology will ever become mainstream? Contex thinks so, according to Abbot. "They reckon that in about 10 years or so, if someone smashes your wing mirror you will be able to go to your computer and simply print out another one."

BlueSky sells the Contex printer for about £40,000.

Acrobat stops sensitive data leaking out

Acrobat 8, the latest version of Adobe's portable document format (Pdf) toolbox, hits the shelves this month with a new feature designed to prevent accidental leakage of sensitive information.

There have been several cases of people finding sensitive information buried in Pdf files that the authors thought had been erased, and the new redaction tool is said to prevent this.

There have been similar embarrassing leaks with the change-tracking feature in Word, which can expose all drafts to document recipients if not used with care. *PCW* regularly gets press releases which show errors in this way.

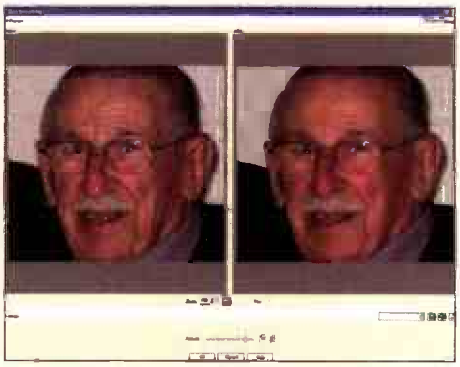
Acrobat 8 also extends the Pdf format to allow multiple documents to be packaged into one file, and the free Acrobat reader has been upgraded to allow users to fill in Pdf forms onscreen and email the results to a specified address.

Other new features include improved reviewing and real-time collaboration, including a module called Adobe Connect that allows you to discuss a document online with colleagues using text chat.

- Nuance's Pdf Converter Professional 4, which converts Pdf files to Microsoft Office formats and vice versa, is available now for £69. Nuance claims it is three times faster than rival products.

Paint Shop the rejuvenator

You can stay forever young with the aid of Paint Shop Pro Photo X1, the latest version of Corel's photographic toolbox. A new 'skin smoothing' feature lets you remove any wrinkles or blemishes from your photos. Another feature ages pictures, making them look as if they were produced using processes in use between the 1830s and 1980s. Corel claims Photo X1, which costs £89.99 or £59.99 for an upgrade, has features that are normally only available in professional products costing up to £1,000.



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customer rating ★★★★½

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- Offers integrated GSM/GPRS /EDGE technologies and is packed full of high-end features including a built-in camera and keyboard, GPS Navigation, and multiple messaging capabilities - in a stylish, lightweight design.

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- 10.1 Megapixels
- Self cleaning sensor
- 3 fps burst - up to 27 fames

Canon EOS 400D with EF-S 18-55mm lens

£579.99 inc vat (£493.61 ex vat)

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customer rating ★★★★★

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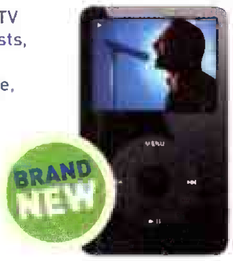
- The iPod does it all - TV shows, games, podcasts, audiobooks, photo albums, and, of course, an entire library of music - up to 20,000 songs, in fact.



Apple iPod 80Gb Black

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quicklinx 48X2PW

where people in the know go

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In brief

Browser VPN

A new appliance is said to be the first to combine the functions of a business-class router, firewall and a gateway, providing staff with Virtual Private Network (VPN) office access from anywhere in the world. The £350 (ex Vat) BiGuard S10 uses Secure Sockets Layer (SSL) VPN security and has been designed to be easy to set up and manage, says manufacturer Billion.

The S10 (pictured) allows access at configurable levels from any major browser.

→ **www.billion.co.uk**

Trusty drives

M-Systems has launched a suite called Mtrust to help companies manage the use of USB Flash drives and keep them secure.

→ **www.m-trust.com**

Cheaper music

Emusic, America's second-largest online music store, has set up in Europe offering mp3 tracks at prices starting at £8.99 a month for 40 downloads. This works out at 22p a track compared with 79p at Apple's iTunes store.

→ **www.emusic.com**

Free music

A new version of web radio recording software gets the PCs of users to monitor the music from 14,000 stations. It allows you to choose from 77 different genres and sends your chosen tracks to your PC. Radiotracker 3 Platinum costs £20 from Rapid Solution Software

→ **http://tinyurl.com/n89w7**

Ipod sales

Just five per cent of tracks used on iPods are bought from Apple's iTunes store, according to a survey from Jupiter Research.

→ **www.pcw.co.uk/2164418**

Logmein zaps stolen data

Sensitive data on stolen or lost laptops can be zapped remotely using a new feature of the Logmein remote access service. The company got the idea after discovering that some stolen machines had been recovered thanks to the existing Logmein client software.

A gang that had been stealing from travellers on a US interstate highway was broken up when an IT manager tried "on a whim" to use Logmein to access a laptop stolen from one of his users.

He recalled: "Lo and behold, I found that it was online. The thieves were stupid enough to plug the computer into the internet." He noted down the IP address, which detectives managed to trace to a physical address through the thief's service provider.

At the address they found six stolen machines and made a number of arrests.

This was just one of a growing number of similar cases, says Logmein. It is not always possible to track an IP address to a physical location, and Logmein developers thought protecting data would be a good fallback.

When a laptop goes missing a user can activate the 'shredding' feature, which kicks in when the machine next goes online.

Logmein has to guard against the risk of 'false positives', when a machine turns out simply to have been mislaid rather than stolen. "The real trick is to be able to recover gracefully from a mistake," said chief executive Mike Simons.

So the shredding module has a hierarchy of measures – from simply making the data 'hard to reach' by using fast encryption, to overwriting.

Owners can also choose to have their data wiped if the machine is offline for a set period, a risk-free move if the information has been backed-up.

HTC PDA packs sat nav

htc
Rupert Street
Oxendon Str
Haymarke
Regent Str
Eagle Place
NE
65
metres
2.50
15:24
22
800
A4 Piccadilly Circus

Chinese giant HTC has added four new devices to its handheld lineup, which it has begun selling under its own name after years of making products for other brands.

The lineup includes the HTC S920, the Blackberry lookalike that now seems obligatory for any mobile vendor. Like others in the range it uses the Windows Mobile 5.0 operating system, providing access to corporate email. It is available this month and will cost about £279.

The quad-band P3300 (pictured) is a slim phone-enabled organiser with integrated satellite navigation using Tom Tom Navigator 6 software. It is a quad-band GPRS device with Wifi and Bluetooth and costs from £349.

The £419 P3600 3G smartphone packs a two-megapixel camera and a secondary one for video calls.

The HTC S310 is an entry-level quad-band GPRS smartphone costing about £179.

→ **www.htc.com**

Fusion phone gets Wifi

BT is to offer a business version of its Fusion phone that doubles as a standard GSM mobile and a voice over IP (VoIP) handset.

The current consumer version uses Bluetooth to connect to a base station for VoIP links. The new Fusion uses a Wifi link to connect with corporate networks.

One advantage is that staff can be contacted on the same number whether or not they are in the office, says BT.

But it could also cut costs considerably, judging by research from analysts such as Gartner and IDC, which suggests that up to 50 per cent of business calls are made from a mobile at the caller's desk.

This is often because the mobile phone contains a personal contacts book and is more familiar to the user than a highly featured desk phone. Also, on a company mobile, the caller is not footing the bill.

- Netgear's SPH101 Wi-Fi Skype phone should be available to buy in the UK by the time you read this. Amazon was taking pre-orders at a price of £163.

→ **www.amazon.co.uk**

'Breakthrough' £30m bid

A company claiming to have made phenomenal improvements in communications technology is seeking to raise $30m (£16) with a float on the Alternative Investment Market.

Florida-based XG Technology's xMax system was greeted with scepticism when it was announced last year. Chief technology officer, Joseph Bobier claims it can deliver data using hundredths of the power required by "conventional" signals.

→ **www.pcw.co.uk/2164488**

14Mbit HS link trial

Ericsson is testing High Speed Download Packet Access (HSDPA) links capable of delivering 14.4Mbits/sec downstream to mobile devices on Vodafone networks, the company has announced.

It has already upgraded Vodafone's infrastructure to support 1.8Mbits/sec in 17 UK towns and cities, with services already available.

"Vodafone has not released a date for it yet, but the 14.4Mbits/sec HSDPA will be deployed into operator networks when the operators are ready," said Jacqueline Hey, managing director at Ericsson UK. Vodafone declined to comment.

HSDPA requires hardware and software upgrades to existing Vodafone base stations, so no extra network coverage will be provided.

Hey said that the upgrades are designed primarily to provide end-users with extra bandwidth and more reliable connections. "It will reduce latency on current 3G connections, and minimise delays and errors. That's almost an integral feature of how HSDPA is designed," she added.

VNU labs tests of Vodafone's Mobile Connect HSDPA PC card achieved downstream rates of about 1.2Mbits/sec in central London, and upstream rates of 340Kbits/sec.

- Blackberry users on T-Mobile will be able to monitor live traffic information and images supplied by Traffic TV. Subscriptions to the service start at 10p per day. The latest Blackberry, called the Pearl, is the thinnest yet at 14.5mm and weighs just 89g. It packs a 1.3-megapixel camera. *Martin Courtney*

→ **www.vodafone.co.uk**

→ **www.ericsson.com**

Palm targets Europe

Palm has launched a new Treo smartphone tailored for the European market and aimed at capturing some of the push-email market pioneered by Blackberrys.

The Treo 750v has a Blackberry-style, tiny qwerty keyboard that delivers email for £10 a month as a Vodafone service. But, as it uses the Windows Mobile 5.0 operating system, it operates easily with Microsoft's Exchange Server 2003 to provide push-email and synchronisation with corporate systems.

Palm chief executive Ed Colligan said the Windows interface had been given a lot of extra usability features, including a threaded SMS display that makes texting more like Instant Messenger chats.

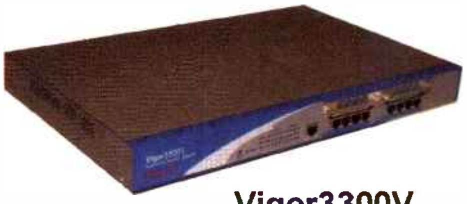
It had all the features of a PDA and above that was a great phone, he said.

The 750v will be sold initially only by Vodafone. It will cost up to £150, depending on the contract you choose.

→ **www.palm.com**

The Treo will be sold by Vodafone only, initially

DrayTek Broadband Firewall/Routers



Vigor3300V

DrayTek routers and firewalls provide a vast array of essential and advanced features, designed around users needs. The new Vigor2800 series provides compatibility with the latest ADSL2+ lines, as well as enhanced security, content filtering, VPN, 108Mb/s wireless and Voice-over-IP. Also available is the **Vigor2900** series for cable modem users and the new **Vigor3100** router/firewall for SDSL.

The new **Vigor3300V** is a high performance firewall, VPN concentrator and VoIP (Voice-over-IP) device. Stateful Firewall, load balancing, content filtering, up to 200 VPN tunnels and up to 8 VoIP ports. (Due March).

Vigor3100 SDSL

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VigorTalk for DrayTEL
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Vigor2900

Vigor2800 Series

DrayTek VoIP-equipped routers let you use your broadband line to make and receive voice calls. Calls to any other VoIP-equipped users are completely free and you can make calls to regular phones via DrayTEL with national & international calls from just 1p/min.

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PSTN

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VoIP : 800800@draytel.org

For full details of all models visit
www.draytek.co.uk

Specification subject to change. Facilities vary with model.

Fat chance for thin clients

Origami ultra-mobiles could have a rival if the network computer finds its legs, writes Clive Akass

A few years back, Oracle boss Larry Ellison made a comment that sparked one of those industry spats that keep techie journalists in business. He declared that the days of the PC were over, that Microsoft was finished, and computing would be taken over by cheap network computers acting as the front end for applications running on servers.

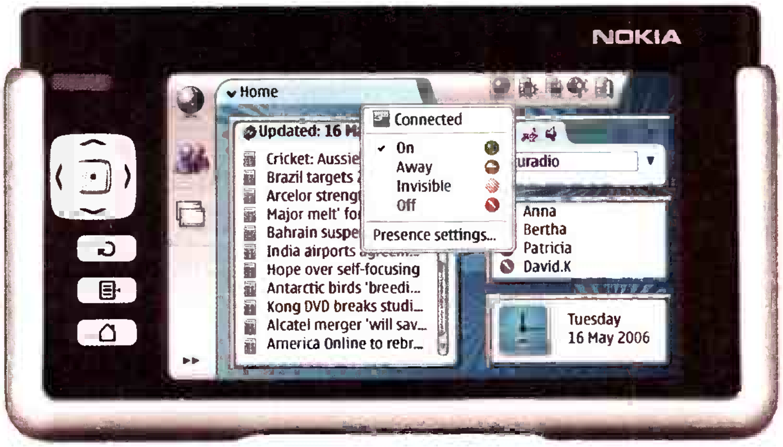
The death of the PC was clearly exaggerated, and quite a few people at the time pointed out that the network computer had been around since the earliest days of computing – when people used 'terminals' to timeshare mainframes. IBM had coined a rather better term for them – thin clients, as opposed to fat clients that use network services but pack their own storage and run their own applications.

Ellison got people talking because he had a point: there is a lot to be said for thin clients, in the broadest sense of computers that rely on remote processing. They are cheap, retain sensitive data on secure servers and draw less electrical power while providing access to powerful processing. They are widely used and may soon be more so because these advantages apply particularly to maturing mobile computing.

Wifi makes mobile thin clients viable even in the home, where processing can be offloaded to a PC. Emerging UWB wireless links look even more promising because they are faster, use less power and don't (like Wifi) shout down the neighbours.

Wireless links such as 3G and Wimax are viable for running thin clients at a longer range, but are currently too costly for heavy use.

I have been looking at the Nokia 770, a Wifi-linked tablet that acts primarily as a mobile front end for the web (see review at **www.pcw.co.uk/2163772**). It is not a pure thin client because it packs organiser applets and storage, but it is as close to one as you will find in the mainstream market. It provides instructive compare and contrast with the new ultra-mobile PCs (UMPC).



The 230g Nokia 770, measuring 14.1x7.9x1.9cm, lists at £245, but a mass-market thin client could be cheaper, even with a bigger screen. Next to it is an Amtek prototype UMPC shown at Cebit earlier this year

Browser-based spreadsheets, contact managers, word processors and other office applications are becoming available online from the likes of Google and Microsoft, so even without its native applets the 770 can perform the tasks for which a PC is most used.

A machine of this class would also be capable of running Remote Desktop Protocol (RDP) software, enabling it to act as a front end for a PC running Windows XP Professional, which would make it able to do almost anything a PC can do.

RDP does not support pen or speech input, and the 770's native handwriting recognition is nowhere near as good as that of a Microsoft-based Origami UMPC. But these tasks could be offloaded to the network, if the software were available.

Nuance, publisher of Dragon Naturally Speaking, has demonstrated remotely processed speech recognition for mobile phones that requires only 4Kbits/sec of bandwidth and can be done even over a relatively slow GPRS link.

A UMPC can do everything the 770 is capable of, but it does not rely on the network: it will run PC applications offline. It uses more power than the 770, though some of the latter's savings on processing is offset by greater use of Wifi.

The 770 has a standby time of seven days, but it lasts only about three hours when surfing, which is about as much as you will get from a UMPC: though, of course, that has a larger battery.

Ergonomically, the machines are very different. The 770 is easily pocketed and light (230g), though heavy for a mobile phone. It is, in essence, a PDA optimised for web access, and with VoIP capabilities, is fine for writing the odd email, but too small to be a workhorse like the UMPC.

But both machines, coming from completely different directions, are part of the same evolutionary thread: the emergence of the handheld tablet as a new dominant platform.

Tablets will come in all sizes, but one will surely predominate, just as we generally use A4 paper. This is not only a matter of physical convenience: a standard size would facilitate elegant formatting of displayed content.

It will not be as small as the 770 (unless scrolling or hinged screens come in) and I'd say it will be no bigger than a UMPC with a 7in screen. You can always connect to a larger display when you need it.

Microsoft is encouraging manufacturers to test the market for 5in models, and to make UMPCs thinner and lighter as cooler processors emerge. Prototypes are already down to 600g, which is half the weight of a small notebook.

It could be that two classes of tablet go mainstream: fat clients such as the UMPC for people who need to do offline work on the move, and low-cost thin clients, almost indistinguishable in size and functionality, for use in the office or home.

Tablets will have to be affordable, because sooner or later they are likely to become necessities, central to the way we operate. So, cheap thin clients may be the only way to avoid digital deprivation.

Even if UMPC-class tablets become so commoditised as to be barely more expensive, they may offload processing such as a thin-client mode when a network is freely available to prolong battery life or to gain processing power.

Microsoft tried to launch a thin client into the mainstream three years ago with what it called the smart display. It failed because the device could not be made cheap enough (and, in my view, because the displays were too large for convenience). Screen prices have plummeted since then, so there could be thin times ahead.

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Vote for the best of 2006

The end of the year is rapidly approaching, which means it's time for us to ask you for your opinions on the products and brands you've purchased throughout the year. Your votes will decide the winners and losers in the *PCW* Awards for Excellence 2006, an award that celebrates excellence in technology, design, support and value for money.

And to show our appreciation for taking up your time, we've got some great products lined up in our special prize draw for all those who cast a vote.

We're looking for reader-chosen winners in 18 categories of product (listed below) and additional editorial awards will be chosen by the *PCW* team. In each category of the online-only survey you'll be presented with a list of manufacturers to choose from. Make your choice and tell us the main reason you've chosen a particular brand by ticking one of the check boxes provided (After-sales support & service, Product design & style, Technical excellence or Value for money). It's as easy as that. Everyone who votes in the survey will get a chance to win one of the great prizes listed opposite.

Thank you in advance for your help, and good luck!

Voting commences on 16 October 2006 and closes on 15 December 2006.

Results and a list of prize winners will be published in the first issue of *PCW* to go on sale in January 2007.

VOTE ONLINE AT www.pcw.co.uk/awards

The awards categories

Reader voted awards

Prizes in the following categories will be awarded based purely on reader votes received via our online survey at **www.pcw.co.uk/awards**. Voting closes on 15 December 2006.

- Best broadband ISP
- Best desktop PC manufacturer
- Best digital camera manufacturer
- Best digital home entertainment manufacturer
- Best GPS (sat nav) manufacturer
- Best graphics card manufacturer
- Best hard drive manufacturer
- Best inkjet printer manufacturer
- Best laptop manufacturer
- Best laser printer manufacturer
- Best memory manufacturer
- Best multifunction printer manufacturer
- Best monitor manufacturer
- Best motherboard manufacturer
- Best networking equipment manufacturer
- Best online retailer
- Best PDA/smartphone manufacturer
- Best portable entertainment device manufacturer

In each category, readers must say which one of the following excellence criteria is the most relevant to their chosen winner

1. After-sales support & service
2. Product design & style
3. Technical excellence of products
4. Value for money of products

Additionally, there will be room for brief comments on the survey form.

Editorial awards

PCW's editorial team will choose winners in the following categories based on our assessment of a product's overall excellence.

- PCW product of the year
- Best component
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- Best software
- Business product of the year

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→ **www.shuttle.com**

Runner-up prizes

Tiscali ADSL Max broadband package – worth £215
Tiscali is offering one winner the chance to enjoy a year's Tiscali ADSL Max broadband connection. This provides unlimited monthly usage with a download rate of up to 8Mbits/sec. Tiscali will also provide a free modem and connection as well as free email, anti-spam and anti-virus protection as standard.
→ **www.tiscali.co.uk**

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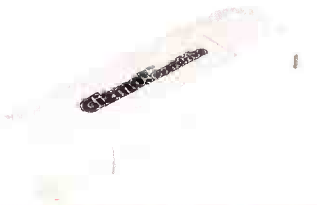
10 Crucial 2GB Gizmo Overdrives worth £42.29 each
Despite their small size, these high-speed Gizmo USB memory sticks can store up to 2GB of data and are perfect for transferring video, music and photos between PCs. We've got 10 of these great devices to give away.
→ **www.crucial.com**

Crucial 2GB Ballistix memory kit – worth up to £294.91
Crucial's Ballistix memory is specifically built for demanding performance enthusiasts and features integrated aluminium heatsinks and low latency. One lucky winner will receive a 2GB kit that's matched for compatibility to your existing system.
→ **www.crucial.com/uk**

10 copies of PCW on CD-Rom worth £14.99 each
Ten winners will receive the brand new edition of *PCW* on CD-Rom, which contains searchable and printable full electronic versions of the January to December 2006 issues of *PCW*.



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Terms and conditions

Readers must vote in at least two categories but do not need to vote in every category. You may not vote for any company that employs you or with which you have a professional relationship. Vendors may not vote for themselves. Entries without the requested contact information will not be entered into the prize draw. Votes must be in by 15 December 2006. Breaking of any of the terms and conditions will result in your vote being considered null and void.

This prize draw is open to all qualifying participants in the *PCW* Awards for Excellence survey. *PCW* is the sole judge of the prize draw and the Editor's choice is final. Prize offer applies to residents of the UK and the Irish Republic only. Entrants must be over the age of 18. Winners will be selected at random from all complete survey entries received. No cash alternative is available in lieu of prizes. VNU reserves the right to substitute the prize for one of greater or equal value if circumstances make this unavoidable. Prizes will be dispatched 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 prize draw. 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. Broadband packages are subject to availability in the winners' area, plus Tiscali's normal terms and conditions.

INTERACTIVE

LETTERS

Send your letters to The Editor, *PCW*,
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32-34 Broadwick Street, London. W1A 2HG.
Send your email to letters@pcw.co.uk

LETTER OF THE MONTH

Going green

I read with interest Nigel Whitfield's article on the effects of PCs on our planet (*PCW*, October 2006, p38). Both Nigel and Kelvyn Taylor make the point that consumers should assess the environmental impact of PC manufacturers before purchasing equipment. Consumers can 'vote with their wallets' and reward those companies that are doing the most to reduce harm to our environment.

I agree with this advice and your magazine is in an excellent position to enable the consumer to follow it. It may be unrealistic to expect individual consumers to phone each manufacturer ahead of every purchase of equipment, but your magazine could include 'environmental impact' in equipment ratings. This would allow consumers to decide which company to buy from.

A painless way to carry out this assessment would be to put the onus on the company to convince you of its green credentials. Each company could have a default value of one star for environmental impact, and if it wants more stars it would have to convince you it is taking the problem seriously by putting in place mechanisms that are making a difference.

At first it may only be practical for this assessment to be based on companies rather than individual products, but I think this would be a huge enabler of green consumer pressure, which will result in a change in manufacturers' behaviour.

Ian Selkirk

Kelvyn Taylor replies: A good idea, but it's an unfortunate fact that we don't have the resources to verify any such environmental claims made by manufacturers, and without proper verification they're worthless. Even a big dedicated organisation such as Greenpeace only ranks high-tech companies based on publicly available information (**http://tinyurl.com/cc4j9**). But even individual consumers can make a difference by constantly asking suppliers for planet-friendly products: that's the way environmentally friendly timber eventually became widely available in DIY superstores.

PCW will continue to highlight consumer feedback such as yours and promote planet friendly products wherever practical.

TOM TOM RESULT

I wrote to you a while ago (*PCW* July 2006) about the security of sat nav systems. I have just installed the newest software for my Tom Tom One, and it now has owner identification and Pin number protection built in – so the manufacturers do listen!

Laurence Barker

The latest Tom Tom One software shows that manufacturers do listen

GREAT COMPUTERS... AND DELIVERY COSTS

Being in the market for a new base unit (in fact two), *PCW* was my first stop to see what the state of the market was. The August edition said good things about the Mesh Core 2 Duo system, so I headed off to the Mesh site.

I found it had a good Core 2 Duo base unit-only system – the Elite 2 Duo SLI – for £799. So I put two into the shopping cart at a cost of £1,598 and proceeded to the checkout, where the total price was a whopping £1,760. How could that be? On examination of the details, it transpired that the delivery charge on a base unit to Northern Ireland is an incredible £69 (ex Vat), resulting in a total delivery charge for two base units of £162.15.

Surely this is a mistake. How can it cost such an amount to send parcels whose total weight can be no more than 20kg to a UK address? Royal Mail will send an item of up to 10kg anywhere in the UK, with guaranteed next-day delivery – and insure it

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32 Guy Kewney

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.

for £1,000 – for £18.90 all inclusive. Assuming that each unit weights less than 10kg, that's a total of £37.80.

I recently sent £1,000-worth of items weighing a total of 8kg to Taiwan using DHL's express service. The items arrived in three days at a cost of £55.

Surely a company such as Mesh can negotiate favourable delivery terms with a carrier, given the volume of business it generates. I find it impossible to believe that £162 reflects the actual costs of delivering two base units to Northern Ireland, regardless of the carrier. I tested the checkout, and if I were to buy 10 base units, Mesh would charge me £810 for delivery.

With those delivery charges, I was not inclined to purchase from Mesh and I assume that few people in Northern Ireland would consider it a cost-effective company to deal with.

Ian McNeill

Kelvyn Taylor replies: We queried this with Mesh, who apologised for the fact that the Mesh website can't discount delivery on multiple items. In such cases they strongly recommend speaking to a sales advisor, who in most cases will be able to resolve this or any other problem.

Is there some mistake regarding Mesh's sky-high delivery charges to Northern Ireland?

BACKUP TO THE FUTURE

Dylan Armbrust's editorial (*PCW*, November 2006) was very pertinent. A while ago the hard drive on my home PC gave up the ghost and I lost a lot of photographs, many of great sentimental value. Since then I back up fervently – a lesson well and truly learned.

However, files such as photographs need to be archived. This raises the question of which is the most reliable medium to use to archive valuable data. Until recently I assumed that optical media (CD-Rom or DVD) would be the best long-term option. But then I read an article in a photographic magazine that said they can lose their data in a relatively short time. Can *PCW* recommend the most durable storage medium for archiving digital files over a long period?

I also wonder which file format is likely to be readable by the next generation. The pace of change in data recording technology is accelerating. We've seen the demise of vinyl records for music, film for home movies, and now VHS is becoming obsolete. Will my unborn grandchildren have the technology to view the digital photos I am taking today, even if I manage to archive them safely?

John Morley

Kelvyn Taylor replies: This is a perennial problem. Even if your archived data is intact in 50 years' time, will there be any devices and applications that can still read it? For important photos we'd be inclined to make high-quality prints just in case. Despite our wholehearted embracing of digital technology, printed media still has a great track record in the longevity stakes. In terms of optical media, there's no solid proof of how long it can last.

Perhaps the only real solution is to regularly transfer the data to the newest media format, at the same time updating the file format if necessary. But, of course, not many of us have the time or patience to do this.

CLARIFICATIONS & AMPLIFICATIONS

- **Actinic Business 8**

The review of Actinic Business 8 in our November issue mentioned that it links to Sage and Quicken accounting packages. That should have read 'Sage and Quickbooks'. Apologies for any confusion this may have caused.

THROWAWAY LINE

I read with interest your article on the high cost of toner in the November edition of *PCW*. I am the proud owner of an Epson Aculaser C900 colour laser printer. I love the machine and have had no problems with it.

However, my first full change of the black and three colour cartridges set me back almost £300, when a new printer was selling for little more than £200. But, as you point out, a new printer would be supplied with only a 'starter' amount of toner.

Next time I went for the refill option. U Refill Toner (**www.refilltoner.com**) sent me bottles of toner, but also sent full-colour instructions on what to do first.

"Don't believe the printer when it says it's empty" they stated. There followed instructions on how to turn the cartridges back so that they appear full.

Since turning back the black and then later the colours one by one, I have printed hundreds of pages and still not used the new toner. I have printed full-colour flyers for a club, programmes for concerts, 1m square colour posters, and recently 150 A4 prints of a full-colour painting.

And all this on 'empty' cartridges. The new toner was ordered last October.

As further proof of the amount of printing I've done since then, the toner monitor now tells me the cartridges are half empty again.

I know this sort of thing happens in other machines, so how much ink and toner are we literally throwing away?

Phil Cumberworth

VIRGIN ERROR

I have just returned from abroad and am planning to set up mobile phone, broadband etc. My son gave me a copy of your magazine containing an article on wireless networking and I was delighted to see the headline 'Virgin offers broadband service for free' (*PCW* November 2006, page 15). I signed up and then asked for my wireless router, offering a one-off payment of £16.99 as reported in the article. But Virgin has never heard of its offer of a wireless router for £16.99. Their router costs £69.99! I am now wary of the accuracy of your other reports.

Alan Clouter

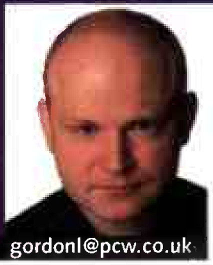
Clive Akass replies: We have checked with Virgin and it seems this discrepancy was a mistake by our reporter. In fact the deal gives you a modem free but you have to pay extra (£69.99) for the wireless router. Our apologies for the confusion.

WIN Next month's prize for the letter of the month is Imation Disc Stakka

The Disc Stakka is an automated device that stores, protects and retrieves optical media, such as CDs, DVDs and games discs. It holds up to 100 12cm discs and can be linked to a PC or Mac via its single USB connection. The carousel can be stacked up to five-high and hold up to 500 discs in any format.

The Disc Stakka comes with Opditracker content management software, which includes a database and search engine that can find and eject any disc within seconds. For more information on the Disc Stakka, go to **www.imation.co.uk**.

Gordon Laing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Is there an answer to digital SLR dust?

Frustrated by his photographs being ruined by annoying, dark blobs, Gordon Laing zooms in on two models that offer a solution

Barely a year ago I broached the problem of dust and digital SLRs in this column. It turned out that the ability to swap lenses – the great benefit of a digital SLR (DSLR) – was equally an Achilles' Heel. With the lens removed, dust can enter the body and settle on the low-pass filter where it then casts tiny and annoying shadows onto the sensor. The result: small dark blobs on your photos, which are particularly noticeable on blue skies.

This issue is now well-known, but strangely for some time it seemed Olympus was the only one to respond. Its Super Sonic Wave Filter (SSWF) vibrated the filter in front of the sensor in an attempt to shake any dust off.

Despite its success against dust, few other DSLR manufacturers followed Olympus' lead. Until now, that is, with the launch of the Sony Alpha A100 and Canon EOS 400D, which are likely to be two of the most popular DSLRs in the run-up to Christmas. Both claim anti-dust capabilities, but how effective are they? I decided to find out.

'The Canon records the position of persistent particles, which can then be retouched out'

First up, the Alpha A100, Sony's debut digital SLR, born from a collaboration with Konica Minolta. Based on Konica Minolta's earlier Dynax 5D, the Alpha A100 features a built-in anti-shake capability which actually shifts the CCD sensor by as much as 5mm in any direction to counteract wobbles. The benefit of building this into the body is that you, in effect, enjoy anti-shake on any lens you attach, and it's not a great leap to realise a sensor housing vibrating at high speed could also shake off dust particles. This is exactly what Sony has implemented with the A100, which vibrates its sensor every time you switch the camera on and off. The low-pass filter also has an anti-static coating to avoid dust being attracted to it in the first place.

Next up is the Canon EOS 400D, the successor to the best-selling EOS 350D. The 400D boasts a number of unexpected improvements, including several approaches to eliminating dust. See our review on page 76 for more details.

First, like Sony, the 400D's low-pass filter has an anti-static coating, and Canon has also manufactured the body cap out of a material less likely to produce dust. The main line of defence though follows Olympus by vibrating a filter in front of the sensor in an attempt to shake any dust off. And if you wondered where all this shaken-free dust ends up, most DSLRs employ sticky pads inside their housings to trap it.

Canon has gone one step further, though, by allowing a reference frame to be recorded, which maps the position of persistent particles. This data is then appended to subsequent images and used by Canon's supplied software to automatically retouch out the offending marks. This reference data is so simple it has virtually no impact on file size, and you're free to update it before important events or prevent its attachment altogether.

Now, before going any further, it's crucial to realise testing for dust can never be as controlled as other benchmarks. There's no way of telling how much dust is already within the body, nor any way to introduce the same type and number of 'test' particles for each model. As such it's impossible to scientifically conclude one camera is better than another at eliminating dust. All I can say is whether dust marks were visible on my images, and whether the camera's systems reduced them.

The bottom line? Dust certainly was visible on several images I took with both cameras, despite numerous vibrations of their filter or sensor. I admit to swapping lenses frequently and deliberately didn't take care to avoid dust during the test period, but while particles unsurprisingly entered the bodies, they weren't all shaken free. Canon's second line of defence proved quite effective, using reference data to later retouch out most, although not all, dust marks.

Perhaps my environment is dustier than average. Maybe I could have been more careful and avoided changing lenses on less than calm days, but I believe swapping optics is the whole point of a DSLR. Maybe I was just unlucky.

Either way, neither system was 100 per cent infallible. Only time and many user reports will build a picture of whether one anti-dust system is more effective than another, but with some manual intervention still firmly on the agenda, I'm not packing away my little blower brush yet. **PCW**

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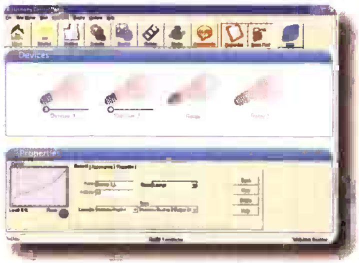
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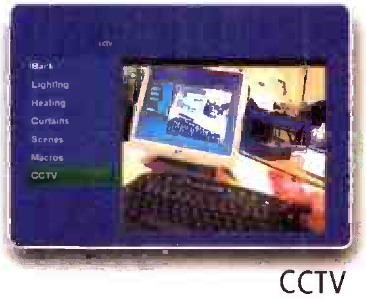
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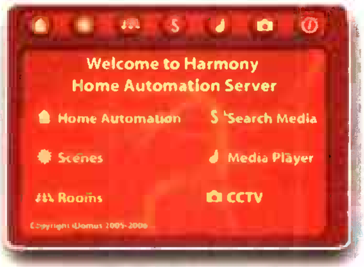
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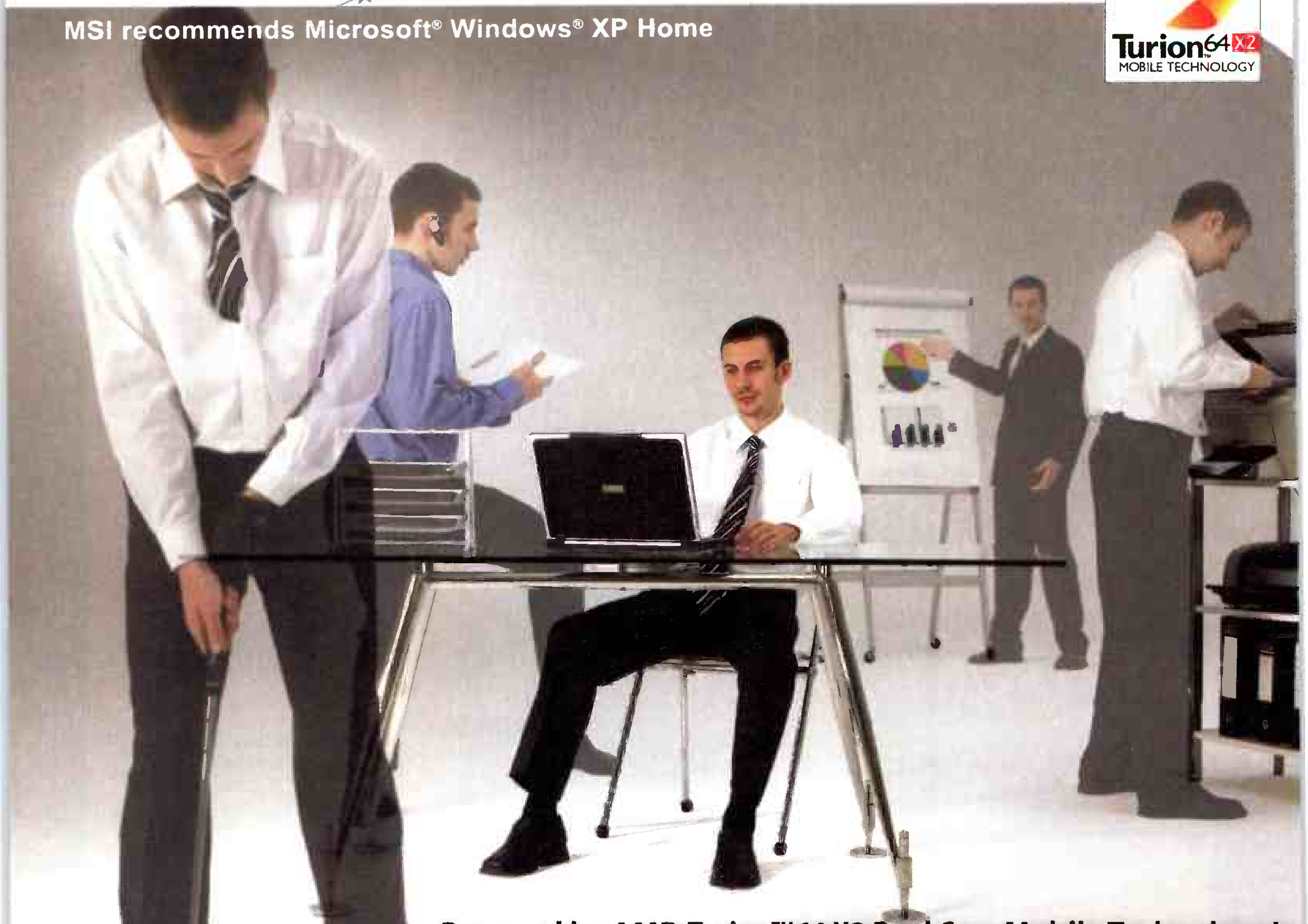

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- 4 x USB, 1 x Firewire, S-Video
- 6 Cells Long Life Battery

L730

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- AMD Turion™64 TL52 Processor
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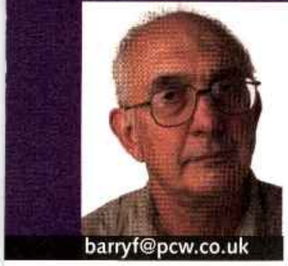
Barry Fox



barryf@pcw.co.uk

Two-tier internet on the horizon

As we wait for clever technology such as Lightscribe to hit the shelves, hostile patents are exploding on to the market, says Barry Fox

Whatever happened to Lightscribe – HP's clever system for laser-etching a label on the back of a blank CD? At last year's IFA show in Berlin the Lightscribe partners had a joint demo. But not at the 2006 show. I had been expecting to see HP and Lightscribe at IFA because, as they say in the social columns, an announcement is expected very soon.

Since Lightscribe was launched in January 2005, it has gone nowhere slowly. Press promotion has ground to a halt. Dell still refuses to offer the option of Lightscribe-enabled drives. Blank discs are pricey and hard to find, burning a label takes an age and then all you get is a single colour image.

HP sees legal downloading and burning as big opportunities for Lightscribe. Handwritten labels look horrid. Printing a paper label and sticking it to the disc is a hassle. Inkjet printing direct to disc needs a white label disc and special printer.

'HP sees legal downloading and burning as big opportunities for Lightscribe'

If a download contained the data needed to make a Lightscribe full-colour label, the finished CD or DVD would look a lot more like a shop purchase.

Recently filed patents reveal that HP plans to coat a Lightscribe blank with three colour-forming layers – cyan, magenta and yellow. All three layers respond to heat from the drive laser and the effect is helped by specks of heat-absorbing metal embedded in the dyes.

The drive laser in the drive is tightly focused on the disc surface, so creates hotspots in the top layer. This writes the yellow content of the picture as yellow dots. Then an ultraviolet lamp that is built into the drive shines on the disc surface to fix the top layer by inactivating any remaining yellow dye.

In a second pass the laser heats the spots that represent the magenta content. The inactivated yellow layer gets hot in spots, which transfer the heat to the magenta layer underneath. This forms a dot image of the magenta content. Shining ultraviolet light of a different frequency onto the disc inactivates any remaining magenta dye.

Finally the laser heats spots on the top surface, which represent the cyan content. The heat transfers through the inactivated yellow and magenta layers to write the third layer in cyan dots. The result is a full-colour label, like a colour photo print, with laser-fine resolution. In theory all the system needs is a new drive with two UV lamps and colour-sensitive blank discs. More patents from HP suggest an alternative approach; a disc with frequency-dependent dye layers and a drive with lasers of three different wavelengths – one for magenta writing, one for cyan and one for yellow.

It looked likely that HP would unveil a full-colour system at IFA. But the absence of a Lightscribe booth makes it pretty clear that nothing in the patents yet works well enough to sell.

By way of contrast, I fear that some unrelated technology now being patented by German IT research lab Infineon may work a lot better than many of us would like. VoIP (Voice over IP), sending speech over the internet, is eroding revenue from conventional voice calls. There has long been talk of a two-tier internet, with a free service that is good enough for data and a premium service for things like VoIP. Infineon now claims success with a system which can deliberately impair VoIP transmission so that speech is spoilt and voice service is not possible.

A node in the network analyses IP packets as they pass through, distinguishes between internet data and internet voice packets and then adds pseudo packets that are labelled as voice but actually contain nothing useful. A filter lets the data packets sail through unimpeded but creates an artificial bottleneck for anything labelled as voice. So the mix of genuine voice packets and pseudo voice packets is delayed. The delay is more than the VoIP system can cope with, so when the genuine speech is decoded it flutters and warbles and becomes unintelligible. The pseudo packets are filtered off when they leave the node, so no-one need know why speech quality is so poor.

Infineon has also filed a patent in Germany on ways of impairing speech sent through Wifi hotspots. The overall data rate is intermittently slowed so that the speech signal jitters. Hostile technology like this is a bit like a bomb. Once invented, it gets used sooner or later. And that's why we may see a two-tier internet before we see full-colour Lightscribing. **PCW**

Guy Kewney

guykewney@gmail.com

The age of innocence

While it's true that many computer viruses are spread by illicit websites, not all victims have solicited illicit sites, says Guy Kewney

Imagine this. You sit down at your home PC at the end of a day's work and discover it's doing all sorts of things it shouldn't – and things you certainly didn't ask it to do. You ring Dogbert Technical support, explain the problem, and are told, "Those are caused by you watching porn."

It's a great way for Dogbert to get his call rate up because (as you can see if you find the original Dilbert cartoon) the victim instantly hangs up. Well, who would want to be thought of as someone who looks at filth?

It's this aversion to feeling ashamed that means a lot of people get nasty infections (and not just on their PCs) and spread them because they are too ashamed to admit what they were doing when they got them. Or, even worse, because they weren't actually doing anything to be ashamed of, but think people will assume they were.

'A broadband link and a 17in flat-screen display doesn't turn you into a Mr Hyde'

Now, let's get the rubbish out of the way first. There exists a very popular website called Page Three. For readers outside the UK, Page Three is the page on which the UK's most popular daily newspaper runs a regular picture of a bare-breasted young woman. And there are some other interesting stats about Page Three, too. For example, it's not just popular with adolescent males; it is read by almost as many women as men. And it is hugely popular.

There is a simple verification for this: the hits on the page are high. Explanation? Well, take your pick. Either there's one mad freak who accesses the page 100 times a second, or several hundred thousand people go there every day – totalling millions every week.

And I suppose I'm not giving away the results of any top-secret government research if I reveal that most studies show that this sort of thing is a pretty normal, and common, activity. Consider five of your friends or work colleagues. Which of them will log on to a website containing sexually explicit content this week alone? Answer? More than half of them.

But which of them will admit it? A hollow silence is the only response, unless you count exaggeratedly innocent expressions as a response.

The acquisition of a broadband link and a large, 17in flat-screen display doesn't turn an ordinary human being into a Mr Hyde. But it does make it possible for the ordinary (2.3 times a week) adult to examine an awful lot more examples of websites where such visuals are displayed than if they had to march down to the newsagent and buy a magazine.

And, sadly, a significant number of these websites are operated by people with no scruples whatever, which is why an awful lot of Trojan Horse programs, spyware and other malware are propagated from their servers. What they trade on, of course, is the knowledge that if you and I get infected, we will keep quiet about it.

The news that Microsoft's Internet Explorer has a vulnerability in the way it handles vector graphics is this month's episode in the ongoing malware saga. Next month, there will be another exploit. Statistics suggest it will be yet another Microsoft program that is involved. After all, why compromise a minority freeware program for Unix-family users, when the same amount of effort will scoop up over 90 per cent of the PC users in the world? And that's before we even start the discussion about which platform is the easiest to compromise.

Let's be adult about this. First, there's nothing particularly rare about an interest in sex. Second, the idea that if you have an infection, illicit sex is the only explanation has to be abandoned.

I suspect my own private wish will not be fulfilled. I would like to have a PC industry in which people who picked up a Trojan from a site about grammar or spreadsheets actually tell tech support they were visiting XXX dot com rather than the other way round. I quite like honesty, but shame is destructive!

And in a world where shame is as great a force as sexual desire, I suspect the best we can hope for is that people recognise that infections can be acquired quite innocently. And this applies whatever your definition of innocence, and that a cure should instantly be sought and applied. **PCW**

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Convert analogue videos into DVDs

Transferring VHS and camcorder videos to DVDs ought to be easy, but it isn't as simple as you might think. That's why you need to read Ken McMahon's step-by-step guide

Converting VHS videos into DVDs should be so simple that you don't have to give it much thought. But the minute you do start to think about it you can quickly become bogged down. How do you connect an old analogue camcorder or VCR to your PC? What if you no longer have the camcorder? Which capture codec should you use and, if the video quality is mediocre, how can it be improved?

Getting video into your PC is only half the battle. Once it is digitised you'll want to make adjustments and use filters to improve the video and audio quality, edit it, perhaps combine it with new footage shot on a DV camcorder, and then burn the entire project, complete with menus, to a DVD.

You'd easily be forgiven for dropping the whole idea were it not for the fact that our eight-page superguide answers all these questions and guides you through the entire process from capture, through editing and improving video quality, to burning.

CAPTURING VIDEO

In the days of analogue video editing it was commonplace to transfer footage from 8mm camcorders to a standard VHS tape. This provided the opportunity for simple editing as well as a means of distribution.

Being analogue, such a transfer involved some loss in quality, so if you have the original tapes from the camcorder it's better to use these. Connecting a camcorder to your capture device using the analogue video-out port is quite straightforward. If you no longer have the camcorder you may still be able to use the original tapes – VHS-C camcorders recorded onto a compact VHS cassette and shipped with an adapter that allowed you to play the tapes in a standard VHS VCR.

Wedding 2000
DVD
DVD+R 8X
4.7 GB
RW
120 minutes

Illustration: Ian Naylor

Making the connections

The first thing to think about is how to connect the analogue player to the capture device. In most cases this is a question of connecting your VHS VCR to your PC. In essence, there are three connections you need to make between the player and the capture device: one for video and one for each of the left and right stereo audio channels. At the capture-device end these are almost always colour-coded RCA phono connectors – yellow for video, red and white for the right and left stereo audio channels.

Although some camcorders have a yellow composite video-out port, the audio is often on a single port and you may find that both

Video troubleshooting

Many problems with video capture can be solved quite easily. Here are some common ones.

No video

First check the cables. If you can, verify that there is an output signal by connecting the player to a television. Check that the digitiser appears in the Windows Device Manager and make sure the source is correctly set in the capture software.

No or poor-quality audio

Check that the audio cables are correctly connected. If you are using an S-video cable you'll also need to connect RCA stereo leads. If the audio quality is choppy, try changing the audio encoding parameters.

Dropped frames

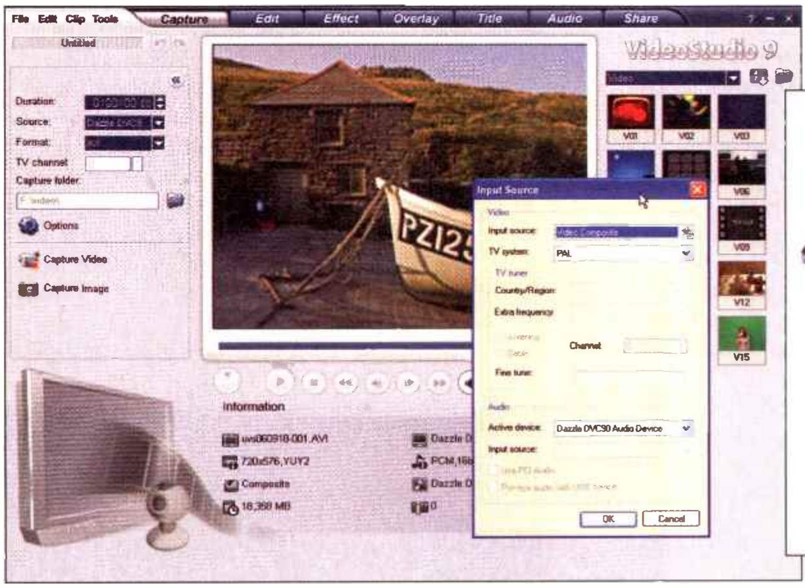
Dropped frames can be a result of processor overload, so check that your setup meets the minimum system requirements for your capture hardware and software. Close any other programs, and disable screensavers and anti-virus software. A nearly full or badly fragmented hard disk could also be the cause. Try to use a dedicated 7200rpm drive purely for capture. Failing that, create a dedicated video-capture partition.

Preview is black and white/jerky/poor quality

Your capture software is set to the wrong video standard; in other words, NTSC or Secam when you have a Pal VCR attached.

No audio inputs on capture card

Some older capture cards and television tuner cards were manufactured without audio input sockets. In this case, you can connect the audio directly to the line-in port of your soundcard. However, you may need to find the right cable, or an adapter, to convert the red and white stereo RCA phono connectors to a single 3.5mm jack plug.



Input Source

Video

Input source: Video Composite

TV system: PAL

Audio

Active device: Dazzle DVC90 Audio Device

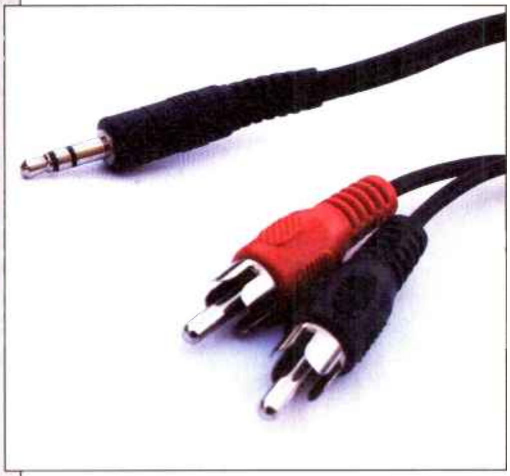
uvs060918-001.AVI

720x576,YUY2

Composite

18,368 MB

Verify that there is an output signal by connecting the player to a TV and make sure you set the video and audio sources in your capture application



If your video capture card doesn't have audio-in sockets, connect the audio outputs of the VCR to your soundcard using a cable such as this one

the composite video and the audio ports are combined into a single 'AV-out' socket. Whatever the setup, the camcorder will have been supplied with a cable to connect the AV port to the inputs on your capture device.

In the case of a VHS VCR, the output options will depend on the model. More expensive models will provide more outputs, but on cheaper models you may find that the only output port is a single Scart socket used to connect the VCR to a television. If this is the case you can get an adapter that fits into the Scart socket to provide composite video and stereo audio outputs.

Hi-band and quality

As well as ensuring that, if possible, you capture from the original tape, there are other things you can do at the capture stage to ensure the best possible result. If your analogue camcorder was a hi-band model (Sony Hi-8 or S-VHS-C) you should connect it to the capture device using the S-video output on the camcorder, or on your S-VHS VCR. S-video, which separates the analogue colour and luminance signals, will produce a cleaner result, so if an S-video output is available make sure you use it.

> 'S-video will produce a cleaner result, so if it is available to you, use it'

You'll need an S-video cable, which you can pick up for about £10, and you'll also need to ensure your capture device has an S-video-in port. However, S-video doesn't carry audio signals so you also need to connect the audio output of your player to the left and right stereo audio-in ports on the capture device using standard red and white phono leads.

Capture hardware

What kind of capture device you opt for will depend on your existing setup, which may already have a perfectly adequate capture device lurking within it. The first thing to check is your graphics card. If it includes an integrated TV tuner, or was designed for video editing, it may be capable of analogue video capture – check the documentation and look for video-in ports.

If you've replaced your analogue camcorder with a DV model, check to see if it has an analogue-in port (see screen 1). If it has, you can use it as a capture device by connecting your analogue player to it and recording the signal in DV format onto the

↘

AV1
S-VIDEO OUT
NORMAL
TEST SIGNAL
AV2
S-VIDEO OUT

Here the connection is set up for composite video and stereo audio, but the S-video socket below would provide a better-quality connection

tape. From there you can perform routine DV capture of the footage to your PC, via USB or Firewire.

If you own an HD or DVD recorder, this too can be used to capture footage from your analogue camcorder or VCR. These devices capture and record digital video in Mpeg-2 format, either to an internal hard disk or a recordable DVD. If you don't want to edit the captured footage, a DVD recorder is all you need to archive analogue video in a format that you, and anyone else with a DVD player, can watch for many years to come. If you're thinking of purchasing a PVR (personal video recorder) for this, make sure it has the analogue inputs, eg S-video, that you need. Most PVRs that don't have DVD burners also lack analogue video inputs.

If you need to buy a capture device, there are numerous options, including those we've already mentioned. The cheapest and most convenient are USB capture boxes. These are small, easy to install and often include video capture and editing software, although they will work with any capture or editing software. See the table below for details.

Capture software

Assuming you're capturing to your PC's hard disk, you'll need some software to do the capturing and edit the footage. In the next section, we'll give details of how to 'clean up' and edit captured analogue footage.

Virtually every video-editing and DVD-authoring application includes a capture module that can be used to capture from analogue as well as digital devices. It makes sense to use the same software to capture and edit from your DV camcorder.

If you're starting from scratch, Virtualdub is shareware and is a capable capture, editing and conversion utility, but doesn't score highly for ease of use. Microsoft Movie Maker 2 is free and much more accessible, but captured video is encoded into Wmv format, which isn't ideal if you want to edit or output to Mpeg-2 for DVD authoring. See the section on codecs for what to do if you are using Movie Maker 2 to capture.

Capture how-to

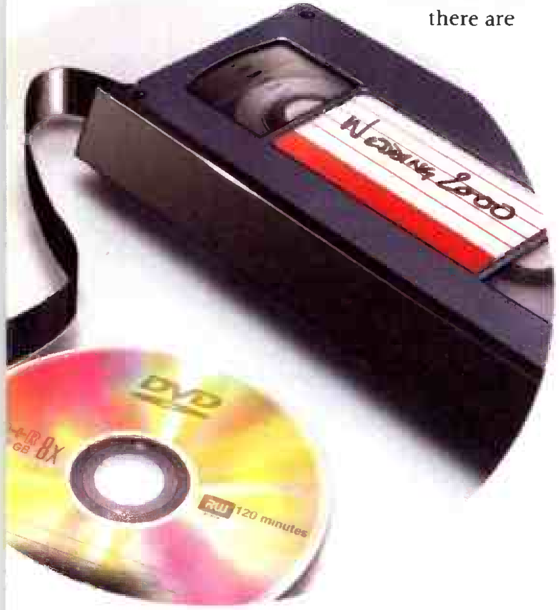
Providing your capture device is correctly installed, you should be able to select it as the source in the capture module of your video-editing program. Check the troubleshooting box on page 35 for likely causes of problems. A common source of errors with analogue capture is an incorrectly set input source, so if you're using an S-video cable make sure the input source is set to S-video and not composite.

What happens next will depend on your capture software, but whatever you're using you'll find the capture process differs from DV capture in one fundamental respect – there is no device control. You can't control the tape transport mechanism on an analogue player so you have to do it manually. First press the Play button, followed by the Capture button.

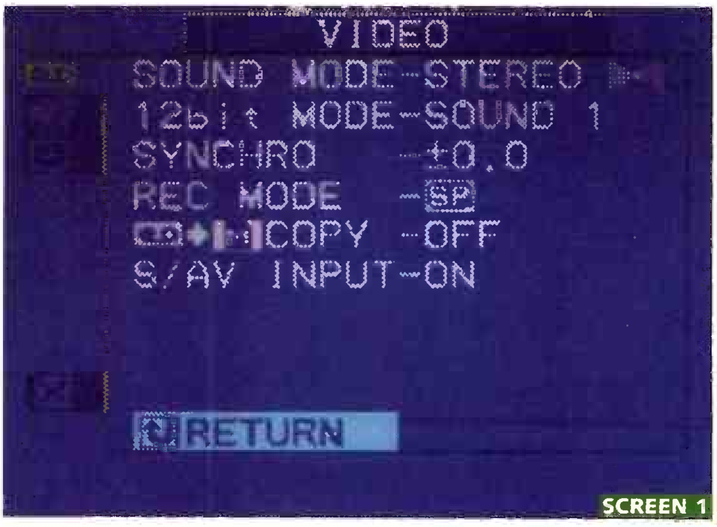
If your application has automatic scene detection the simplest thing to do is let the tape roll and delete the scenes you don't want later. Otherwise you'll need to watch the preview and hit the Start and Stop capture buttons at the appropriate time.

What codec?

Your choice of capture codec will depend on



If your DV camcorder has analogue-in, use it to record your analogue source to DV. However, you may have to configure the port using the on-screen menu (right)



VIDEO
SOUND MODE-STEREO
12bit MODE-SOUND 1
SYNCHRO -±0.0
REC MODE -SP
COPY -OFF
S/AV INPUT-ON

Capture products

MANUFACTURER	PINNACLE	TERRATEC	AVERY LEE	MICROSOFT	ULEAD
Product	Dazzle DVC90	Grabster AV150	Virtualdub	Movie Maker 2	Videostudio 10 plus
Price inc VAT	£39.99	£49.64	Free	Free	£59.99 (£54.99 download)
URL	www.pinnaclesys.co.uk	http://uk.terratec.net	www.virtualdub.org	http://www.microsoft.com/windowsxp/downloads/updates/moviemaker2.mspx	www.ulead.co.uk
Description	Compact USB analogue video digitiser, with composite and S-video-in ports	Compact USB analogue video digitiser, with composite and S-video-in ports	Open-source video capture and processing utility	Video capture and editing application that uses Microsoft's Wmv format	Capable home video-editing application, including DVD-authoring and burning

↘

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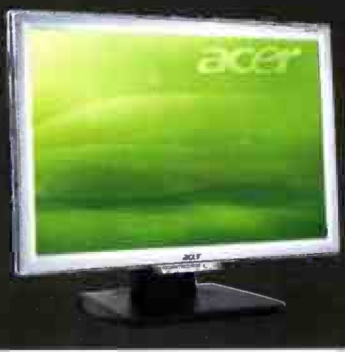

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How to correct jittery pictures

There's a limit to what you can do with digital tools to restore poor-quality analogue captures. And as we've seen, ensuring that the signal which comes into your digitiser is as clean as possible can save you a lot of work later on.

Many of the problems associated with poor VHS picture quality are due to mechanical differences that make it impossible to play back the signal from the tape in exactly the same way that it was recorded. These differences are called time-base errors and are compounded every time an analogue copy is made. Time-base errors are manifested as rolling, horizontal displacement, jittering, alternate lightening and darkening of the image and wavy vertical lines.

These problems can be corrected using a Time Base Corrector (TBC) that replaces the synchronisation signal on the videotape. If you have a good-quality S-VHS VCR it may have a built-in TBC, in which case all you have to do is switch it on.

Standalone TBCs cost several hundred pounds, but if you're really dedicated, or have lots of poor-quality VHS video to capture, it could prove a worthwhile investment.

a number of factors, but the most important is what you intend to do with the video once you've captured it. One approach is to capture everything at the best possible quality. You can always transcode it later to a smaller, lower-quality file, if you need to.

High-quality, full-frame video takes up a lot of space and subsequent transcoding will add time to your workflow, but these are minor drawbacks and can be dealt with. If later you no longer have access to the analogue source material and want to make a DVD using clips encoded at a low resolution and bit rate, you, and everyone who watches it, is going to be in for a disappointment.

Assuming you're going for the best-quality option there are a number of codec options available. If you're using Windows Movie Maker 2 you'll be stuck with Wmv, which is no bad thing as it provides a wide range of encoding quality options. Select 'Best quality for playback on my computer' in the video-capture wizard to encode full-resolution 25fps (frames per second) Pal video at 2.1Mbits/sec.

If you plan to edit the captured video, whether you're going to mix it with footage from a DV camcorder or not, encode it as DV. This will produce the best-quality clips and allow you to get the best performance from your editing software, which is designed to work with DV-encoded material.

Encoding directly to Mpeg-2 is worth considering if you plan to archive your captured footage directly to DVD, or you plan to produce a DVD having done minimal editing. To produce a DVD the material will eventually have to be encoded to Mpeg-2 anyway. The advantage of doing it at the capture stage is that it saves you time later on and there's no risk of quality loss due to unnecessary transcoding.

There has to be a downside, though, and it's this; Mpeg-2 isn't really designed to be edited. Unlike DV, an Mpeg-2 video stream is temporally compressed. Individual video frames are constructed by referencing information in the frames that precede and follow them. The processing overhead involved in this can slow down timeline editing substantially and can also make frame accurate edits difficult. So, even if the final destination of your footage is a DVD, if you plan to do any amount of editing, capture it using a DV codec and transcode to Mpeg-2 when you are ready to author your DVD.

> **'If you plan to do any amount of editing, capture it using a DV codec'**

EDITING

Once you've captured your video, the next step is editing it. The techniques demonstrated here will go some way to help clean up and improve the look of captured analogue footage that suffers from video noise, bad colour and poor audio quality.

But prevention is better than cure. If you haven't yet captured your analogue footage, there are a number of things you can do to ensure that your source material is as clean as possible and save yourself a lot of time post processing.

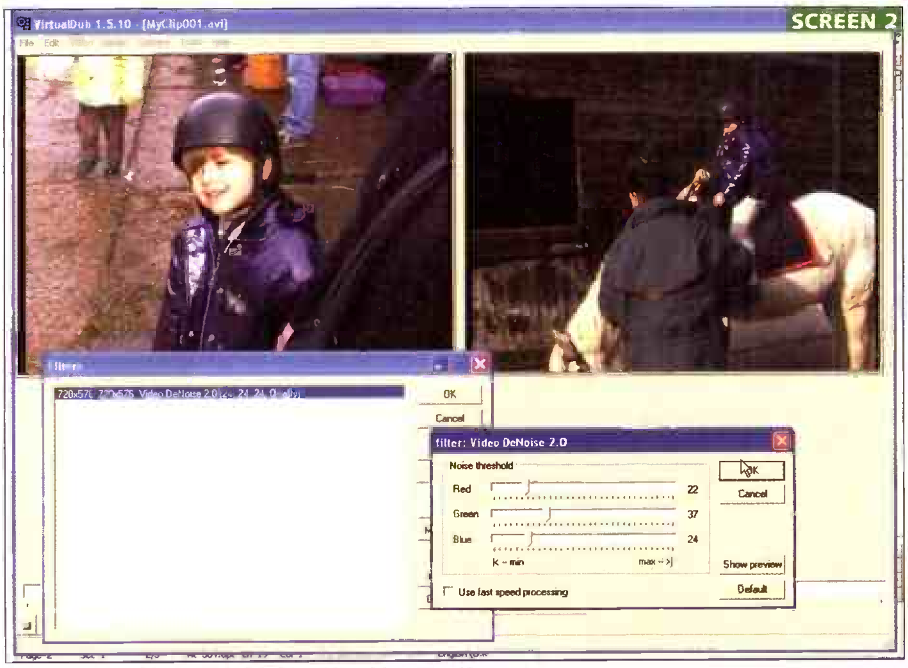
First, make sure you use the right leads to connect your player to the capture device. If your analogue footage was shot using a Hi-8 or S-VHS camcorder, use a playback device that supports these formats and connect it with an S-video cable. If you use a composite video connector to capture from a hi-band source, you are throwing away more picture data than you'll ever be able to restore.

Make sure you capture from the original source footage if possible. Possibly the biggest single advantage that digital video has provided is the ability to make multiple identical video copies with no generational loss. It wasn't always so, and in the bad old days editing analogue video involved copying it to a new VHS tape. This first-generation copy was inferior to the original and with every copy the story got worse.

Capture using the best-quality codec. This will usually be DV AVI. High bit-rate Mpeg-2 is fine if you intend to go straight to DVD, but see the editing drawbacks mentioned in the previous section.

Finally, if your playback device is a VHS VCR, clean the heads using a head-cleaning tape or some other method. Dirty heads can

Most video editors have a de-noise filter of some description. The better ones, such as Rising Research's Video Denoise plug-in for Virtualdub, work on individual colour channels



filter: Video DeNoise 2.0

Noise threshold

Red 22

Green 37

Blue 24

☐ Use fast speed processing

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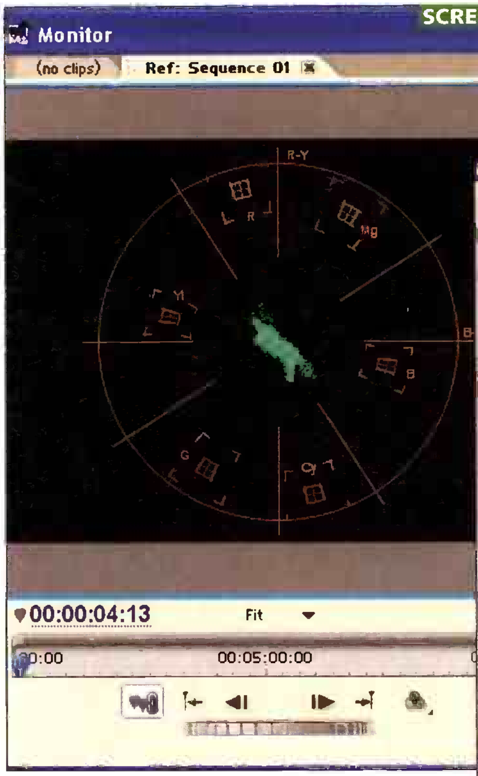
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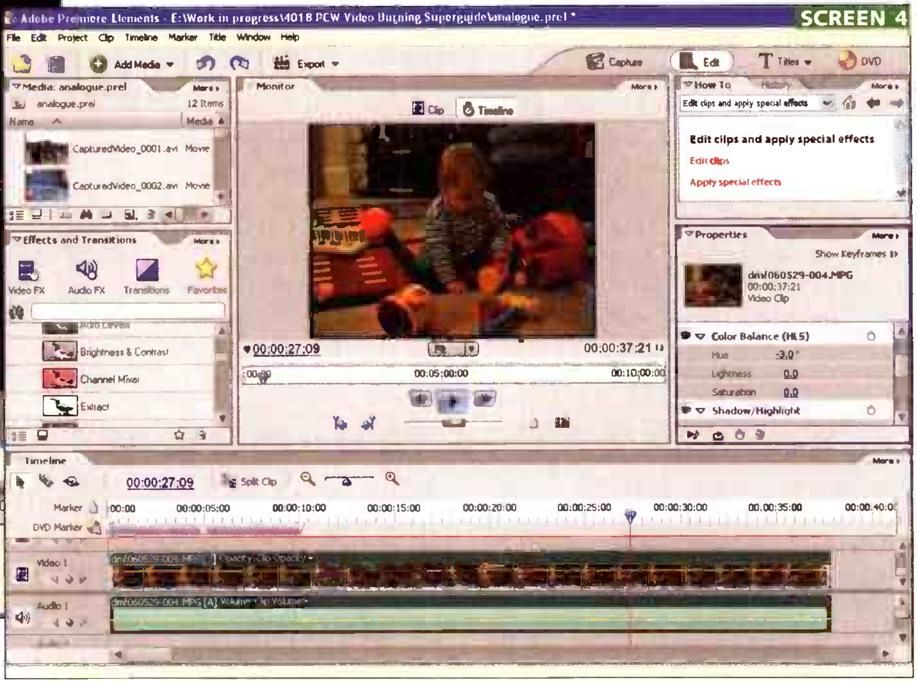
Above: Premiere Pro and other professional editing applications provide tools such as the Vectorscope to help analyse colour problems and keep colours within broadcast-safe levels

Below: Adobe Premiere Elements' shadow/highlight tool allows you to brighten the shadows and darken the highlights in analogue footage independently, without affecting other pixels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00:00:37:21
Video Clip
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Hue
Lightness
Saturation
Shadow/Highlight
Split Clip
Marker
DVD Marker
Video 1
Audio 1

cause noise, colour bleeding, blooming, muffled audio and a host of other problems that hours of post-processing will only partially put right.

Noise reduction

Video noise consists of small bright dots and lines, and it can be the result of poor cable connections, poor contact between the play head and tape, or a deterioration of the tape itself. As well as being visually intrusive, noise makes video harder to compress.

Most video-editing applications provide a de-noise filter of some description. At their worst, they do little more than blur the video image and resharpen edge detail, so the result may be less palatable than the noise. The better ones analyse each frame and attempt to make an intelligent differentiation between noisy pixels and genuine image data. A good noise-removal filter will provide separate adjustment for the individual RGB colour channels. This is essential because the noise is often much worse in one channel than in others. Restricting processing to this channel increases the chance of substantially reducing the noise without degrading the overall picture quality.

There are a variety of free and inexpensive tools for reducing video noise from VHS captures. Video Denoise is a free plug-in for Virtualdub that does a good job of noise removal and is easy to use (see screen 2). It analyses noise separately in the red, green and blue channels – you set the amount of denoising via three sliders. The same plug-in is also available for Adobe Premiere. Both can be downloaded from **www.risingresearch.com**.

> 'Take care not to exceed broadcast-safe levels of colour and brightness'

Another problem that can affect analogue video playback and capture is colour bleed, which makes it look as if the colours in your video have been smeared and blurred. Brightly coloured objects are no longer sharp and the colour bleeds into surrounding areas. Colour bleed is particularly evident with strong colours, most noticeably reds, and can be exaggerated by multiple copying. If you're capturing from a second- or third-generation copy it will almost certainly be suffering from colour bleed.

Again, the answer comes in the form of a free Virtualdub plug-in. Flaxen VHS Filter 1.0 is one such plug-in, written by Donald Graft, and can be downloaded from **http://neuron2.net/flaxen/flaxen.html**.

Colour balancing and tonal controls

Analogue copying can also have the effect of desaturating colour and increasing contrast in video images. These are things that you can, to some extent, correct with tonal and colour controls in your video-editing application. It's also likely that the video will have a colour imbalance or cast that needs correcting.

When making global colour changes to video, you need to take care not to exceed broadcast-safe levels of brightness and colour. There are various technical specifications that define what these limits are. If you're interested you can take a look at the European Broadcast Union's Technical Recommendation 103-2000 at **www.ebu.ch/CMSimages/en/tec_text_r103-2000_tcm6-4677.pdf** or the BBC's guideline's at **www.bbc.co.uk/guidelines/delivering_quality/pdf/tv/tv_standards_worldwide.pdf**.

If your video isn't going to be broadcast you still need to think about broadcast-safe limits. The reason they exist is that if exceeded they can cause degradation in image quality and even interfere with audio – exactly the type of problems you may have spent much time and effort trying to eliminate from you analogue captures.

You're unlikely to find colour controls that will help you stay within broadcast-safe levels in budget video-editing and DVD-authoring applications. For that you'll need professional applications, such as Premiere Pro, Sony Vegas and Avid Liquid Pro. Premiere Pro's Vectorscope (see screen 3) and Waveform monitor provide graphical representations of colour and brightness levels.

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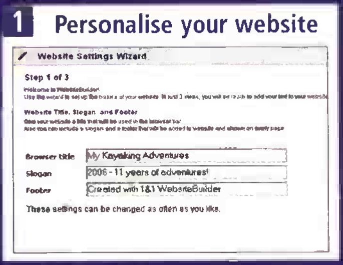

Website Settings Wizard

Step 1 of 3

Website Title, Slogan and Footer

Browser title My Kayaking Adventures
Slogan 2006 - 11 years of adventures!
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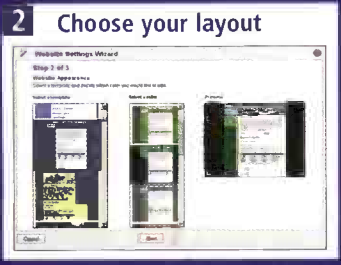
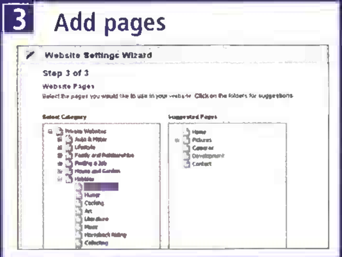
2 Choose your layout



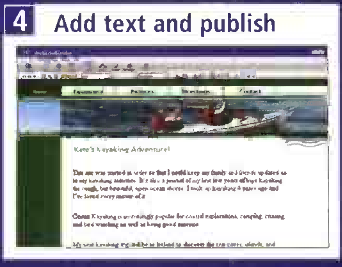
Website Settings Wizard
Step 2 of 3
Website Appearance

3 Add pages



Website Settings Wizard
Step 3 of 3
Website Pages
Select Category
Suggested Pages

4 Add text and publish



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Firewire 1394 Port

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100GB Hard Disk
DVDRw MultiDrive
17" Widescreen
128MB ATI Graphics
Wi-Fi Wireless
BLUETOOTH

Time Traveller® M790S

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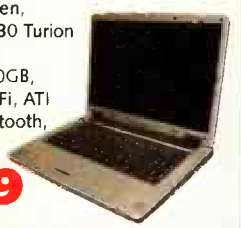
L00013

15.4" TFT Screen, AMD 3000+ Mobile CPU, 1024MB, 100GB, DVDRw, Wi-Fi, ATI 128MB, Windows XP
£499
L00008



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But one thing you can do, regardless of the software you're using, is to monitor your edits on a portable television. To do this you'll need a graphics card that supports TV output. Alternatively, if you have a DV camcorder connect it via the Firewire cable, set your editing software to playback on the camcorder and connect that to the TV. Viewing your edited output on a television, rather than your computer display, will give you a much better idea of how the colours are going to look on the final DVD.

Colour and tonal controls in home video-editing applications all work in a similar fashion, providing a means of altering contrast by adjusting black and white levels and adjusting overall colour by manipulating red, green and blue levels. Adobe Premiere Elements provides particularly versatile controls for making basic contrast and colour adjustments to an analogue capture that's suffering from some of the problems we've mentioned.

Premiere Elements 2 provides the basic image-control parameters – brightness, contrast, hue and saturation – in the Properties panel. Reducing the contrast and boosting the saturation just a little while monitoring the results will probably result in an immediate improvement, but there's a better option. Expand the Video Effects tab in the Effects and Transitions panel, and then click the reveal triangle to show the Adjust filters.

If you don't feel confident about making tonal and colour adjustments use the Auto Color effect. This adjusts the clip colour and contrast by neutralising the mid-tones and limiting the tonal range by adjusting the levels of pure black and white. The temporal-smoothing control specifies the range of frames used to determine the degree of correction. If set to zero it analyses each frame of video independently, while setting it to higher values smoothes out adjustments over time.

Shadow/highlight is another useful tool for restoring detail lost through analogue copying (see screen 4). This allows you to brighten the shadows and darken the highlights independently, without affecting other pixels. It's a very effective way of reducing the contrast and restoring lost detail.

To boost saturation use Image Control, which emulates the processing amplifier or 'Proc amp' commonly found on analogue video equipment. However, be careful not to increase the saturation too much – it's easy to exceed broadcast-safe limits using this control, so keep an eye on your television monitor for bleeding, oversaturated colours.

Finally, you can eliminate colour casts using either the Balance (HLS), Color Balance (RGB), or the Channel mixer. Of the three, the Color Balance (RGB) works most intuitively.

All of these effects are keyframeable, so if the degree of correction varies over the length of a clip it isn't a problem. In the absence of keyframes a simple solution is to split clips.

If you're editing together clips from different analogue sources and want to match them all in terms of tonal range and colour the Color Match effect will help you. It's easy to use – you just select sample pixels using an eyedropper tool from the shadow midtone, highlight areas of the source clip you want to match, then apply them to the target clip.

'View output on a TV for a better idea of how it will look on the final DVD'

Audio cleaning

Noisy audio can be as much of, or even more of, a problem to correct than poor-quality video, but most editing applications provide audio filters. These, if they can't remove problems, can at least diminish the worst of the pops, hisses and crackles that are common with analogue audio captures.

Premiere Pro's Denoiser is designed specifically to remove noise from analogue recordings and has noise floor, freeze reduction and offset controls with which you can attempt to eliminate only those parts of the audio that fall within definable levels or frequencies, such as tape hiss. Not all noise filters are as sophisticated as Premiere Elements, however. Videostudio's remove noise filter, for example, has a single threshold slider you adjust to a level at which the noise you don't want to hear is removed.

If you don't have a dedicated de-noise filter, try a low-pass filter, which cuts out sound above a specified frequency and can be used effectively to eliminate tape noise and other high-frequency sounds.

A common problem with camcorder audio shot with a built-in mic is that you can't hear it. If your editing application has a normalise filter, use it to increase the overall volume of the sound without distorting the loudest bits.

Finally, if your video-editing application doesn't provide the filters you need to clean up your audio, all is not lost. If it supports VST plug-ins you'll probably be able to find a free one that will do the job.

BURNING

With your analogue footage captured, cleaned up and edited, all that remains now is to get it onto a disc. For most of us, DVD is the

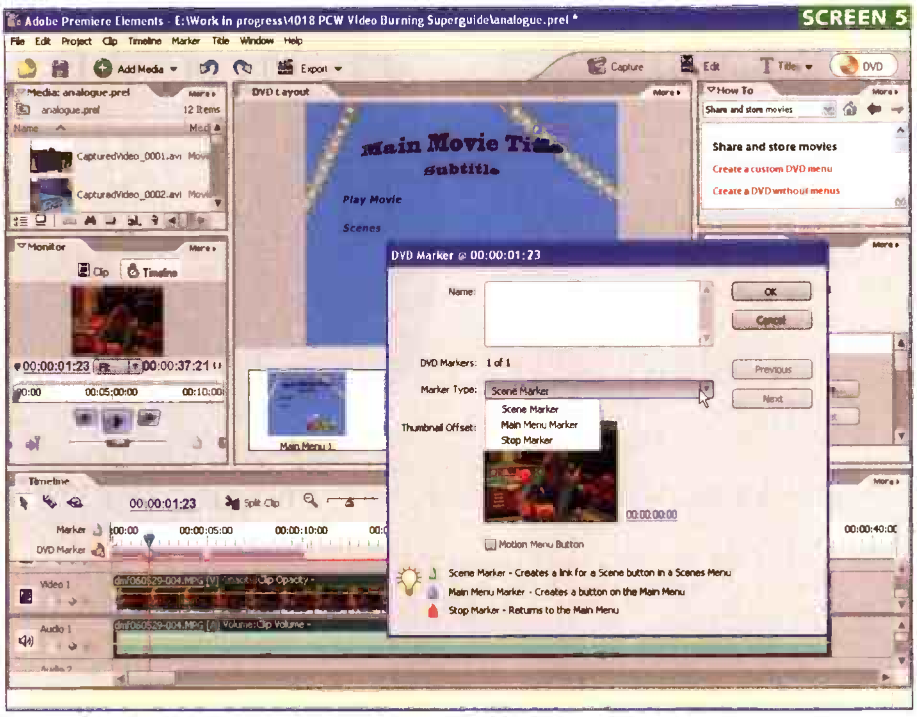
Burn video directly to Blu-ray and HD-DVD discs

It has been a long wait, but the necessary hardware and software is now becoming available to enable you to record, edit and burn high-definition video to either Blu-ray or HD-DVD discs. HDV camcorders, Blu-ray and HD-DVD burners and blank recordable disks are currently expensive and thin on the ground, but as with CD and DVD before them, prices will come down rapidly as more products hit the market.

Software vendors haven't been slow to introduce high-definition support. Earlier in the year, Ulead had to remove Blu-ray support from DVD Movie Factory 5 because the spec hadn't been finalised. The situation has been resolved and you can download the BD Discrecorder module from Ulead's website.

Other applications that support burning to Blue-ray and HD-DVD discs include Cyberlink Power Producer, Nero Burning Rom and Roxio Easy Media Creator 9. These applications record to Blu-ray discs using the BD-R/RE AV format. Like the DVD-VR format, this was designed for TV recording and playback, and writes using the Mpeg-2 transport stream, which means no transcoding is necessary. Straight-to-disc transfers from HDV camcorders are therefore possible and most video applications now feature HDV editing support, but there's currently little in the way of DVD-style menu authoring.

↘


SCREEN 5
Adobe Premiere Elements - E:\Work in progress\4018 PCW Video Burning Superguide\analogue.prel *
File Edit Project Clip Timeline Marker Title Window Help
Add Media
Export
Capture
Edit
Title
DVD
Media: analogue.prel
analogue.prel
12 Items
CapturedVideo_0001.avi
CapturedVideo_0002.avi
DVD Layout
Main Movie Title
subtitle
Play Movie
Scenes
Main Menu 1
How To
Share and store movies
Create a custom DVD menu
Create a DVD without menus
Monitor
Clip
Timeline
00;00;01;23
00;00;37;21
Timeline
Split Clip
Marker
DVD Marker
Video 1
Audio 1
Audio 2
OK
Cancel
Previous
Next
Scene Marker
Main Menu Marker
Stop Marker

DVD Marker @ 00:00:01:23

Name:

DVD Markers: 1 of 1

Marker Type: Scene Marker

Thumbnail Offset: 00:00:00:00

☐ Motion Menu Button

Scene Marker - Creates a link for a Scene button in a Scenes Menu

Main Menu Marker - Creates a button on the Main Menu

Stop Marker - Returns to the Main Menu

One of the advantages of integrated video-editing/DVD-authoring applications such as Premiere Elements is that you can create chapter menus automatically from the timeline

obvious choice. DVD players are everywhere – on top of or underneath most domestic TVs, in computers and even PlayStations. And the only hardware you need is a DVD writer. The bewildering array of writable DVD formats shows no sign of diminishing, but with many column inches having already been filled on that topic, and most drives now offering multiformat support, it's not something we intend to go over again.

In this section we'll cover everything you need to know to produce the perfect DVD, starting with which software to use.

There are two aspects to producing a DVD: authoring and burning. Authoring involves creating a navigable menu system through which the user can select individual 'chapters' or simply play the entire movie. Burning is the process of encoding the video into a suitable format and physically writing the video and menu data to the disc.

Where software is concerned there's a degree of crossover between video editing and DVD burning, and the lines have become somewhat blurred. You'll find that nearly every video-editing application on the market integrates DVD authoring and burning features.

Dedicated DVD-authoring applications aimed at home users, such as Ulead DVD Movie Factory, provide capture and editing tools in addition to their core DVD menu-creation and burning functions.

Then there are the media suites, such as Roxio Creator and Nero, in which a suite of media and data utilities feed into a burning back end.

Professional DVD-authoring applications, such as Adobe's Encore DVD 2, provide advanced menu-authoring tools, but unless you're producing DVDs commercially you're unlikely to need them. Dedicated encoding applications provide greater encoding flexibility, and a wealth of other tools, but if you want to get results with the minimum of effort then a basic video editor will do the job and is, in any event, a good place to learn the basics.

'A basic video editor is a good place to learn the basics of authoring'

Authoring

One of the advantages of DVD-authoring directly from a video-editing package is that you can base DVD chapter menus on clips or timeline markers. Ulead Videostudio gives you the option of creating chapter menus based on scene detection, or at a defined time interval. In Adobe Premiere Elements 2, chapter menus can be created automatically using markers placed on the video-editing timeline (see screen 5).

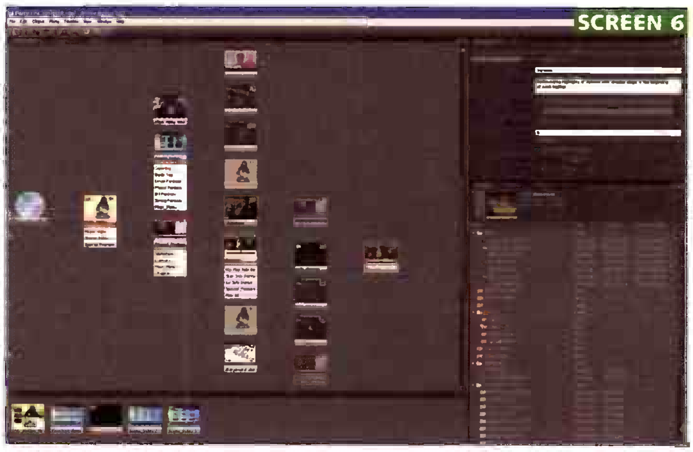
Most authoring software now permits the creation of motion menus with a live video backdrop as well as video thumbnail buttons. Sufficient additional menus to accommodate all your chapters are automatically created and there's a selection of customisable style templates so you can quickly assemble a multi-layered menu system with a consistent theme.

Advanced applications will also allow you to define the navigational structure (see screen 6). For example, you can determine whether, at the end of a chapter, play continues seamlessly into the next one, control is returned to the main menu, or to the sub-menu from which the original selection was made. This could be important if you're designing a DVD-based kiosk system to, say, demonstrate a product catalogue.

Menus aren't for everyone, though, and it is possible to create a DVD with only a single menu that automatically starts your movie when the disc is inserted in the player. But, even if you're only archiving captured footage for your own use, it's worth splitting it into chapters so you can quickly access any part of it.

Encoding

The DVD video format specifies that video must be encoded in Mpeg-2 format. That doesn't mean that as long as you produce an Mpeg-2 file you'll be able to make a DVD, as there are other compatibility requirements. If you're encoding from within video-editing or DVD-authoring software you'll have any



Professional DVD-authoring applications such as Adobe Encore enable the creation of complex menu layouts and navigational structures

number of preset options that will be pretty much guaranteed to work (see screen 7). If you're using a standalone encoder it's up to you to ensure that the resolution, bit rate, audio encoding and other parameters conform to the DVD format.

Taking the reliable route, and starting with an application that provides Mpeg-2 presets, there is still plenty of scope for tweaking to get the results you want. This primarily involves changing the bit rate in order to fit the required amount of video onto a DVD at the highest possible quality and involves some elementary arithmetic.

A single-layer recordable DVD has a capacity of 4.3GB (or 4.7GB if you call 1,000 bytes a kilobyte and are keen to talk up the capacity of your media). The maximum DVD video transfer rate is 9.8Mbits/sec, including audio and subtitles. At a constant bit rate of 8Mbits/sec you can fit over an hour of Mpeg-2 video on a DVD, including a Dolby Digital 5.1 surround-sound track and as many subtitle tracks as you like, up to a maximum of 32. What this means in practice is that for videos of up to one hour in length on a single-layer 4.7GB DVD, you should encode at the highest available quality setting.

To fit more than an hour of video onto a single-layer DVD, it is necessary to make some quality compromises. Basic encoders will offer 'best','good' and 'standard' quality presets, which each cram progressively more video onto a disc at progressively worse quality. Using the mid-range option you should be able to fit two hours of video on a DVD with little noticeable loss in quality.

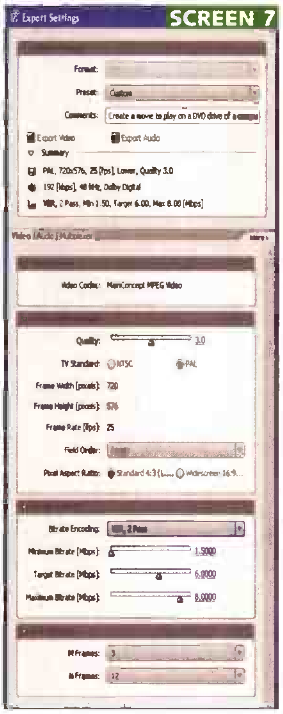
Constant v variable bit rate

How is this possible? Mpeg video uses two kinds of compression. First, intra-frame compression removes 'redundant' information from the image, much in the same way as Jpeg compression works on still images. Then, inter-frame, or temporal compression, removes more data by organising the video stream into groups of frames and removing common pixel data.

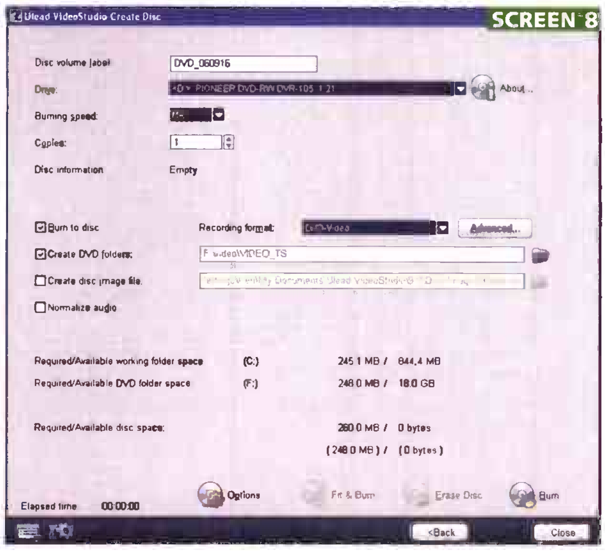
Clips in which nothing much changes – a talking head in front of a static background, for example – can be more easily compressed than action scenes, fast cuts and complex transitions. By encoding the video stream using a variable bit rate (VBR), allocating more bits to difficult-to-compress scenes and fewer bits to static video, overall quality can be maintained at lower average bit rates.

Single v two-pass encoding

If your encoder offers two-pass encoding, use it. It will take a little longer, but the benefits in terms of improved quality for a given video file size are well worth it. Two-pass encoding provides the encoder with a second bite of the cherry. The second run provides the opportunity for more efficient compression, eliminating some of the 'guesswork' involved in the first pass and more efficiently re-encoding sections of video that can be rendered with fewer bits.



Format:
Preset: Custom
Comments: Create a movie to play on a DVD drive of a compu
Summary
PAL, 720x576, 25 [fps], Lower, Quality 3.0
192 [kbps], 48 kHz, Dolby Digital
VBR, 2 Pass, Min 1.50, Target 6.00, Max 8.00 [Mbps]
Video Codec: MainConcept MPEG Video
Quality: 3.0
TV Standard: ○ NTSC ● PAL
Frame Width [pixels]: 720
Frame Height [pixels]: 576
Frame Rate [fps]: 25
Field Order:
Pixel Aspect Ratio: ● Standard 4:3 (1.... ○ Widescreen 16:9...
Bitrate Encoding: VBR, 2 Pass
Minimum Bitrate [Mbps]: 1.5000
Target Bitrate [Mbps]: 6.0000
Maximum Bitrate [Mbps]: 8.0000
M Frames: 3
N Frames: 12



Disc volume label: DVD_060916
Drive: -D- PIONEER DVD-RW DVR-105 1.21
Burning speed:
Copies: 1
Disc information: Empty
☑ Burn to disc
Recording format: DVD-Video
☑ Create DVD folders: F:\video\VIDEO_TS
☐ Create disc image file
☐ Normalize audio
Required/Available working folder space (C:) 245.1 MB / 844.4 MB
Required/Available DVD folder space (F:) 248.0 MB / 18.0 GB
Required/Available disc space: 260.0 MB / 0 bytes
(248.0 MB) / (0 bytes)
Elapsed time 00:00:00

Above: Play it safe by writing DVD files to a hard disk and testing the result with a software DVD player before you burn a disc

Left: If you want to experiment with Mpeg-2 encoding, start with a preset option and then try different encoding bit rates

With encoder settings provided by applications such as Ulead Videostudio, DVD Movie Factory Pinnacle Studio and Premiere Elements, you can select two-pass variable bit rate encoding and set average data rates up to the maximum of 9,800Kbits/sec. You also have access to audio encoding. The two most commonly used formats are Dolby AC-3 and PCM. Depending on the installed audio codecs, you can use AC-3 to encode mono, stereo or 5.1-channel sound. AC-3 is a more efficient codec than PCM, so if it's available make use of it. Having said that, compared with video, audio occupies a relatively small part of the overall disk space.

> 'Two-pass encoding takes a little longer, but the benefits are worth it'

VCD

Video CD (VCD) and the higher-quality Super Video CD (SVCD) formats were originally developed in China as a lower-cost alternative to DVD. In the early days of DVDs, when DVD-burning hardware and recordable media were prohibitively expensive, VCD and SVCD provided an inexpensive option for recording home video onto recordable CDs.

VCD video is encoded in 352x288 (Pal) Mpeg-1 format at 1,150Kbits/sec. SVCD is 480x576 (PAL) <peg-2 at up to 2.6Mbits/sec VBR. In quality terms, VCD is worse and SVCD is about the same quality as VHS video. You can fit about 70 minutes of video on a VCD or SVCD.

Many video-editing and home DVD-authoring applications provide VCD and SVCD-authoring features, and most – though not all – domestic DVD players will play them. Although the quality isn't as good, and they don't have the same menu functionality as DVD, VCD and SVCD provide a reliable and cheap video-disc burning alternative for those who lack a DVD burner.

Media and testing

Having decided on your encoding settings, the final stage is to burn the disc. Assuming you've authored your DVD in a video-editing or DVD-authoring application, and have used the preview player to check everything works as it should, you can be reasonably confident the disc you are about to write will work.

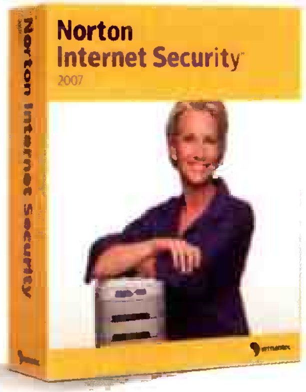
Even so, there are some further precautions you can and should take to be 100 per cent certain. First, most burning software provides the option of burning all the DVD files to a folder on your hard drive. You can then play the DVD files on your PC using your favourite software DVD player, or Windows Media Player.

Second, if you write to a once-only recordable DVD disc and something goes wrong, you've wasted your time and money. Play safe by first burning to rewritable media then, if there's a problem, you can fix it, erase the disc and try again (see screen 8). When you've successfully written a rewritable disc that plays without problems you're ready to record on a write-once disc. **PCW**

THREAT	RELEASED	DECEASED	THREAT	RELEASED	DECEASED	THREAT	RELEASED	DECEASED
Backdoor.Hesive.B	21/2/06	21/2/06	W32.Sygyp.A@mm	21/1/06	22/1/06	Bloodhound.Exploit.55	20/12/05	21/12/05
Trojan.Satiloler.D	21/2/06	21/2/06	W32.HLLP.Sality!inf	21/1/06	21/1/06	Trojan.Lodeight.A	20/12/05	20/12/05
Trojan.Meheerwar	21/2/06	21/2/06	PWSteal.Topfox	20/1/06	20/1/06	Trojan.Lodear.G	20/12/05	20/12/05
Linux.Plupii.C	19/2/06	19/2/06	PWSteal.Tarno.R	20/1/06	20/1/06	W32.Beagle.CZ@mm	20/12/05	20/12/05
W32.Beagle.DU	18/2/06	18/2/06	Trojan.Mdropper.E	19/1/06	19/1/06	W32.Dasher.D	19/12/05	20/12/05
OSX.Inqtana.A	17/2/06	18/2/06	SymbOS.Sendtool.A	18/1/06	19/1/06	PWSteal.Tarno.Q	19/12/05	20/12/05
W32.Alcra.F	17/2/06	17/2/06	SymbOS.Pbstealer.D	18/1/06	19/1/06	Trojan.Mdropper.D	18/12/05	18/12/05
PWSteal.Metafisher	16/2/06	17/2/06	SymbOS.Bootton.E	18/1/06	19/1/06	SymbOS.Skulls.R	16/12/05	16/12/05
OSX.Leap.A	16/2/06	16/2/06	PWSteal.Changgame	18/1/06	18/1/06	SymbOS.Cardtrp.P	16/12/05	16/12/05
W32.Beagle.DS@mm	15/2/06	16/2/06	Trojan.PWS.QQPass.H	18/1/06	18/1/06	W32.Beagle.CY@mm	16/12/05	17/12/05
Bloodhound.Exploit.59	14/2/06	14/2/06	W32.Looksky.H@mm	17/1/06	18/1/06	W32.Dasher.C	16/12/05	16/12/05
Linux.Backdoor.Kaiten	14/2/06	14/2/06	W32.Redplut	17/1/06	17/1/06	W32.Dasher.B	16/12/05	16/12/05
Trojan.Satiloler.C	14/2/06	14/2/06	W32.Blackmal.E@mm	17/1/06	17/1/06	Trojan.Swepdat	15/12/05	16/12/05
W32.Exvid.A@mm	13/2/06	13/2/06	W32.Feebs.J@mm	16/1/06	16/1/06	SymbOS.Cardtrp.O	15/12/05	15/12/05
Bloodhound.Exploit.58	10/2/06	10/2/06	Trojan.Tabela.D	14/1/06	15/1/06	Trojan.Lodear.F	15/12/05	16/12/05
Trojan.Goldun.J	14/2/06	14/2/06	Backdoor.Rustock	12/1/06	13/1/06	W32.Beagle.CX@mm	15/12/05	15/12/05
W32.Kedebe								15/12/05
W32.Beagle.								15/12/05
W32.Beagle.								15/12/05
Trojan.Mdro								15/12/05
W32.Beagle.								15/12/05
W32.Jalabed								15/12/05
SymbOS.Car								15/12/05
SymbOS.Car								15/12/05
SymbOS.Car								14/12/05
SymbOS.Car								13/12/05
W32.Kiman.								13/12/05
Backdoor.Pr								13/12/05
W32.Beagle.								13/12/05
SymbOS.Car								13/12/05
Trojan.Manc								13/12/05
W32.Beagle.DM@mm	2/2/06	2/2/06	W32.Cleevix	2/1/06	3/1/06	SymbOS.Cardtrp.I	12/12/05	13/12/05
W32.Beagle.DL@mm	2/2/06	2/2/06	W32.Dabora.B@mm	30/12/05	30/12/05	SymbOS.Cardtrp.L	12/12/05	13/12/05
W32.Kiman.A	2/2/06	2/2/06	Trojan.Spamlia	29/12/05	29/12/05	W32.Dinoxi.B	11/12/05	11/12/05
W32.Loxbot.F	1/2/06	1/2/06	Trojan.Infticker	28/12/05	28/12/05	W32.Dinoxi	10/12/05	10/12/05
Backdoor.Naninf.D	1/2/06	1/2/06	Bloodhound.Exploit.56	27/12/05	28/12/05	W32.Spybot.ABDO	10/12/05	10/12/05
Backdoor.Naninf.C	31/1/06	1/2/06	Backdoor.Dckane	27/12/05	27/12/05	W32.Aizu.G	9/12/05	9/12/05
W32.IRCBot.I	31/1/06	31/1/06	W32.Neshuta	27/12/05	27/12/05	W32.Looksky.E@mm	9/12/05	9/12/05
Trojan.Gpcoder.D	31/1/06	31/1/06	Trojan.Lodear.I	24/12/05	25/12/05	Trojan.Chuvazada	9/12/05	9/12/05
Backdoor.Doroku	29/1/06	29/1/06	Linux.Mare	24/12/05	24/12/05	W32.Sober@mm!dam	8/12/05	9/12/05
W32.Antinny.AX	28/1/06	28/1/06	W32.Feebs.B@mm	22/12/05	22/12/05	Trojan.Zlob.F	8/12/05	9/12/05
SymbOS.Cardtrp.Q	27/1/06	28/1/06	Trojan.Lodear.H	22/12/05	23/12/05	W32.Kelvir.JJ	7/12/05	7/12/05
SymbOS.Cardtrp.R	27/1/06	28/1/06	W32.Beagle.DB@mm	22/12/05	23/12/05	W32.Mytob.MR@mm	7/12/05	7/12/05
SymbOS.Cardtrp.S	27/1/06	28/1/06	W32.Mytob.MX@mm	22/12/05	22/12/05	Trojan.Spaxe	6/12/05	7/12/05
Backdoor.Dragodor	27/1/06	27/1/06	W32.Beagle.DA@mm	22/12/05	22/12/05	Trojan.Farknew	6/12/05	6/12/05
W32.Imav.A	26/1/06	26/1/06	Trojan.Mitglieder.S	22/12/05	22/12/05	Trojan.Welomoch	6/12/05	6/12/05
W32.Lodav.A	26/1/06	26/1/06	W32.Spybot.ACDM	22/12/05	22/12/05	Trojan.Zlob.E	6/12/05	6/12/05
Trojan.Lodeight.B	25/1/06	26/1/06	W97M.Ruleden	21/12/05	22/12/05	W32.Mytob.MN@mm	5/12/05	7/12/05
Trojan.Bomka	24/1/06	25/1/06	W32.Wisfc	21/12/05	21/12/05	Trojan.Rulndem	2/12/05	3/12/05
PWSteal.Wowcraft.C	24/1/06	24/1/06	W32.Feebs.A	21/12/05	21/12/05	Bloodhound.Beagle	2/12/05	2/12/05

Online threats change.

Now your protection does too.



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Don't panic!

If Windows gives up the ghost, your last resort is probably the XP CD. Jörg Geiger explains how to rescue your data and create an emergency toolkit so you'll be ready for anything

No backup and your computer won't start? Not a problem, according to Microsoft – at least, not if you're using Windows Vista, where the built-in Startup Repair Tool will put things right. Simply boot the computer from the Vista DVD and you can solve start-up problems with a few mouse clicks (see boxout on page 54). But Vista's not here yet, and things aren't so easy for XP users. So, we've put together a collection of the best tips for rescuing your PC.

XP: Nothing works any more

If Windows won't start properly, the first thing to do is to see if you can boot in another mode. Turn on the PC and, after the Power on self test (Post), keep the F8 key pressed. XP will then offer two helpful start-up options – 'Last known good configuration' and 'Safe mode'.

Try the 'Last known good configuration' option first. This reloads a configuration for Windows, including drivers, that is known to be working. XP stores these collections of valid configurations, known as control sets, in the Registry branch HKey_Local_Machine\System. The set that will be reinstalled is contained in Select\LastKnownGood. This can fix the damage if a simple Registry change has caused problems, and it can help sort out blue-screen errors.

Be careful though: the 'Last known good configuration' is not a magic cure-all. It can't repair a damaged user profile or corrupted start files. The biggest problem with this method is that Windows is not bothered about what happens after start-up. As long as the system starts, the previous 'Last known good' settings will be overwritten immediately.

Safe and sound

In Safe mode, Windows loads only the drivers and services that are absolutely necessary. If your system has become unstable, then you can usually start to repair things in this mode.

The relevant Registry key is HKLM\System\CurrentControlSet\Control\SafeBoot, with the subkeys Minimal and Network. In Safe mode, you can reverse a driver update in just a few steps:

Step 1: Click on Start/Run. Enter devmgmt.msc.

Step 2: Click on the device with the problem driver. Select Properties from context menu.

Step 3: Click on Drivers tab. Then click on Installed Drivers.

Step 4: Confirm overwriting of current driver with previous version.

It's also handy to know you can run the system restore function in Safe mode, and roll XP back to roughly the state before a program was installed. To do this, Windows doesn't save a complete system image, but sets up what are known as Restore Points. What exactly is saved is specified in the filelist.xml file in the Windows\system32\Restore folder. You can restore the operating system to a previous condition, but your own work, such as Word files or emails, will remain as is.

XP creates restore points automatically whenever you install software (installation restore points), at regular intervals (system check restore points) and after Windows

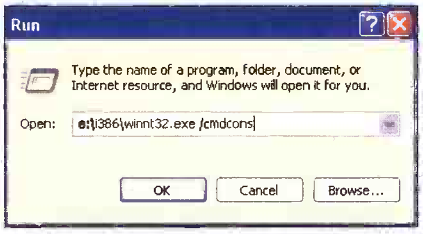
↘

Windows Recovery Console

It's simple to add the Recovery Console to the boot menu. Insert the XP installation CD, click on Start/Run and enter the command e:\i386\winnt32.exe /cmdcons, replacing e: with the appropriate letter for your CD drive. In the dialogue that appears, click Yes. Next time you start the computer, you'll find the Recovery Console in the boot menu. Here are some of the useful commands it provides.

Disk partitioning

The diskpart command starts Microsoft's command-line partitioning tool. When it starts, the list disk command displays an overview of the current hard disk partitioning structure and lets you choose which disk to use. Type 'select disk 0' to select the first hard disk and then 'list partition' to display the partition structure.



Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.

Open: e:\i386\winnt32.exe /cmdcons

Adding the recovery console to Windows is easy – and it could be a life saver later

Overview of services

Windows services can be started and terminated from the console, but first you have to obtain an overview of which services are running. The listsvc command lists services, including a description and an indication of their status.

Controlling services

All you have to do to start a service is issue the Enable command with the name of the service and its start type. The Disable command turns the service off. For example, 'enable dhcp service_auto_start' configures the DHCP service to run automatically when XP next starts.

For a detailed overview of the Windows Recovery Console, go to **http://support.microsoft.com/kb/314058**.

Updates (system update restore points). You can use Safe Mode to select a specific restore point to use to rescue your PC (see screen 1).

Step 1: Log on as an Administrator in Safe mode.

Step 2: Click on Start/Programs/Accessories/System Tools/System Restore. Select the option Restore my computer to an earlier time. Click on Next.

Step 3: Select the restore point you wish to use from the list. Click twice on Next.

Using restore points is more complicated in those cases where Windows XP has not got as far as loading the GUI before giving up. If that happens, you can use the shell command rstrui. Boot up holding down F8, choose the option to start in Safe mode with a command prompt and log on as an Administrator. Change to the Windows directory under system32\restore, and start the system restoration GUI using the command rstrui.exe.

If F8 does not work

In the case of damaged start-up files or similar serious errors, you may not even be able to get as far as pressing the magic F8 key, for example if the system stops with messages such as NT Loader Missing. If that happens, reach for the XP installation CD. For this to work, you'll have to make sure the CD/DVD drive is before the Windows hard disk partition in the Bios boot sequence, so you may need to enter the Bios first.

Step 1: Boot up using Windows CD.

Step 2: If you use a Sata (Serial ATA) or Raid controller that Windows does not recognise automatically, press F6 to add a driver from a floppy disk.

Step 3: After this, press R to select the recovery console.

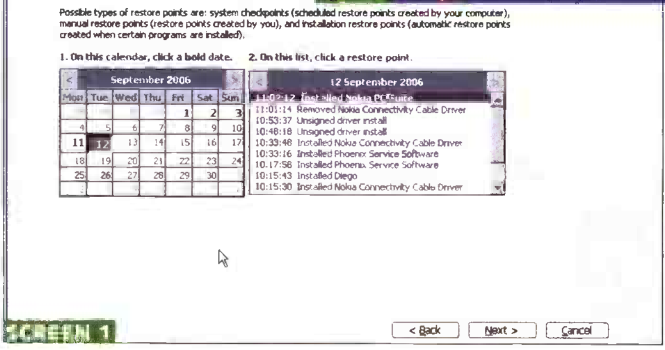
Step 4: Log on as an Administrator, usually using option 1 and entering the password. Beware: if you just press Enter, you'll cancel the process.

Step 5: You can now use some shell commands. To see an overview, type Help.

Step 6: For more information about a specific command, type commandname /? We've listed a few in the box above.

System Restore

Select a Restore Point



The following calendar displays in bold all of the dates that ha restore points that are available for the selected date.

Possible types of restore points are: system checkpoints (scheduled restore points created by your computer), manual restore points (restore points created by you), and installation restore points (automatic restore points created when certain programs are installed).

1. On this calendar, click a bold date.

2. On this list, click a restore point.

12 September 2006

11:02:12 Installed Nokia PC Suite
11:01:14 Removed Nokia Connectivity Cable Driver
10:53:37 Unsigned driver install
10:48:18 Unsigned driver install
10:33:48 Installed Nokia Connectivity Cable Driver
10:33:16 Installed Phoenix Service Software
10:17:58 Installed Phoenix Service Software
10:15:43 Installed Diego
10:15:30 Installed Nokia Connectivity Cable Driver

Left: You can start System Restore in Safe mode

'The Windows start-up is a chain of events that all build on one another'

Another useful function is XP's Autorepair. Boot from the installation CD and choose 'New installation of Windows'. The existing installation will be recognised and you can then select the repair function by pressing R. This function only replaces system files. Files that you have created remain intact, so you don't need to worry about losing your data.

Windows emergency commands

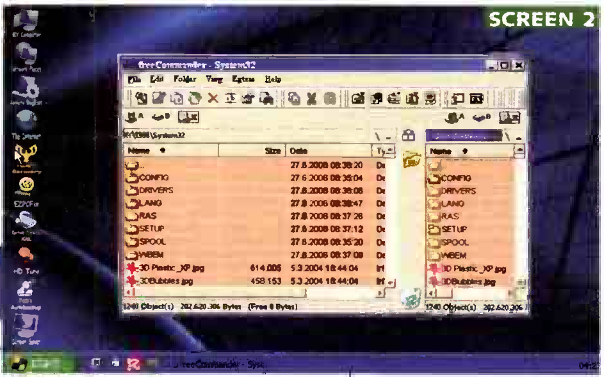
Which command should you use to solve which Windows problem? With so many possibilities it can be daunting, so we've put together a list of the most important ones, and when you may need to use them.

Repairing a damaged MBR

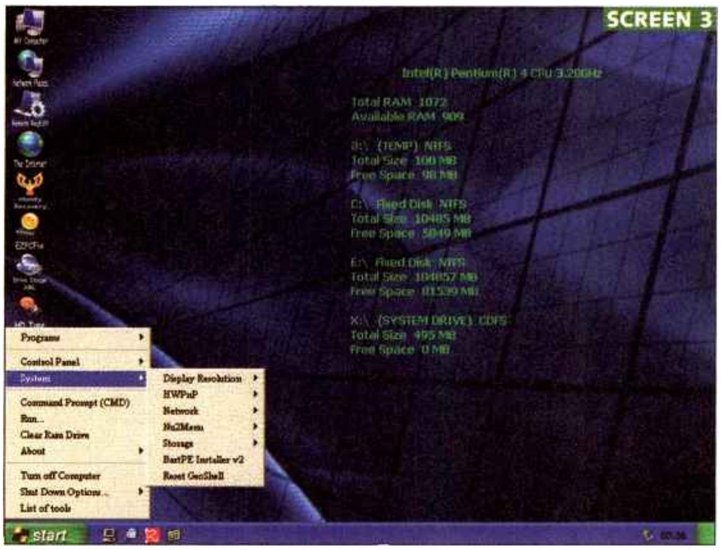
The Windows start-up is a chain of events that all build on one another. It begins with the Bios loading the Master Boot Record (MBR) into the Ram and executing its start code. If the MBR is damaged or partly overwritten, then Windows hangs immediately after powering up and the screen stays black.

The command fixmbr repairs the MBR by rewriting the Master Boot Code. The partition table remains untouched, so fixmbr does not solve any problems with partitioning – contrary to the advice sometimes given on web forums.

The MBR start code looks in the partition table for the active partition and then loads



Above: The Ultimate Boot CD allows you to work in the familiar Windows environment



```
Intel(R) Pentium(R) 4 CPU 3.20GHz

Total RAM 1072
Available RAM 909

D:\ (TEMP) NTFS
Total Size 100 MB
Free Space 98 MB

C:\ Fixed Disk NTFS
Total Size 10485 MB
Free Space 5049 MB

E:\ Fixed Disk NTFS
Total Size 104857 MB
Free Space 81539 MB

X:\ (SYSTEM DRIVE) CDFS
Total Size 495 MB
Free Space 0 MB
```

You can configure basic options, such as screen resolution and network settings, from the UBCD desktop

its first sector, called the start or boot sector, into the Ram. This sector is particularly important as it contains the file Ntldr (NT Loader), which is necessary for Windows to start. So, a broken boot sector will also prevent XP from starting, and can be repaired with the fixboot command, which writes a new boot sector into the active partition.

If the boot sector is OK, but the NT Loader isn't, XP will once again fail to boot, with the screen reporting Ntldr missing. Restart with Ctrl & Alt & Del. In this case, you will have to copy the boot files Ntldr and Ntdetect.com manually from the XP installation CD to the active partition's root directory.

In most cases this will be c:\. Both files are in the i386 directory on the Windows CD (in our example, this is drive e:).

```
copy e:\i386\ntldr c:\
copy e:\i385\Ntdetect.com c:\
```

The ultimate recovery disk

The best recovery tool if XP won't start is a CD-based Windows system that already includes the right tools. The big advantages

Tools on the Ultimate Boot CD

Hard drive check

If you suspect that your hard disk has become slower, the Ultimate Boot CD for Windows has three defragmenters for you to choose between. You can access them from Programs/Disk Tools/Defrag.

You can also start Bart's Stuff (see screen 4), which uses write-read operations to work out hard disk throughput and track down bottlenecks from the Diagnostic entry.

Fixing the Registry

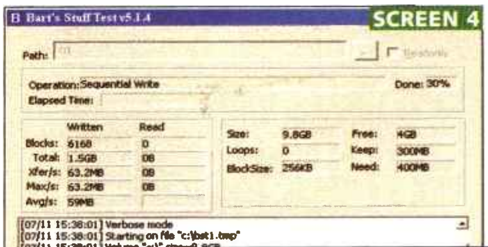
If there's an error, you can edit your PC's Registry from the Ultimate Boot CD for Windows. The relevant tools can be accessed via Programs/Registry Tools. For example, Regcleaner allows you to remove specific programs or start entries from the Registry, while the Regedit entry will start Windows' own Registry Editor.

Secure erase

If you're going to sell your system or pass it on to someone else, you ought to erase all the data securely before doing so. Simply reformatting the hard drive is not sufficient, as data recovery software can retrieve files from newly formatted hard disks. From the Security menu entry, you can access Disk Wipe and Drive Eraser – two tools that will fully erase hard disk content to approved security standards. In addition, Eraser will irretrievably wipe specific files and folders.

Connecting to the net

You can create an internet connection using the Ultimate Boot CD for Windows. From Programs/Applications, you can also start Firefox or a Pdf reader – handy if you can't solve a problem and want to research it online.



Path:

Operation: Sequential Write Done: 30%
Elapsed Time:

	Written	Read
Blocks:	6168	0
Total:	1.5GB	0B
Xfer/s:	63.2MB	0B
Max/s:	63.2MB	0B
Avg/s:	59MB	

Size: 9.8GB Free: 4GB
Loops: 0 Keep: 300MB
BlockSize: 256KB Need: 400MB

```
[07/11 15:38:01] Verbose mode
[07/11 15:38:01] Starting on file "c:\bst1.tmp"
[07/11 15:38:01] Volume "c:\" size=9.8GB
[07/11 15:38:01] Volume "c:\" availabl
[07/11 15:38:01] Operation: Normal
[07/11 15:38:01] Sequential Write
```

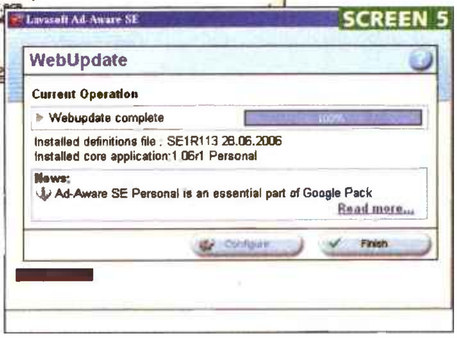
Above: Bart's Stuff will help you track down disk bottlenecks

Anti-virus included

A virus scanner, like regular updates and a firewall, belongs with the most basic of security measures. If the worst happens and your PC does get infected, the emergency CD can help. Using Start/Programs/Antivirus Tools you can start various virus removal tools such as Avast or Stinger, though unfortunately these do not have an update function. It's important to note that virus scanners such as Clamwin do have one, and it is essential to carry out a signature update before doing a scan to ensure it will detect the latest threats.

Antispyware

Ad-Aware and Sybot are two very useful anti-spyware tools you can start from the Programs/Malware Tools menu entry. As with anti-virus software, you should also check for updates with these tools (see screen 5).



Current Operation

Webupdate complete 100%

Installed definitions file : SE1R113 28.06.2006
Installed core application:1.06r1 Personal

News:
Ad-Aware SE Personal is an essential part of Google Pack
Read more...

The emergency CD includes Ad-Aware – a spyware detector – but you do need to install the latest updates before use

↘

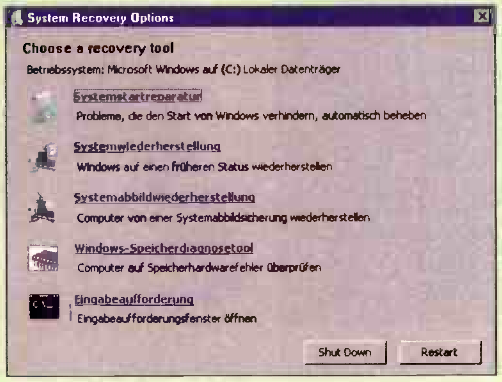
Emergency miracles from XP's successor

Microsoft has come up with something special for Windows Vista – refined recovery tools so you don't have to do all the work.

Under Vista, the installation DVD can do much more. All you need to do is boot from the DVD, then select System Recovery Options.

System Start Repair is a new feature. Vista checks if the MBR is OK, the partition table matches the actual structure and if all the start files are in the right place. If not, the Recovery Tool carries out the repair. If that doesn't work, it reverts to the last working configuration and presents the Administrator with information about the problem.

Windows Vista impresses with a series of new tools for debugging start errors



Choose a recovery tool

Betriebssystem: Microsoft Windows auf (C:) Lokaler Datenträger

Systemstartreparatur
Probleme, die den Start von Windows verhindern, automatisch beheben

Systemwiederherstellung
Windows auf einen früheren Status wiederherstellen

Systemabbildwiederherstellung
Computer von einer Systemabbildsicherung wiederherstellen

Windows-Speicherdiagnosetool
Computer auf Speicherhardwarefehler überprüfen

Eingabeaufforderung
Eingabeaufforderungsfenster öffnen

are that you can work with an easy-to-use interface and won't have driver problems, as might be the case with Dos or Linux utilities.

For the ultimate recovery CD you need only three things: the software from our cover disc; your XP installation CD with Service Pack 2 integrated; and a blank CD. Alternatively, you can download the software from **www.ubcd4win.com** – it's just over 130MB.

Creating a Windows boot disc

Step 1: Unpack the UBCD4WIN software to a folder on the hard disk. You will need about 300MB of free space.

Step 2: Change to that folder, start UBCD4WinBuilder.exe, and confirm that you accept the licence conditions.

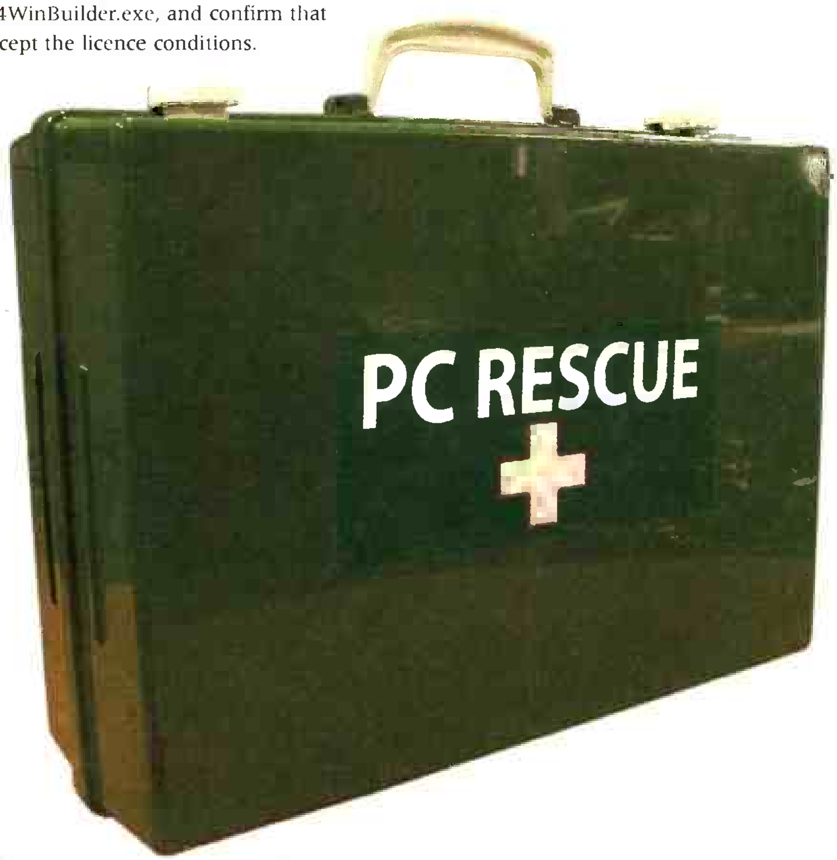
'Before you start tinkering with your system, save all your important data'

Step 3: Insert your Windows SP2 CD. UBCD will search for valid installation sources.

Step 4: Select your CD as the source. Click on Start.

Step 5: Burn ISO image to blank CD.

You can now boot the computer from the newly created recovery CD and start repairs. All you have to do is select 'Launch the ultimate Boot CD for Windows' from the menu that greets you.



Basic backups

The UBCD (see screen 2 &3) takes up where the XP CD leaves off. Before you start tinkering with your system, make sure you save all your important data, such as photos and mp3s, business correspondence or your PhD thesis. You can do this easily by choosing Start/Program Files/Disk Tools and then Backup and Cloning.

A click on NT Backup starts the XP Backup Wizard. You can choose preset options such as My Documents or select individual items by using a file browser. All you then have to do is choose a storage destination. It's quicker if you start a file manager, such as Free Commander, and then simply use drag and drop to save files to a USB stick or external hard disk.

Professional recovery programs always start by making a backup of the damaged partition. The reason is that there is a small risk involved in the recovery process, and it's possible you might do more damage.

You can make a complete hard disk image using the Ultimate Boot CD. You can even choose Self Image from Program Files/Disk Tools/Backup and Cloning to generate and save a complete 1:1 image of the system partition. All you have to do is specify the source partition and a target file. Optionally, you can allow the image to be compressed, which saves space but takes longer. Restoration is done in the same way, except you need to swap the source and the target.

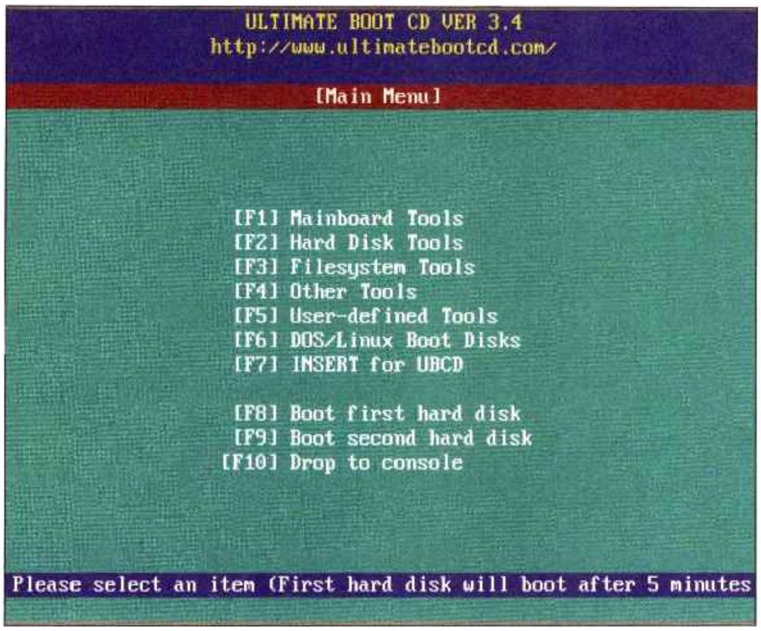
Ultimate Linux Boot CD

The Ultimate Boot CD for Windows is a development of the original Ultimate Boot CD project that was based on Linux. The Linux version obviously doesn't require you to have a Windows installation disc, so it can be useful if yours has been lost or not supplied with the original PC. You can download the Ultimate Boot CD (130MB) from **www.pcw.co.uk/2158286** or visit **www.ultimatebootcd.com**. You'll also find a list of users and companies that will ship you a pre-burned CD for a small shipping/handling fee.

The Linux Ultimate Boot CD comes in two versions – Basic and Full – the main difference being that the Full version includes tools that allow you to customise the contents of the boot CD.

Lost your password?

The Ultimate Boot CD can change Windows passwords. It includes a special emergency utility called the Offline NT Password & Registry Editor. After starting UBCD, use the F3 function key to select the Filesystem Tools entry. Scroll to the right using the cursor keys and press F6 Offline NT Password & Registry



```
ULTIMATE BOOT CD VER 3.4
http://www.ultimatebootcd.com/

[Main Menu]

[F1] Mainboard Tools
[F2] Hard Disk Tools
[F3] Filesystem Tools
[F4] Other Tools
[F5] User-defined Tools
[F6] DOS/Linux Boot Disks
[F7] INSERT for UBCD

[F8] Boot first hard disk
[F9] Boot second hard disk
[F10] Drop to console

Please select an item (First hard disk will boot after 5 minutes
```

The Ultimate Boot CD is also available based on Linux

Editor. This starts the Linux-based utility and displays a command prompt ready for you to enter a command. Select the option a to display all partitions. If this does not work, then you can choose to load a new hard disk driver. The l option only displays the NTFS and Fat partitions. Enter the number of the Windows system partition.

Next you have to specify the file path to the Registry. Just press Enter to accept the default, Windows/system32/config. Option 1 takes you to the password sub-menu, where you should select 1 again to start the Editor.

The program shows a list of users. Enter the username for which you want to change the password and then enter *. This sets a null password for the selected account and was the only reliable method in our test. You have to confirm the security dialogue by pressing z.

Leave the editor by pressing ! and then q. You will have to confirm a second security dialogue by pressing z again in order for the changes to be saved. Exit the menu and start the computer again. Windows will then run its hard disk checking tool, Chkdsk, and restart the computer. You can log in using the new password.

USB memory sticks

> **'DSL has a few tricks up its sleeve to help solve common PC problems'**

You can't always remember to carry an emergency CD with you, but how about a memory stick? On the cover disc, you'll find Damn Small Linux (DSL) 3.0.1 (**www.damnsmalllinux.org**), which you can use to create a start-up USB memory stick that only needs 64MB of space (see screen 7). Here's how to set one up:

Step 1: In order to boot from the USB stick there are two options in the Bios – USBZIP and USBHDD. USBHDD is enabled by default, which treats a USB stick like an extra hard disk drive. Select the USBHDD entry.

Step 2: Copy the Damn Small Linux ISO file from the cover disc to a folder on your hard drive.

Step 3: Use a burning program to copy the ISO file to a CD.

Step 4: Boot your PC from the newly created CD.

Step 5: Right-click on the Linux Desktop and select Apps/Tools/Install to USB Pendrive.

Step 6: Insert the USB stick into a free USB socket on the computer, but do not mount the drive. In order to find out whether DSL has recognised the USB stick, open a shell and enter the command 'dmesg |grep scsi-A 3'.

Step 7: Work through the wizard and choose Installation in the next step. Choose DSL CD as the ISO source

Step 8: You can now set up special boot options, for example the resolution or programs to be started automatically. Use the same options as you did for starting DSL from CD. This will create a bootable USB stick with DSL.

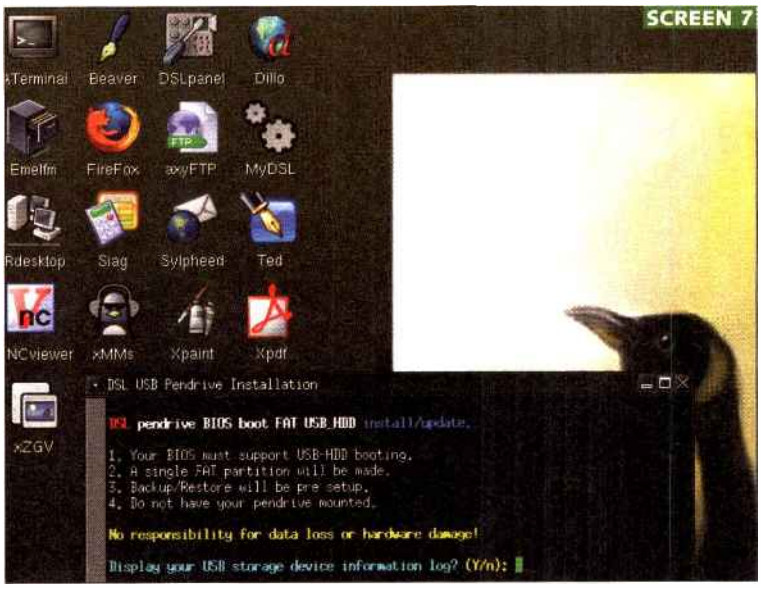
DSL has a few useful tricks up its sleeve to help you solve some common PC problems. For example, you can perform a quick memory test by starting the PC from the USB stick and entering the command memtest at the boot prompt. A quick check to verify Ram functionality will be run and a comprehensive report generated.

The hdparm command-line tool allows you to check the read speed of the built-in hard disk very quickly by entering hdparm-t/dev/sda1. If you use the T parameter, the read speed of the hard disk cache is also tested.

DSL also includes ntfsundelete, which you can use to make deleted files visible again under NTFS. You can tell the program to look for specific files; for example, to search for a deleted Doc file, use the syntax 'ntfsundelete/dev/sda1 -s -m "*.doc"'.

Troubleshooting DSL

DSL usually boots automatically. If problems do arise, Linux is probably having difficulty with individual hardware components. On one of our test PCs it hung for no obvious reason, for example. If you encounter such difficulties, it's still possible to boot by using boot parameters. Often all you need to do is turn automatic hardware recognition off using the failsafe command at the boot prompt. Further boot options are available in DSL with the F2 and F3 function keys. **PCW**



```
DSL pendrive BIOS boot FAT USB_HDD install/update.

1. Your BIOS must support USB-HDD booting.
2. A single FAT partition will be made.
3. Backup/Restore will be pre setup.
4. Do not have your pendrive mounted.

No responsibility for data loss or hardware damage!

Display your USB storage device information log? (Y/n):
```

Damn Small Linux brings together numerous utilities. Its 50MB size allows it to be installed on USB sticks

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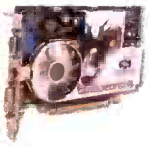

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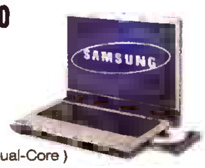

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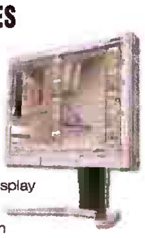

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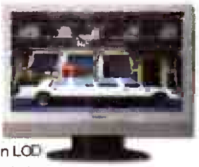

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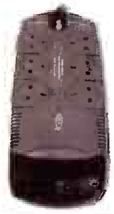

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Keeping your cool

Adequate cooling plays a big part in keeping your PC running smoothly. Terry Relph-Knight explains how to design a cool system properly

Random crashes can make using a PC frustrating, and the first thing many people check is the drivers (see the feature in the November issue of *PCW*, free online at **www.pcw.co.uk/2164416**). But there can be other culprits.

Reliability problems can be caused by poor cooling. A common symptom is when your PC exhibits problems only after it has been turned on for a while, or if things become worse in hot weather such as this summer's UK heatwave.

In extreme cases a poorly cooled PC may simply shut down without warning. And, perhaps, never turn on again.

For many people, taking the DIY route and building their own PC is the best way to get the system they want, but one of the most difficult things to get right is cooling. In recent years CPUs, bridge chips, graphics cards and hard disks have increased their heat output, and while this trend may be reversing with Intel's new dual-core designs – at least for CPUs – the inside of a modern PC is getting warmer. With so many significant heat sources spread throughout the case, a simple 'slap a fan on it' approach needs to be replaced by integrated cooling design. There's surprisingly little useful information available on how to go about this, and one of the most irritating things about cooling devices is that the manufacturers rarely publish sufficient details to allow you to compare products and calculate cooling performance.

For a high-performance PC, cooling design can't just be left to chance – it needs thought and effort to get right. A properly designed system balances temperatures against noise and keeps the cost of the cooling components themselves under control. The result should be a reliable, quiet system that helps to extend the life of the individual components. In this feature we'll see what can realistically be done to achieve that.

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It's important to choose a case that suits your components

Have a plan

Although the internal layouts of most PCs are broadly similar, it's the details that make the difference in cooling design. One of the first choices in building a PC is the motherboard and it's the position of the heat-generating components on this that should be the starting point for your thermal design. The CPU puts out the most heat, followed by the graphics card. Dual-CPU boards are more difficult to cool than single-CPU boards because two processors generate twice as much heat, and one CPU will be closer to the power supply air inlet than the other.

Hard disks should not be overlooked either, as current high-capacity designs can become frighteningly hot. Look for a case that allows you to fit a local fan, with an intake for outside air, to cool the hard disks if required.

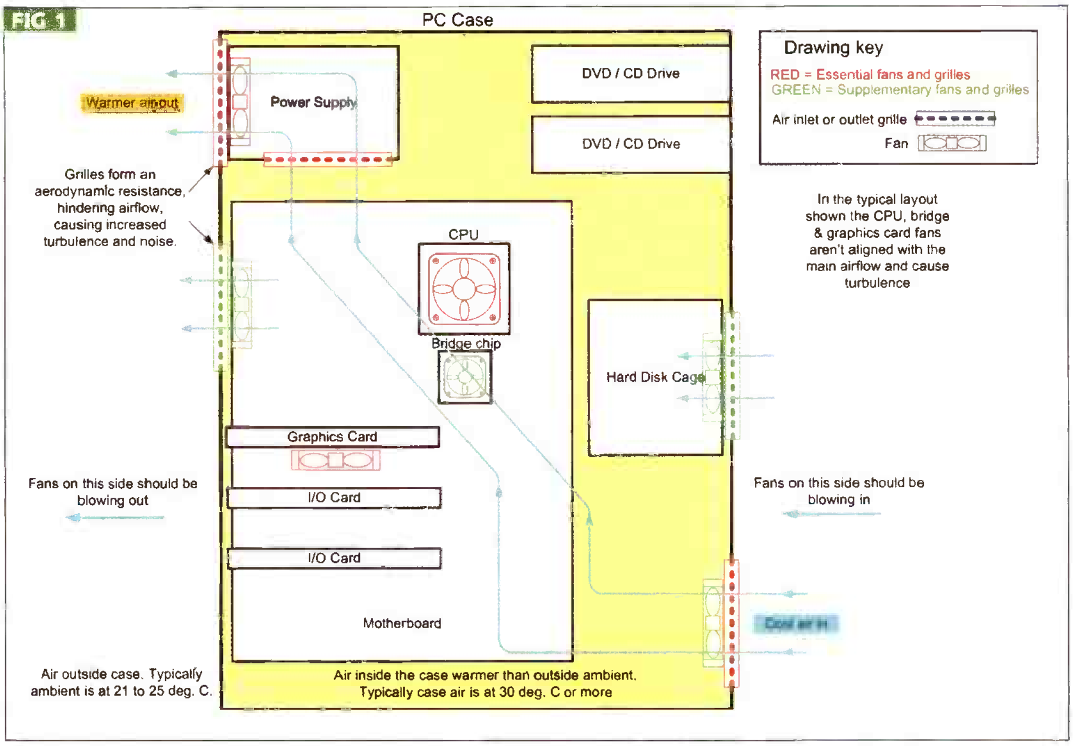
A case in point

The next step is to choose a case, bearing in mind the location of the CPU, bridge chip, graphics card and memory. Cable routing should also be considered. Some case and motherboard combinations force you to put peripherals such as hard disks and DVD drives in awkward positions relative to the motherboard connectors, resulting in poor cable routing.

It's important to buy a case that suits your components. Buying a really small case that has no room for fans when you're putting together a cutting-edge dual-CPU system isn't going to help keep everything cool.

The volume of air inside the case acts as a heat store: given the same heat input, the air ↘

FIG 1


PC Case
Warmer air out
Power Supply
DVD / CD Drive
DVD / CD Drive
Drawing key
RED = Essential fans and grilles
GREEN = Supplementary fans and grilles
Air inlet or outlet grille
Fan
Grilles form an aerodynamic resistance, hindering airflow, causing increased turbulence and noise.
CPU
In the typical layout shown the CPU, bridge & graphics card fans aren't aligned with the main airflow and cause turbulence
Bridge chip
Hard Disk Cage
Graphics Card
I/O Card
I/O Card
Fans on this side should be blowing out
Fans on this side should be blowing in
Motherboard
Cool air in
Air outside case. Typically ambient is at 21 to 25 deg. C.
Air inside the case warmer than outside ambient. Typically case air is at 30 deg. C or more

Whether desktop or power, most PC cases have a similar airflow path

The power supply unit and its fan are crucial components for case cooling

in a small case will rise to a higher temperature than the air inside a larger case. Also, big cases often allow for a better layout and easy cable routing. Wide cases allow for space above the I/O cards so that air can escape and circulate around them.

An all-metal case, particularly an aluminium one, will run cooler than a mostly plastic one. Cases with sound-damping treatment tend to run at a higher temperature, because the sound-damping treatment also acts as heat insulation.

There's a typical engineering trade-off here; a good-size aluminium case with sufficient airflow and an appropriate choice of CPU and graphics cooling device may actually be quieter than a design with sound insulation that needs better cooling fans.

Choosing a power supply

The usual ATX design for personal computer tower and desktop cases treats the power supply fan as the principal means of drawing cooling air through the case. In a tower case, air is supposed to enter through a grille in the bottom corner at the front of the case and be blown out of the back corner, at the top of the case, by the power supply fan (see figure 1).

Desktop cases usually use the same arrangement, but tipped on its side, so air enters through a grille at the front left of the case and is blown out at the rear right.

Whatever the layout, the power supply and its fan are crucial components for case cooling and are consequently a key source of fan noise. However a supply with a high power rating and a more powerful fan may allow the total fan count to be kept low, resulting in less noise. Some of the high-end power supplies available have speed-controlled fans so they can be adjusted to minimum noise while still providing sufficient airflow. These include the Nesteq range from Quiet PC (**www.quietpc.com**), which cost between £100 and £150; the Zalman ZM460B-APS 460W at £84.99; and the Q Technology Ultra-Quiet 460W at £70, which can also be bought from Quiet PC.

Remember that dual graphics card SLI or Crossfire setups can be a headache in terms of heat dissipated and in current draw from a single supply rail. This can be in excess of 20A, requiring a very careful choice of PSU.

Cable dressing

As you build a new PC it often looks tidy – until the power supply leads and disk cables are introduced. These cables can hinder air flow if they're poorly placed. In the past few years, the trend has been towards round drive cables, rather than the earlier flat ribbon cables, which could block airflow completely. If you still have flat cables in your PC and think airflow might be a problem, swap them for round ones.

Simply strapping the power supply cables out of the way of the path between the CPU and the PSU fan using plastic cable ties can make a significant difference in case and CPU temperatures, particularly since general-purpose PSUs are designed to drive both Intel and AMD processors and often have a number of cables that will never be used.

Components

When you've put together case, motherboard and power supply, you need to choose the other components of your cooling system. We'll refer to 'coolers' as the complete system used to cool a CPU and to the cooler's components as heatsinks, fans and heat pipes. A CPU cooler in its simplest form consists of a heatsink of

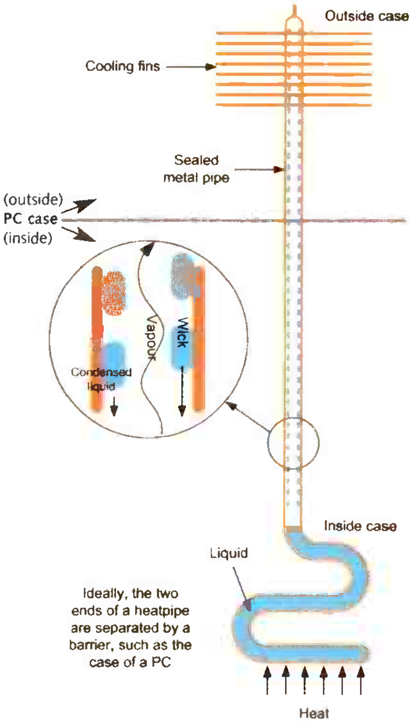
Zalman produces various 'flower' and 'fan' cooler designs

Cooling technologies explained

Cooling systems in PCs rely on two mechanisms – conduction and convection. Efficient conduction requires materials that have low resistance to the transfer of energy from one atom to the next, or low thermal resistance (which can also be referred to as high thermal conductivity). Gold (Au), silver (Ag), copper (Cu) and aluminium (Al) all have high thermal conductivity (Au = 3.18, Ag = 4.29, Cu = 4.01 and Al = 2.37 W/cm-°C). Unfortunately, air has a very poor thermal conductivity (air = 0.000262), so a good CPU cooler design needs a heatsink with a big surface area to allow heat transfer from the metal to the air, and then a good airflow to ensure that the heated air is moved quickly away from the heatsink surface. Heatsinks are one instance where a turbulent air flow turns out to be a good thing and actually improves the heat transfer.

Water conducts heat more efficiently than air and several CPU coolers are available that use a closed loop of water, with a convection cooling tower mounted outside the PC. Although these systems are silent and do a good job of cooling, they are also mechanically complex, relatively difficult to install and cumbersome.

Most cooling systems are limited by the ambient temperature of the surrounding air. There have been attempts to market cooling systems using similar principles to the domestic refrigerator, but these have turned out to be too expensive and complex. There are also companies making systems using Peltier elements to cool the air intake. In these systems the case air inlet is divided into two by one or more Peltier elements. These are heat pumps that absorb heat energy on one side and emit it on the other, under the influence of an electric current. The hot side of the element is isolated in its own fan-cooled air path outside the PC case and the cooling side is used to cool the air passing into the case. Syrtin Corp (**www.syrtin.com**) makes the Nextherm ICS 8200 case with a built-in Peltier cooler, temperature control and status panel.



Heat pipes are found in many of the best CPU coolers

Heat pipes

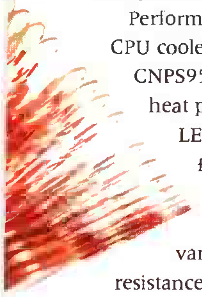
The simplest form of heat pipe consists of a vertical sealed metal tube, with the bottom of the tube in good thermal contact with the heat source and the top end of the tube thermally connected to cooling fins.

A small amount of liquid (often water or alcohol) in the tube is heated by the heat source and evaporates, cooling the hot end of the pipe. The heated vapour rises up the tube to the top, where it is air-cooled by the fins, re-condenses and drips down to the bottom of the tube to start the cycle over again.

The problem with this simple design is that it relies on gravity-driven convection to work and must be vertically oriented. Commercial heat pipes use the capillary action of a metal mesh or sintered metal powder 'wick', to return the condensed fluid. Although these capillary designs are less dependent on gravity for their operation, it nonetheless has a significant influence on their efficiency.

Heat pipes are usually made from copper, but are much more efficient than solid copper of the same cross-sectional area. The best of the current CPU coolers use two or three heat pipes rooted in a copper block, which is clamped to the CPU. The pipes are bent into a circle and thermally connected to a very large number of thin copper plates, or fins, which are force convection-cooled by a fan.

Heat pipes operate efficiently only within certain temperature bands, depending on their design, and they require a sufficient temperature differential between the 'hot' and 'cool' ends (see diagram above).



extruded aluminium, a fan bolted onto the heatsink and a mounting kit. Even though CPU production is limited mostly to two companies, the variety of CPU and socket types is such that you have to be careful to choose a cooler and mounting kit that are compatible with the CPU and socket.

Performance, appearance and prices of CPU coolers vary, from £36.99 for a Zalman CNPS9500-LED Aero Flower with three heat pipes, multiple thin copper fins, blue LED illumination and fan, to less than £5 for an unbranded cooler with a simple, finned aluminium heatsink and fan. Performance varies a lot too, with thermal resistances ranging from 0.12°C per watt to 0.6°C per watt. Frequently, thermal resistance figures aren't given. Instead, it's stated that a cooler is suitable for use with particular CPUs, leaving the customer with no idea what operating temperature can be expected.

CPU fans can cost anywhere from £5 to £37

Comparing coolers

Many CPU coolers are designed to appeal to those who build PCs for looks rather than function. While there's nothing wrong with this approach, an expensive, flashy-looking CPU cooler will not necessarily be good at keeping a CPU cool.

The information you need to compare coolers is the thermal resistance, which is usually given in °C per watt (smaller values are better). The best coolers are relatively complex and include heat pipes in their design. Achieving the best possible contact between the CPU case and the bottom of the heatsink is absolutely critical – ideally the heatsink base should be polished mirror-smooth.

A heatsink that doesn't feel hot to the touch can be a bad sign because it could mean it isn't conducting the heat away from the component it's supposed to cool. This will probably be because it isn't in proper contact – perhaps because of dirt between the CPU and the cooler surfaces, or because of too thick a layer of thermal compound.

↘

Testing your cooling system

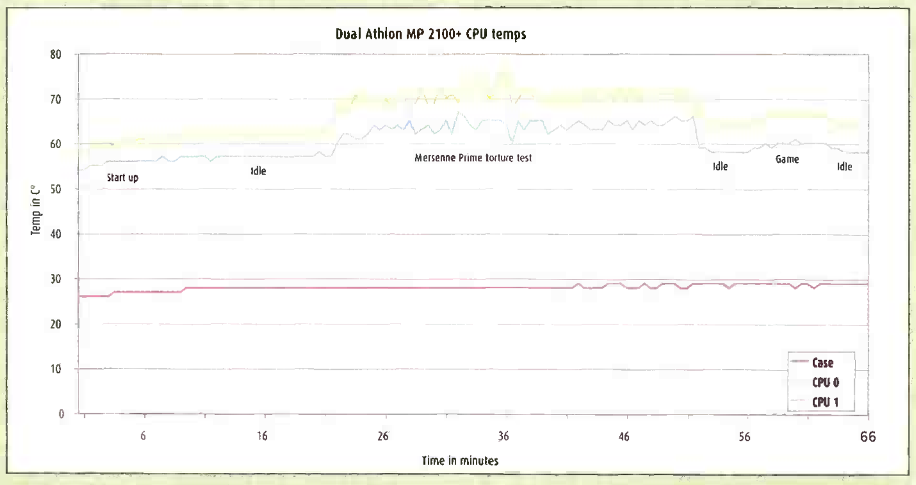
To test your cooling system, first take the PC's case side off, then check that all the fans are spinning and that they appear to be blowing air in the right direction. Load a temperature and fan utility, so you have a display of CPU temperatures and fan spin rates. Many motherboard manufacturers now supply these utilities for their motherboards. Hopefully, this will have a logging feature so you can record the data for later analysis in a spreadsheet. Third-party temperature utilities may give more information, or be more flexible in their configuration. Motherboard Monitor (MBM5) by Alex van Kaam from **http://mbm.livewiredev.com** and Speedfan by Alfredo Milani Comparetti from **www.almico.com** are good examples. Such utilities may also be able to control your fans – depending on your motherboard – and report the condition of Smart-capable hard disks, for which information including temperature will be available.

Motherboards often include on-board temperature sensors or connectors for external thermocouples. For AMD processors, there is often a sensor underneath the CPU socket, and older Intel processors include a temperature-sensing diode. Intel's most recent chips include multiple digital temperature sensors. It's the signals from these sensors that the Bios and monitoring software read. These sensors may be inaccurate, so it's wise to allow for a margin of 5° or even 10° when looking for potentially dangerous temperatures.

Once you have checked that all the fans are running correctly and that CPU temperatures aren't too high, replace the side of the case and add the temperature utility, with logging turned on, to your Startup folder. Turn the PC off and let it cool for half an hour. Turn it back on and leave it running in idle for 20 minutes, then run a processor-intensive task for 20 minutes. Stop the task and leave the PC running for 20 minutes. Stop the temperature logger and examine the file by graphing the results using a spreadsheet (see diagram).

As a rough guide, the maximum operating temperature for most CPUs is between 90-100°C. Normal running temperatures should be no more than between 60-70° C and with a top-notch cooling system you should see a temperature of around 45°C.

If you have problems, it's worth checking the airflow. Air is a little difficult to see, so the old-fashioned smoke-stick test is quite a useful way of checking what your airflow is doing. A stick of cheap, smoky incense works well. Used on a test PC, we found that virtually no air was entering through the rather restricted front lower grille and that one of the case fans was generating a lot of turbulence in conjunction with the power supply fan.



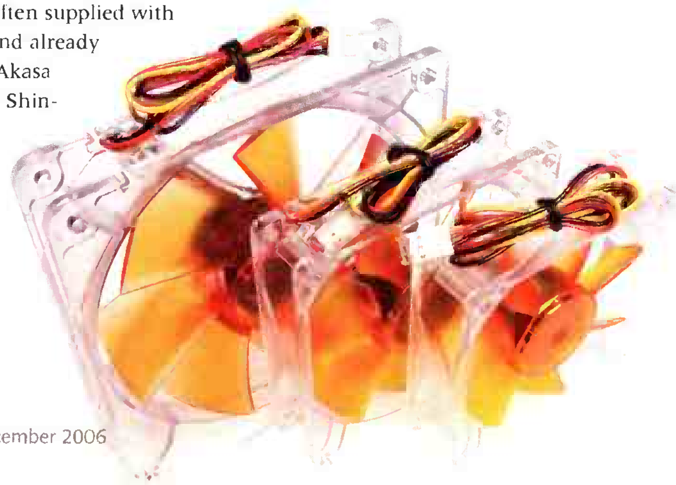
These temperature plots were obtained running the MBM5 log from startup on a dual-Athlon system under CPU different loads

Thermal compounds

The CPU cooler can operate efficiently only if it is in good thermal contact with the CPU. Because the CPU package and the cooler don't have perfectly flat mating surfaces, a small amount of a suitable thermal compound is used to improve conductivity. The trick is to apply enough compound to fill any gaps, but not so much that it forms a thick layer between the CPU and the cooler, which can actually reduce thermal efficiency. Less is definitely more, and a paint-thin layer is all that's required.

Modern heatsinks are often supplied with a layer of thermal compound already applied. For example, the Akasa coolers are supplied with a Shin-Etsu coating. This usually looks like a square of grey tape, but is a metal powder suspended in a base that's designed to be almost solid at room temperature and to partially liquefy at normal CPU temperatures. Although convenient, the problem with this compound is that it tends to form far too thick a layer between the CPU and the heatsink. If you have a cooler with this sort of compound already applied, it can be removed by wiping with a rag or tissue dampened with cleaning fluid.

It's generally agreed that the most efficient thermal compounds available today are loaded with particles of metallic silver. Artic Silver (**www.articsilver.com**) is perhaps the best of these. Many compounds need several hundred hours of burning-in to achieve maximum performance.



Fans

After the heatsink comes the fan. PC fans all have low-voltage DC motors that are usually driven from the +12 volt rail of the PSU, taking a share of the available power and generating some heat of their own. They are available in a range of standard sizes, measuring 60, 80, 90 and 120mm to the outside edges of the fan frame.

In general, the bigger the fan, the more air it will move and the quieter it will be. Small fans are often run at high speed to achieve a good airflow in a small space, while bigger fans can run slower and still move a good volume of air.

Fan airflow direction should be taken into account in your overall cooling design; unfortunately, it isn't marked on the majority of PC fans. However, airflow is always away from the concave side of the

In general, the larger the fan, the more air it will move and the quieter it will be

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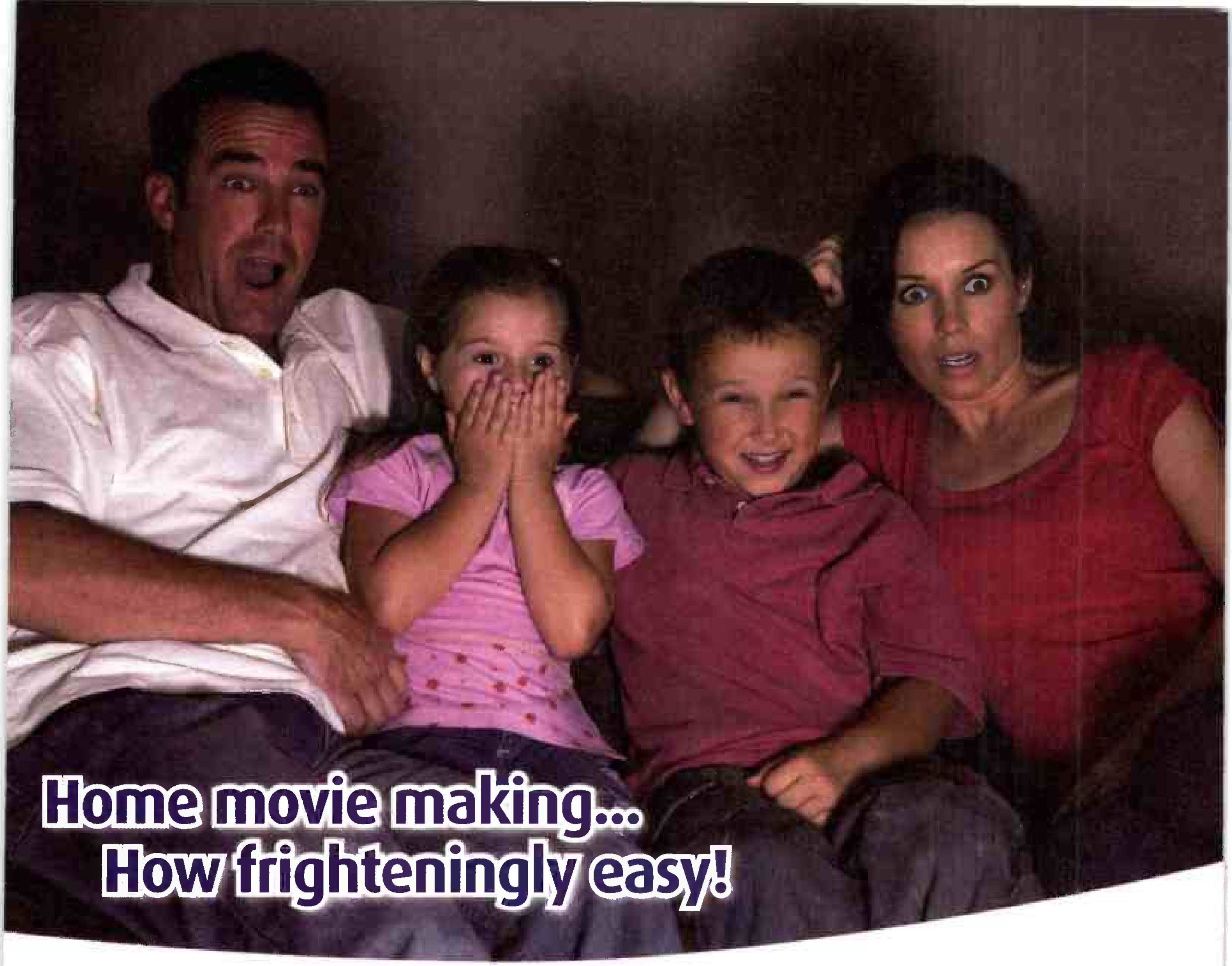
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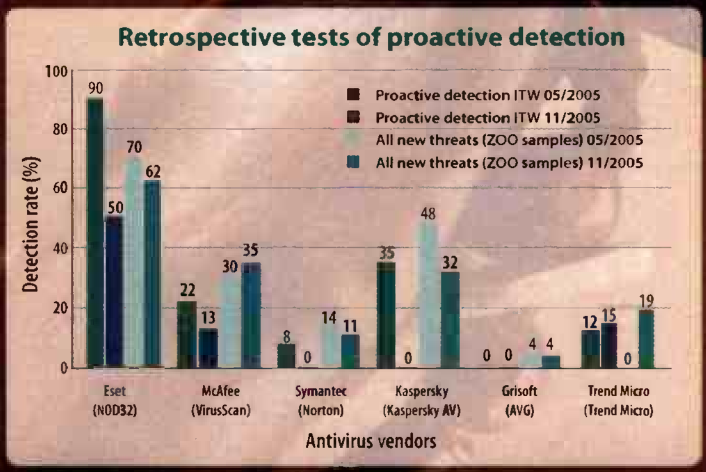
Retrospective tests of proactive detection
Detection rate (%)
100
80
60
40
20
0
■ Proactive detection ITW 05/2005
■ Proactive detection ITW 11/2005
■ All new threats (ZOO samples) 05/2005
■ All new threats (ZOO samples) 11/2005
90
50
70
62
22
13
30
35
8
0
14
11
35
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48
32
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4
4
12
15
0
19
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blades. PC fans have three connecting wires: a red wire for +12V, a black wire for 0V, and a yellow wire for the speed sensor.

Fans, like CPU coolers, are another vital cooling component for which manufacturers often manage not to publish the most significant performance figures. You'll frequently see fan specifications listing noise levels and rotation rates with no mention of airflow rates. If airflow rates are given, they are often in cubic feet per minute rather than in cubic metres per minute because this results in numbers that are 35 times higher.

Often overlooked, fan grilles can have a big effect on airflow and fan noise. Case manufacturers often add extra grilles and mountings to their cases for the addition of extra fans. These are usually a collection of perforations punched into the sheet metal of the case. The ratio of holes to metal necessary to maintain strength means that these grilles have quite a high resistance to the flow of air, often cutting airflow by more than 50 per cent. This also causes turbulence, which leads to increased fan noise.

This is more of a problem at the front of the case, where incoming air has to pass not only through the grille in the metal but also the often tiny slots in the plastic front panel.

On the positive side, these aerodynamically inefficient grilles minimise electromagnetic radiation leaks, but home PC builders fitting additional fans may find it worthwhile to cut away the grille and fit a wire fan guard instead.

Fan controllers

Fan noise is always an issue and, providing temperatures aren't high already, noise can be reduced by fitting a fan controller that runs at a slower speed. Some fans have built-in controllers that can be adjusted via a small preset on the fan, or an external knob mounted on an I/O card bracket. These are inconvenient to adjust. A better solution is to fit a multi-fan controller that sits in a 3.5in or 5.25in drive bay. Most 12V fans will still spin with a 3V supply, but fan controllers usually work by dumping the energy that isn't driving the fan inside the case as extra heat. A better, simpler approach is to use only the minimum number of fans actually required to cool your system.

Choosing the right components

Before choosing cooling for specific components, it helps to know their thermal characteristics. Unfortunately, that information can be surprisingly hard to dig out.

For example, an Intel Pentium 4 2.8GHz processor dissipates between 68.4 and 89W, with a maximum operating temperature of 69°C; the Core Duo range T series dissipates a maximum of 31;, and AMD's Athlon 64 2800 and 3400 dissipate a maximum of 89W.

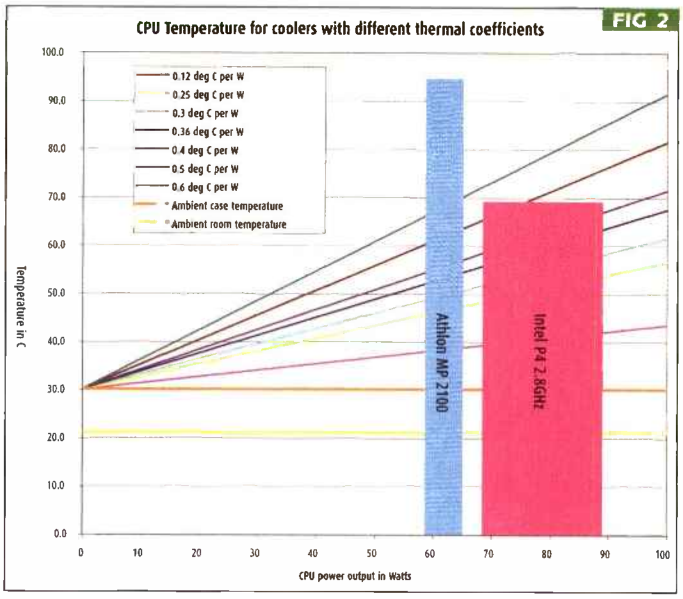


FIG 2

In this graph, operating temperature is plotted against input power for a range of CPU coolers with different thermal resistances. The 'safe' operating areas for two processors are overlaid

Some processors, such as the AMD Athlon 64 FX-57, exceed 130W, while power consumption for current graphics cards is generally between 20W and 30W.

The new Intel Core 2 Duo desktop chips dissipate about 65W at a maximum temperature of 60.1°C, indicating that CPU power – at least for the highest performance chips – may be on the increase again.

The Seagate range of Barracuda 7200.10 hard disks (500GB or 750GB) is rated at a maximum operating temperature of 60°C and dissipates a maximum of 12.6W, while the Samsung Spinpoint P is rated at 60°C with a maximum dissipation of 9.5W.

Doing the sums

Once you know the amount of heat dissipated by a component and its safe operating temperature, you can start to work out which cooling solution is most appropriate, provided you know the basic information. Thermal resistance figures are essential to be able to compare coolers and calculate CPU working temperatures, while flow rate figures can be used to compare fans. The temperature above ambient of a CPU fitted with a particular cooler can be calculated as follows:

Temperature difference between CPU and ambient = power dissipated x thermal resistance between the CPU and ambient (see figure 2).

The total thermal resistance is the resistance of the cooler plus the contact resistance between the cooler and the CPU. The contact resistance varies depending on how good the thermal compound is and how close the heatsink and the CPU are in contact.

Once you've settled on components, it's important to test your cooling system effectively. The box on the previous page gives some tips on how to do this. It may take a while to find all the information you need to ensure everything's cooled adequately, but the reward should be a much more stable PC. **PCW**

Cooling component suppliers

Ajigo – fans and CPU coolers – **www.ajigo.com**
Akasa – fans and CPU coolers – **www.akasa.co.uk**
Asian Vital Component – fans and CPU coolers – **www.avc.com.tw**
Artic Silver – thermally conductive 'grease' and adhesives – **www.articsilver.com**
Coolermaster – cases, PSU, fans and CPU coolers – **www.coolermaster-europe.com**
Dynatron – heat pipes, fans and CPU coolers – **www.dynatron-corp.com**
Evercool – fans and CPU coolers – **www.evercool.com.tw**
Gigabyte – motherboards, graphics cards, fans and CPU coolers – **www.gigabyte.co.tw**
Maplin – off-the-shelf fans, coolers, etc – **www.maplin.co.uk**
Quiet PC – online store for PSU, fans, coolers, etc – **www.quietpc.co.uk**
Scythe – fans and CPU coolers, fanless cases – **www.scythe-eu.com**
SilverStone Technology – cases, PSU, fans and CPU coolers – **www.silverstonetek.com**
Spire – cases, PSU, fans and CPU coolers – **www.spirecoolers.com**
Sytrin Corp – PSU, coolers, refrigerated cooling – **www.sytrin.com**
Taisol – CPU coolers and custom heat pipes – **www.taisol.com**
Thermaltake – cases, PSU, fans and CPU coolers – **www.thermaltake.com**
Vantec – PSU, CPU coolers, accessories – **www.vantec.com.tw**
Zalman – fans and CPU coolers – **www.zalman.com**

Vista's encrypted disks

Microsoft's Vista operating system promises perfect protection for your data with Bitlocker, its drive encryption system. However, the technology has its risks, as Heiko Mergard explains

Until now, it has been all too easy to hack into Windows-based systems. Anyone who starts the PC using boot media such as a Linux live CD can just prise protective mechanisms such as the NTFS-based EFS (Encrypting File System) out of the way, as EFS doesn't encrypt all the data saved on the hard disk. Numerous pre-boot and system files, as well as temporary data, remain accessible this way. In many cases, valuable data on lost or stolen notebooks has not even been protected using EFS. A Windows password isn't enough to prevent data theft using, for example, a live Linux or XP CD such as those in the feature on page 51.

Total encryption

This is where Vista's Bitlocker, also known as Full Volume Encryption (FVE), comes in. This new feature encrypts the operating system drive (Volume) completely on a sector basis rather than by files, so it protects all data, including that in the Paging File, Hibernation File and all system files. If applications from third-party manufacturers are installed on the encrypted disk, then Bitlocker protects their data, too.

However, if you activate the Bitlocker Drive Encryption then you must bear in mind that it does not protect the entire hard disk. Bitlocker only encrypts the partition on which Windows Vista is installed. If data-only partitions exist, they will remain unprotected. Microsoft makes the assumption that if you have such partitions you will secure them using EFS, which is protected by Bitlocker indirectly, as the encryption keys are located on the OS partition.

Windows Vista Enterprise and Ultimate editions install Bitlocker automatically, but do require that the hard disk is partitioned. It also has to be activated manually. Other versions of Vista do not support Bitlocker at all. If you want to use the drive encryption under Longhorn Server, you have to first add the Bitlocker files from the DVD, check the Bios and TPM for compatibility, and add the Trusted Platform Module (TPM) drivers.

In order to use all of Bitlocker's security functions, your PC must have the following components available: TPM 1.2 chip; Trusted Computing Group (TCG) 1.2-compliant Bios; a Bios which supports USB in the pre-boot phase; a Windows boot partition; an unencrypted system partition larger than 50MB for hardware-specific data which the Bios requires after the system has booted to load Windows; and a USB stick to store the Recovery Key on.

Depending on your PC's configuration and your security requirements, Bitlocker provides five start options:

1 PC without a TPM chip: Even if you don't have a TPM chip in your PC, you can still use Bitlocker. To do this, the Startup Key required to decrypt the data is stored on a USB stick. The stick must be attached to the PC in order for Bitlocker to allow it to boot.

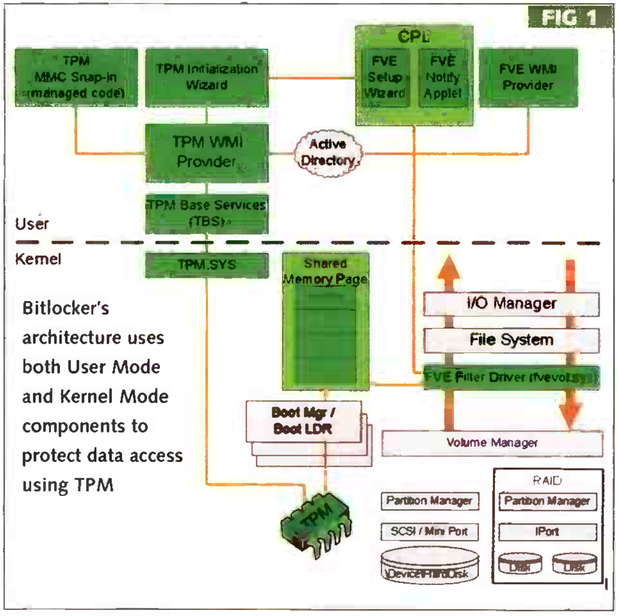
2 PC with a TPM chip: Data decryption is bound to a checksum for recognised system components, which is stored in the TPM chip. As in the first option, the PC can only be accessed once the data has been decrypted.

3 TPM and Pin: As an additional authentication measure, every time you start the system, you have to enter a Pin between four and 20 digits in length.

4 TPM and Startup Key: Instead of entering a Pin you connect a USB stick from which the required Startup Key is read. Without it, Bitlocker won't boot the system.

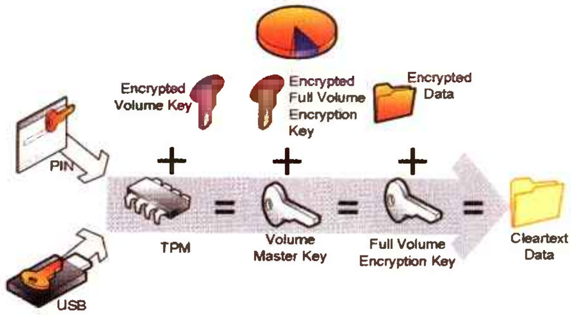
5 Recovery Key: In order to access the data after a checksum error has occurred – for example, after an attack by a hacker or if the hard disk has been installed in another PC – Bitlocker will also decrypt using the Recovery Key. You can type it in as a Recovery Pin using the function keys, or it can be read from a network drive or USB stick.

FIG 1



Bitlocker's architecture uses both User Mode and Kernel Mode components to protect data access using TPM

FIG 2



You can protect Bitlocker even more securely by using a Pin or USB token

After selecting the security options that you want when activating Bitlocker, a reboot is required before the Vista partition is encrypted. During this process Bitlocker also detects the fingerprint of previous boot components. These checksum hash values are meant to ensure that the system has not been tampered with.

Bitlocker will only commence the decryption routine and allow the boot process to start if the fingerprint stored by default in the TPM is unaltered. This is meant to protect PCs better from boot sector viruses and rootkit attacks. So, if an attacker alters the boot sector, or if you mount the encrypted hard disk in another PC or swap the motherboard, the hash value will change and Bitlocker will block access to data.

Bitlocker will only instruct the TPM to decrypt the remaining data if the integrity of the monitored boot components has been verified. After that, the responsibility for system protection is handed to the OS. The following items are included in the integrity check: the Bios, Master Boot Record, Boot Manager, NTFS Boot Sector, NTFS Boot Block and the Core Root of Trust of Measurement (CRTM).

Multiple keys

Bitlocker's encryption is sector-based, and multiple levels of protection, each with their own keys, prevent unauthorised access to the data on the drive.

The basis of the protection is provided by the Full Volume Encryption Key (FVEK), which encrypts the data on the hard disk. Bitlocker currently supports between 128-bit and 512-bit encryption. The default encryption uses a 128-bit AES algorithm.

The FVEK is encrypted by the Volume Master Key (VMK). The order in which the data is encrypted is shown in figure 2.

To access encrypted data if Bitlocker has been deactivated, there is also what is known as a 'Clear Key'. This is stored (unencrypted) on the hard disk and uses the VMK and FVEK to allow continued access to encrypted data after deactivation of Bitlocker. If the system is activated again, there's no longer any access to a Clear Key.

In addition to the keys that are tied to the TPM, you can store a Startup Key on a USB stick. This has to be plugged in while booting and provides a second level of authentication in addition to the TPM.

Rescue strategy included

Encryption is always a risky thing. If you misplace the key for decrypting the data, it's completely lost. There are other circumstances where your data would be permanently lost, were it not for the Bitlocker Recovery Console, such as a defective TPM, a damaged or destroyed Startup Key, a forgotten Pin, updated boot components, a new motherboard, or even if you want to use the encrypted drive in a different PC.

Using the Recovery Console and the appropriate Recovery Key, you can always get at your data. When you activate Bitlocker it's essential that you generate a recovery password. This 48-character code consists of eight blocks of six characters each. You can view it, print it and store it as a text file; for example, on a USB stick.

Parallel to your password, Bitlocker stores the Recovery Key – the equivalent of the Startup Key. For its part, the Recovery Key decrypts a copy of the encrypted VMK-BLOB (Binary Large Object), which makes access to the data possible. If you move a Bitlocker-protected drive to another PC, then all you have to do to make the encrypted partition accessible is to plug in the USB stick with the Recovery Key on it.

Remember the restoration codes allow access to all encrypted data independently of the TPM. To be prepared for all eventualities, you can also copy your Recovery Key to a further USB stick and store it in a different location. Administrators can, however, use a Group Policy to prevent the creation of Recovery Keys.

As we've already mentioned, drive encryption is also supported on Longhorn Server, which is also able to encrypt data partitions, unlike the client variant. These are then protected by different keys to the system partition, but mounted normally by Longhorn. The keys for the data volumes are stored on the system volume. An External Wrapping Key (EWK) using 256-bit AES encryption protects the data VMKs, and a feature called Auto Unlock takes care of automatically decrypting the data drives.

This function independently copies the EWK into the operating system partition Registry. Because of this the data volumes can only be used if the OS volume starts smoothly. The copied EWK deletes the system again if Bitlocker is deactivated on the system drive. In this case, the Administrator will have to enter the Restoration Key by hand so that the data can be accessed. Correspondingly, a copy of the EWK has to be kept on a USB stick for a data partition recovery scenario. **PCW**

Free alternatives

Free Compusec 4.21 SP2

A complete security suite from CE-Infosys (**www.ce-infosys.com**), Free Compusec lets you encrypt whole hard disks, including the OS and hibernation mode files. It supports Windows 2000/XP, as well as Red Hat and Suse Linux. You can also encrypt CDs, DVDs, diskettes, USB sticks and network folders. VoIP encryption is now included in the form of Closedtalk. There's a built-in password manager, which encrypts your passwords using a secure 128-bit AES algorithm. You can even specify a user/password to enable pre-boot authentication.

abylonsoft
Version 5.6
abylon CRYPTDRIVE
NEU

Abylon Cryptdrive 6.0

Cryptdrive (**www.abylonsoft.de**) will let you set up 448-bit or 256-bit encrypted drives that are protected against unauthorised access. It will automatically encrypt data that is copied to an encrypted drive. Each client can have up to 10 128GB containers. It supports Windows NT4/2000/XP and Server 2003.

GNU Privacy Guard 1.4.4

This is an open-source tool for encrypting data sent to one or more recipients. Signatures are integrated to verify the integrity of the data, and keys are verified using a mutually trusted network. GnuPG (**www.gnupg.org**) makes use of an asymmetric encryption process which consists of a private, password-protected key and a public key.

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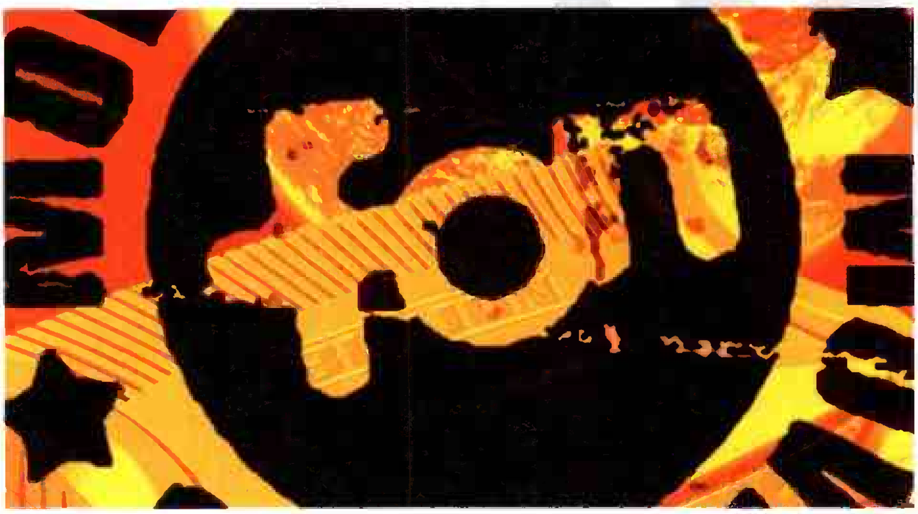
Net benefits

Wifi hotspots are great in theory, but public access points can be awkward and expensive to use. So why not create one at home? Nigel Whitfield explores the options



Wifi is undoubtedly a useful technology, but for people who stray beyond the home or office, the cost of using an access point can be prohibitive.

While business users can soak up the extra cost, home users are less willing to pay over the odds. It's no surprise, then, that many people have no qualms about using unsecured networks, hitching a free ride on someone else's broadband.

But there are alternatives to expensive commercial broadband services or unauthorised piggybacking on unsecured networks. One of the fastest growing is Fon.com (see screen 1), with more than 85,000 users worldwide – 3,000 of whom are in the UK.

The idea is fairly simple: Fon.com users – or Foneros – set up their broadband so it can be accessed wirelessly by other Foneros. In return, they're able to connect to any Fonero's shared access point around the world, free of charge. Anyone else can connect to a Fon access point for a charge of €3 (about £2) for a 24-hour period – less than the rates charged for casual use by the main hotspot operators.

The income from these other users (Fon calls them Aliens) is used to subsidise the cost of the Fon Wifi routers that power the service. You can have a share of the income from people who use your hotspot, but then you also have to pay to use Fon hotspots around the world. In Fon's rather bizarre lingo, those who share for free are called Linus, while those who expect cash are Bills.

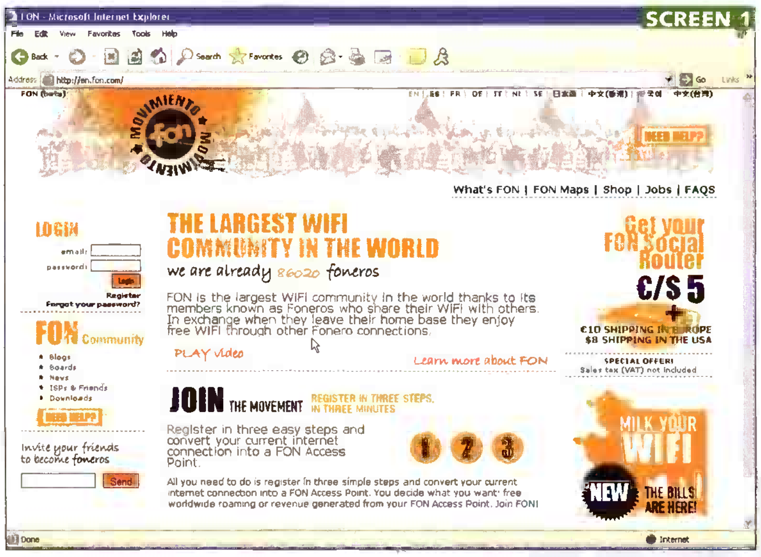
Fon is keen on making its service as simple to use as possible by taking the hassle out of setting up a hotspot and dealing with random unknown users. Fon provides customised firmware for some Linksys and Buffalo wireless routers, which ensures all the access points work alike, allowing registered users to connect, and other users to purchase payments and register. And if you don't have a router already, you can buy one preconfigured for only €5 (about £3), plus postage and Vat. However, if you don't register it with Fon within a certain time period, you'll be charged an additional €45 (about £30) to prevent people simply joining up for the cheap hardware.

The technical side

On the technical side, it is fairly straightforward. It's based on open-source software – Chillispot (**www.chillispot.org**) – which is the hotspot software, and custom firmware images for the routers. It's about as close to plug and play as you can get.

Chillispot serves up the login page users first see when they try to browse via your hotspot with the sort of sign-in form familiar to anyone who has used public access Wifi. It then relies on a Radius server for the authentication. Fon operates a central server, which your access point queries when someone connects, verifies that they're entitled to access, and then informs the Chillispot software (see screen 2).

The Fon software package allows you to specify a couple of URLs that people can browse for free. So, for example, you could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Fon.com seems, on the face of it, a great way to get free Wifi access

allow them access to your own website, or a page of local information, and it's supposed to allow for some basic customisation as well.

Of course, not everything is perfect. While there are plenty of Foneros around – Spain, for instance, has more than 10,000 and France more than 6,000 – the forums on Fon's website suggest that the number of active hotspots is actually much smaller. Some users may have simply bought the router because of its price, while others may have failed to set it up.

And with hotspots typically set up by home users, don't expect to be able to sit outside a major tourist attraction and connect to the web for free. Locations tend to be outside the city centres, and the maps on the Fon.com website aren't always accurate, making it somewhat hit and miss.

So, while the talk from Fon's team is of widely available low-cost wireless access, it appears the reality is rather different. Sharing your broadband connection may entitle you to free access from a Fon hotspot, but finding one when you travel could be tricky.

Potential legal implications

Making money out of your broadband connection may seem attractive, especially if you're lucky enough to live somewhere where there are lots of potential visitors. But is it legal? And what happens if someone downloads material they shouldn't do or uses the connection for illegal purposes?

Charging others for access to your broadband is a legal grey area, but regardless of this your ISP's terms and conditions may prohibit you from doing it. And even if you want to offer free access, you need to make sure your broadband connection can be shared. Some ISPs will be happy as long as you stay within your terms of use. Don't forget that if you have a download limit, other people will be contributing towards it. Other ISPs may ban this type of sharing, unless you take out a more expensive business account.

More importantly, where do you stand when someone uses your connection to do something illegal? The Fon.com system doesn't allow anonymous access, so their servers will, in theory, have a record of the user who was logged in to your access point. In practice, however, obtaining that information and proving it was that particular user hacking a bank or downloading illegal porn may not be so straightforward. Clearing your name could depend not only on Fon's willingness to provide another user's details, but also on the willingness of those investigating to consider any evidence that's produced.

Finally, if you're selling internet access, or profiting from it, you'll be liable for income tax – don't nurture the false hope that no-one will ever find out to whom the likes of Fon.com are making payouts.

Security conscious

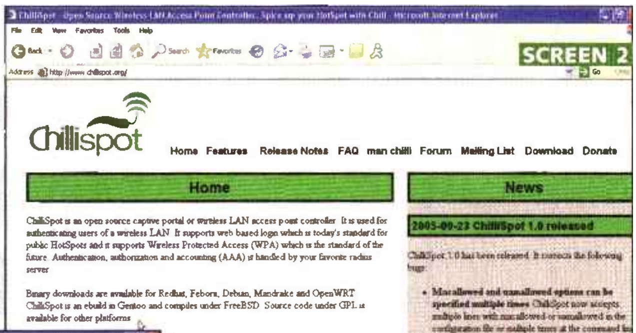
There are other concerns, too. While Fon makes much of the fact that there's no anonymous access – all users have to be authenticated against their servers – some users are concerned about the possible security implications of allowing other people to share their connections. It's certainly true that if you don't configure an access point in the right way, other people could potentially access systems on your network, and this is especially true if you are connecting via the access point yourself, opening up the possibility of sniffing data, such as your email passwords. Since there's no wireless encryption used, such sniffing is quite easy.

Technical worries are not the only concerns users have. Some are wary of the amount of control Fon has over the system, including the potential of updating the router firmware remotely, or restricting the abilities of sites to customise the login page that visitors see.

Fon.com isn't short of cash, with backing from companies including Skype and Google. In addition, some view it as a network being built by users providing bandwidth and electricity in return for a subsidised router and free access to other hotspots while Fon takes most of the income. Depending on your view, Fon is either an altruistic effort to extend Wifi access in Europe and America, or a means of building a business on the back of volunteers.

While Fon.com may be the most well-known of wireless community operations, it's not alone, but thanks to the subsidised routers, it's certainly the cheapest to join. In theory, though, there's nothing to stop you setting up your own public access system, using Chillispot and a local Radius server.

Right: The Chillispot software allows you to run an access point of your own


SCREEN 2
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www.chillispot.org/
Go
Chillispot
Home Features Release Notes FAQ man chilli Forum Mailing List Download Donate
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News
Access
Radius
Internet

ChilliSpot is an open source captive portal or wireless LAN access point controller. It is used for authenticating users of a wireless LAN. It supports web based login which is today's standard for public HotSpots and it supports Wireless Protected Access (WPA) which is the standard of the future. Authentication, authorization and accounting (AAA) is handled by your favorite radius server.

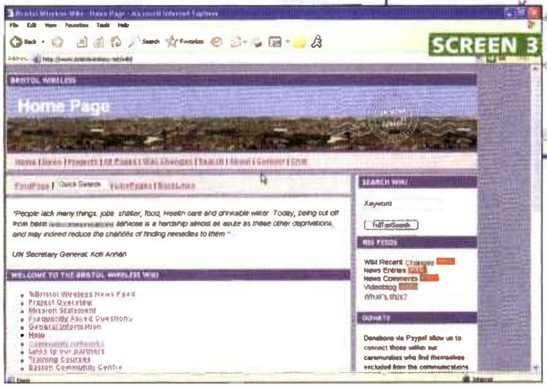
Binary downloads are available for Redhat, Fedora, Debian, Mandrake and OpenWRT. ChilliSpot is an ebuild in Gentoo and compiles under FreeBSD. Source code under GPL is available for other platforms.

2005-09-23 ChilliSpot 1.0 released

ChilliSpot 1.0 has been released. It corrects the following bugs:

- **Macallowed and uamallowed options can be specified multiple times**
- **Improved IP allocation after restart for MAC authenticated users**

Below: True community projects, such as Bristol Wireless, provide free access to those who might not be able to get online



"People lack many things: jobs, shelter, food, health care and drinkable water. Today, being cut off from basic telecommunications services is a hardship almost as acute as these other deprivations, and may indeed reduce the chances of finding remedies to them."

UN Secretary General, Kofi Annan

WELCOME TO THE BRISTOL WIRELESS WIKI

- Bristol Wireless News Feed
- Project Overview
- Mission Statement
- Frequently Asked Questions
- General Information
- Help
- Community networks
- Links to our partners
- Training Courses
- Easton Community Centre

Donations via Paypal allow us to connect those within our communities who find themselves excluded from the communications

But Chillispot and Fon aren't the only solutions for Wifi access. Locustworld is home to the popular MeshAP software, which can link broadband connections and multiple wireless routers together, providing seamless coverage over a larger area, while information hops from one node to another.

The Locust system uses dedicated custom units, extending the range beyond that which is possible with a standard access point, and making it a useful system for those wanting to provide blanket coverage in a particular area. It has also found favour with a number of rural community Wifi projects, and the latest versions now support Sip (Session Initiation Protocol), so VoIP (Voice over IP) phone calls can be routed around easily.

Other solutions for sharing Wifi include: Wi-Here (**www.wi-here.com**) for companies that want to provide free access to customers, and the Wifi Freespot site (**www.wififreespot.com**), which lists free hotspots around the world.

If the altruistic side is what appeals to you, there are other projects around the country aiming to provide community wireless access. A partial list is available at **www.freenetworks.org**, including projects such as Bristol Wireless (**www.bristolwireless.net**) (see screen 3) or the Lancaster Mesh (**www.lancastermesh.co.uk**). They may not offer the €5 router, but are arguably more effective at targeting internet access at those who really need it. **PCW**

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CISCO SYSTEMS

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EDITED BY
WILL STAPLEY

REVIEWS

Apple is clearly already gearing up for the Christmas shopping season and has released a whole new range of iMacs, Mac Minis and iPods. You'll find full reviews of the new 24in iMac, Mac Mini and iPod Shuffle over the next few pages, while reviews of the new iPod and 17in iMac can be read online at **www.pcw.co.uk**.

We've also got Canon's impressive EOS 400D digital SLR on test. As successor to the hugely popular EOS 350D, it's one of the most impressive budget DSLRs on the market and comes with a 10.1 megapixel sensor and an anti-dust system. If bulky cameras aren't your thing, be sure to check out our reviews of Samsung's ultra-compact NV10 and Fujifilm's similarly small Finepix Z3.

Finally, be sure to check out our group test of notebooks for under £700. As you'll find out, even at this low price it's possible to pick up some decent dual-core models.

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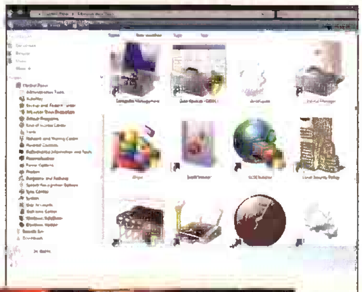


Prices include VAT, unless otherwise stated

OUR SCORING

Excellent ★★★★★ **Very good** ★★★★☆ **Good** ★★★☆☆ **Below average** ★★☆☆☆ **Poor** ★☆☆☆☆

OUR AWARDS

Editor's Choice: The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.
Recommended: A product that combines great features, usability and value for money.
Great Value: Not the best in class, but a product that has superior features and performance for the price.

Editor's Choice

Recommended

Great Value

'When you're shopping for budget laptops, key factors to consider are the amount of Ram, battery life and screen quality.'

Read the review on page 103

iMAC

Apple iMac 24in

Top-of-the-range iMac dazzles with 24in screen

Personal Computer World RECOMMENDED

The fourth member of the revamped iMac range from Apple costs a fairly hefty £1,349, but it boasts the latest Core 2 Duo processor from Intel and a humungous 24in flat-screen display.

The image quality is superb – bright, colourful and finely detailed, thanks to its 1,900x1,200 resolution. It's complete overkill for most computing tasks, of course; you really don't need such a sumptuous display for word processing, surfing the web or mucking about with your home videos.

However, the iMac's 24in widescreen display is terrific for watching DVDs. The iMac also includes a remote control and Apple's Front Row (www.apple.com/imac/frontrow.html) software (the Mac equivalent of Windows Media Centre (www.microsoft.com/mce), so it's a good option if you want to use it as part of a home entertainment system.

The display will also appeal to professional users working in magazine design, photography or video editing, and we wouldn't be entirely surprised if one of these ended up on our art editor's desk somewhere down the line. A new, bigger desk won't be required either as the iMac's all-in-one design manages to stay relatively compact, measuring 42.6cm wide, 43cm high and just 5cm thick. And, at 7kg, it's not much heavier than some of the 17in laptops we've seen recently.

The iMac is certainly powerful enough for professional-level work, too. It's equipped with a 2.16GHz Core 2 Duo processor, 1GB Ram, 250GB hard disk and 128MB Geforce 7300 GT graphics card. That's a pretty good specification, given that the 24in display alone would cost between £700-£800 if you bought it separately.

A decent set of additional features is thrown in as well. The iMac has a built-in webcam and microphone, Ethernet and wireless networking, Bluetooth support, two Firewire ports and three USB2 ports.

The all-in-one design includes built-in stereo speakers with a 24W digital amplifier along with digital audio input and output. Finally, there's the bundled iLife 06 suite that Apple (www.apple.com/uk) includes with all Macs, which includes iMovie, iDVD, iPhoto, GarageBand music software, and the new iWeb for designing web pages.

The one feature that Apple might have added is a TV tuner. Apple has always had a bit of a blind spot when it comes to TV tuners – presumably because they want to sell you film and TV programs via the iTunes Store instead (which is both cynical and annoying, as the iTunes video content is only available in the US).

The £1,349 price tag obviously puts this at the upper end of the home computer price bracket, but it compares quite favourably with the Core 2 Duo PCs that we reviewed recently. Although some of the PCs have overclocked the Core 2 Duo, pushing the processor speeds to almost 3GHz, it's the iMac's 24in screen that is its real selling point and we've rarely seen a machine in this price range with such a large display.

Apple is never going to compete with low-cost PC manufacturers on price, but there are encouraging signs that it is making more of an attempt to take on quality brand-names such as Sony and Toshiba.

If you want something a little more affordable, then there's a 20in model with a similar specification for £999, or the low-end 17in model.

In short, the 24in iMac is certainly one of the most attractive home computers currently available.

Cliff Joseph

Details

Price £1,349
Best price www.pcw.co.uk/bestprices
Contact Apple www.apple.com/uk
Specifications 2.16GHz Core 2 Duo processor • 1GB Ram • 250GB hard disk • Geforce 7300 GT (128MB) • 24in widescreen display • Dual-layer DVD writer • Built-in webcam, microphone and stereo speakers • Two Firewire • 3 USB2 • Ethernet and 802.11g wireless • iLife software bundle • 42.6x5x43 (wxdxh) • 7kg

Verdict

Pros Impressive combination of power and multimedia features
Cons Expensive; no TV tuner; limited upgrade potential

Features	★★★★★
Performance	★★★★☆
Value for money	★★★★☆

Overall An impressively designed system that is equally suitable for home entertainment and professional use
★★★★☆

GAMING PC

Mesh Elite Fire X1950 PCW

ATI's new dual-GPU graphics card is put to good use in this gaming PC

PERSONAL COMPUTER WORLD

The Elite Fire X1950 PCW houses the first new ATI graphics card, the Radeon X1950 XTX, to arrive since it was bought by AMD in July. Just like the Nvidia Geforce 7950, the Radeon X1950 XTX houses two GPUs, which allow for Crossfire graphics without the need for two cards. AMD won't be over the moon that Mesh has gone for an Intel-based system to sit the card in, but with the performance of the new Core 2 Duo processors we can't blame Mesh.

Although it can't match the Core 2 Extreme X6800, which runs at 2.93GHz, the 2.66GHz E6700 that powers this Mesh is the fastest Core 2 Duo processor.

In our processor-intensive Sysmark 2004 SE test, the Elite Fire X1950 PCW powered to a score of 341, while in 3Dmark05 the dual-GPU graphics pushed 3Dmark05 to 9,664. Both these scores are extremely impressive.

A 20.1in Viewsonic VP2030B is included in the package and, with a native resolution of 1,600x1,200, it gives the graphics card plenty of opportunity to demonstrate its power.

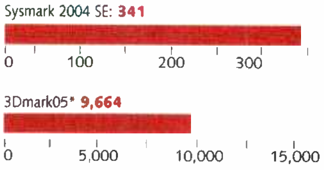
Other components worthy of mention include a decent-size hard drive (300GB), 2GB of DDR2 Ram, Creative X-Fi sound card and 7.1 speakers.

Although you're unlikely to hear it while playing a game or watching a movie, if you're looking for a quiet PC the noise generated by this model might be a concern. The standard Intel CPU fan isn't the quietest, and matters aren't helped by the Chieftec case fan adding to the noise. Things quieten down when disconnected, but with limited space inside the case, it needs all the help it can get to keep the airflow moving.

As far as value for money goes, this system is reasonably priced, but not outstanding. Mesh does, however, include a decent three-year, on-site warranty, but it's worth noting that UK mainland delivery will set you back £39.95.

Will Stapley

Performance



*Tested at 1,024x768 in 32-bit colour

Details

Price £1,649
Best price www.pcw.co.uk/bestprices
Contact www.meshcomputers.com
Specifications Intel Core 2 Duo E6700 • 2GB 900MHz DDR2 Ram

Verdict

Pros Powerful processor and graphics; good monitor
Cons Noisy cooling fans
Features ★★★★☆
Performance ★★★★☆
Value for money ★★★☆☆

Overall A good gaming PC, but the noisy fans may irritate you
★★★★☆

SMALL FORM FACTOR MAC MINI

Apple Mac Mini

A modest upgrade for Apple's compact Mac

We like the Mac Mini. It's reasonably priced, virtually silent when running, and its ultra-compact design makes most small form factor (SFF) PCs look like a tub of lard. And yet we can't help being a little disappointed with this latest upgrade to the Mini.

When Apple (**www.apple.com**) chose to revamp the iMac range recently, it upgraded them from the Core Duo to the Core 2 Duo processor, without any increase in price. In contrast, the Mac Mini stays with the Core Duo and merely gets a minor speed bump from 1.66GHz to 1.83GHz.

To be fair, you are still getting a small performance improvement at no extra cost, but Apple could have been just a little bit more adventurous.

Our review unit was the more expensive of the two Mac Mini models. Priced at £529, it includes 512MB Ram, an 80GB hard disk and a dual-layer DVD writer.

As usual, the Apple Mac Mini does not ship with a monitor, mouse or keyboard, which you will have to purchase separately.

This combination of components gives you pretty good performance and features for just over £500. The only real weakness is the use of an Intel 950 integrated graphics card with just 64MB of shared system memory.

This is fine for handling 2D graphics and video, but it's not going to be much use for the latest 3D shoot-'em-up games. But with Quake 4 pretty much the only big-name title available, it's not exactly the end of the world.

A 1.66GHz version of the Mac Mini costs just £399, which is more of a bargain. It does, however, lack a DVD burner, with just a CD-RW/DVD-Rom drive supplied.

The Mac Mini is still an attractive, low-cost machine for home users. It's just a shame Apple couldn't get the price back down below £500, as it was when the Mini was originally launched.

Cliff Joseph

Details

Price £529
Best price www.pcw.co.uk/bestprices
Contact Apple www.apple.com/uk
Specifications 1.83GHz Core Duo processor • 512MB Ram • 80GB hard disk • Dual-layer DVD writer • Firewire • Four USB2 • Intel 950 integrated graphics processor (64MB shared system memory) • iLife 06 software bundle • 165x165x50mm (wxdxh) • 1.31kg

Verdict

Pros Good performance; compact and elegant design
Cons Pricey; integrated graphics; doesn't include keyboard, monitor or mouse
Features ★★★★☆
Performance ★★★☆☆
Value for money ★★★☆☆

Overall Terrific design, but not the bargain it used to be
★★★☆☆

DIGITAL SLR CAMERA

Canon EOS 400D

Personal Computer World RECOMMENDED

Entry-level camera with high resolution and anti-dust system

The EOS 400D is Canon's latest entry-level digital SLR and the successor to the best-selling EOS 350D. It features a number of improvements, including a higher resolution sensor and a bigger LCD screen. It is the first Canon digital SLR to combat the problem of dust getting inside the body.

But first the resolution: the EOS 400D employs a brand new 10.1 megapixel Cmos sensor that delivers images with a maximum resolution of 3,888x2,592 pixels. If you're printing at 300dpi, that's enough to make a 13x8.5in enlargement (about 1.5in bigger than the earlier EOS 350D), and is sufficient to produce great-looking A3 inkjet prints.

Like its predecessor, the 400D can take any Canon EF or EF-S lens. Thanks to the physical size of its sensor, it will effectively multiply the focal length of the lens by 1.6, so the optionally bundled 18-55mm f/3.5-5.6 lens will act like a 29-88mm model.

The ability to swap lenses is one of the main advantages of SLRs, but doing so increases the chance of dust entering the body and leaving small but annoying dark marks on your images. Like the Olympus SSWF (supersonic wave filter) system in the Olympus E330 DSLR, the EOS 400D combats this by vibrating a filter in front of the sensor in an attempt to shake dust particles off. This process takes one second and occurs every time the camera is switched on or off. Unlike the Olympus system, you can interrupt it and snap a picture should an opportunity arise. The 400D can also record a reference frame to identify the positions of dust particles, which is then tagged onto subsequent images. There's virtually no impact on file size and you can update the frame before important events. This data can later be used by Canon's supplied software to retouch out dust marks on your PC. Both are well-thought-out approaches that, while not 100 per cent infallible, are a welcome step forward.

At first glance the 400D looks identical to the earlier 350D and remains one of the smallest and lightest digital SLRs on the market. The build quality is good for the price and, while some may find the grip a little small, you can't argue against its overall portability. At the back though, Canon has upgraded the 350D's tiny 1.8in screen to a far more acceptable 2.5in display. It's also brighter, features a wider viewing angle and, like the Sony A100, is used to display all shooting information. This, coupled with the anti-dust system, results in the lithium-ion battery life being about 10 per cent less than the 350D's.

On the upside the display can show a vast array of information and is easily visible in direct sunlight. Unlike the Sony, the text doesn't flip by 90° when you turn the camera on its side. The 400D uses the superior nine-point auto-focus system of the pricier EOS 30D, along with its Picture Styles processing options. Canon has also increased the continuous shooting buffer to record up to 27 Jpegs at 3fps (frames per second).

Canon
CANON ZOOM LENS EF-S 18-55mm 1:3.5-5.6 II
EOS
400D DIGITAL
1/4000 F4.0 100
P
ONE SHOT
153

Canon's successor to the 350D comes highly recommended, despite tough competition

Shutter speeds range from 30 seconds to 1/4,000, and sensitivity from ISO 100 to ISO 1,600. It has the same pop-up flash as the 350D and, for something more powerful, a hotshoe for external Speedlites.

In lab tests, the 400D resolved measurably greater detail than its predecessor and the pricier EOS 30D. Indeed, the 400D is now the highest resolution Canon body with an EF-S compatible lens mount. Compare real-life images, however, and there's not a great deal of difference between the 10.1 megapixel 400D and its 8 megapixel predecessor, but anyone upgrading from a 6 megapixel DSLR will notice a big difference.

There's always the fear of greater noise levels when resolutions are increased, but Canon has kept them under check. Crucially, the 400D's images are cleaner than the competition's. It also handles well, feeling responsive and ready for action. The metering, exposure and processing do a good job, delivering great-looking images. And while the anti-dust system didn't get rid of all marks, it eliminated most of them.

The only aspect of the 400D we can criticise is its lack of anti-shake in the standard kit. Canon offers a number of excellent lenses with image stabilisation, but you'll need to pay £400 for a general-purpose EF-S model. In contrast, the Sony A100 has anti-shake facilities built in and comes with a slightly longer zoom than the Canon kit for an RRP of £699.

Ultimately, we prefer the images from the 400D, but the Sony has better features. It's a tough choice and you'll need to check out both in person to make a decision. Nikon's forthcoming D80 should also be considered. Either way, the EOS 400D remains an excellent entry-level digital SLR and comes highly recommended. *Gordon Laing*

Details

Price £719 including 18-55mm lens (£649 body only)
Best price www.pcw.co.uk/bestprices
Contact Canon www.canon.co.uk
Specifications 10.1 megapixel (3,888x2,592 pixels) • APS-C Cmos sensor (22.2x14.8mm) • EF-S 18-55mm f/3.5-5.6 optional lens bundle (equivalent to 29-88mm) • 2.5in screen with 230K pixels • 1/4,000 – 30 seconds and Bulb • 100-1600 ISO sensitivity • 3fps continuous shooting (27-frame Jpeg buffer) • Compact Flash slot (takes Type I or II cards) • 127x94x65mm (wxdxh) • 510g (body only)

Verdict

Pros High resolution; low noise even at high sensitivities; sensible approaches to dust removal
Cons Anti-dust systems not 100 per cent infallible; bundled lens doesn't have anti-shake; Sony A100 is a tough rival

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆

Overall The Canon EOS 400D builds on the success of the 350D and is an excellent entry-level digital SLR
★★★★☆

DIGITAL CAMERA

Samsung NV10

A novel camera with some unusual features

At first glance, the NV10 looks like a rather serious camera. It's finished in matt black for people who want to take photographs, not frosted pink for people who want a piece of bling to match their mobile phone. Neither are its credentials emblazoned across its fascia. Yes, it has a 10 megapixel CCD. Yes, it has a 3x optical zoom, but good taste precludes such boasts. Instead we get elegant yet stylish understatement and superb build quality.

Despite its compact dimensions, it's no mere point-and-shoot toy. Enthusiasts will be pleased to hear there's a full manual mode, in addition to the usual scene, program and fully automatic options.

Just as the quietest of folk are often said to live the most colourful lives behind closed doors, the Samsung NV10 hides a surprising array of features beneath its smart exterior. This is a camera that does just about anything you could want, as well as a few things you probably didn't think of. Some are innovative and useful, others are fun, and some are perhaps a little silly.

Seven shooting modes are accessed via a control dial echoed by an animated version that appears on the LCD screen. This means you won't need to take your eyes off your composition to adjust it. It also means there will be no squinting and fumbling when taking shots in the dark.

A raised shutter release and a recessed power button complete the top-mounted controls, accompanied by a small pop-up flash. To the rear of the camera, things are a little less conventional: There's no menu button; instead, there are 15 buttons – 13 of which are of the capacitive, touch-sensitive type and are arranged along two sides of the LCD panel.

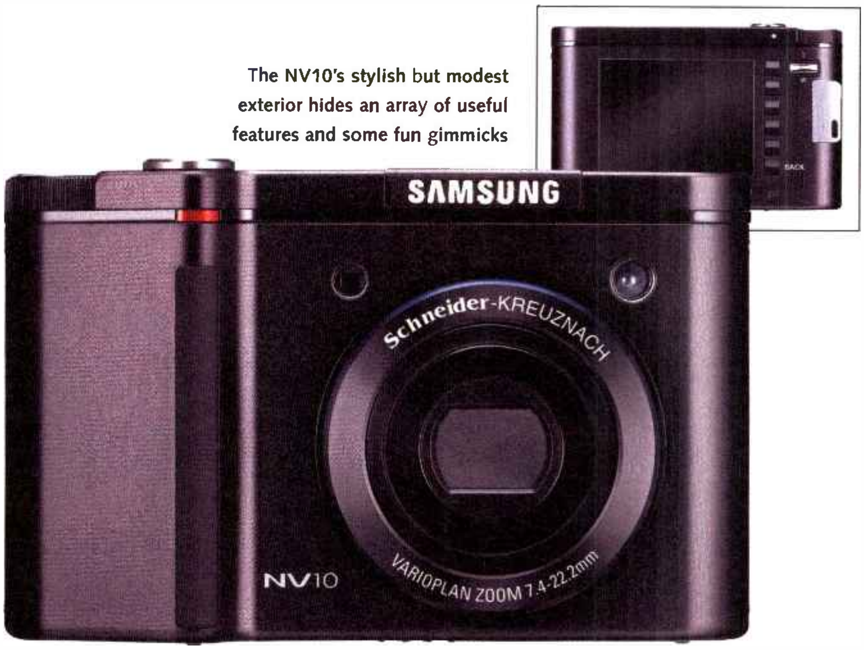
Touching a button reveals additional information about its function, while depressing it fully pops out a highlighted bar containing a row or column of icons. Touching one of the buttons along the other edge of the display highlights a similar bar perpendicular to the first, and where the bars intersect, the icon is selected.

Although this sounds complicated, it's actually quite intuitive and can give you very quick access to a large number of features without having to scroll through wordy menus manually.

Unfortunately, it's a good idea imperfectly executed. The control interface is extremely quick and responsive, but perhaps a little too sensitive. The buttons are small and fiddly, and because they're touch-sensitive it's easy for large fingers to find themselves inadvertently activating adjacent buttons.

This leaves the camera sometimes feeling a little out of control, and there is such a large number of features that finding them all can sometimes become a little frustrating. In playback mode, buttons don't always line up with their respective on-screen icons.

The Special Effects menu houses most of the more esoteric capabilities of the NV10; these include the ability to create animated gif images, panoramas and composite images. You can also add predesigned frame effects to your shots and, if you're a fan of the gurning visages found in seaside novelty cut-out pictures, then you'll love the comedy overlays.


The NV10's stylish but modest exterior hides an array of useful features and some fun gimmicks

With all of these bells and whistles it's easy to lose track of the camera's core features. If you stick to the more conventional modes you'll find a highly capable camera with anti-blur technology, high-sensitivity ISO modes and VGA-resolution movie capture in Mpeg4 format.

All the major settings are available at your fingertips for quick selection without having to take your eyes off your composition. The high-speed capture modes give you up to 2.5 fps (frames per second) at full resolution, or up to 7fps if you step down to 1,024x768.

Overall colour balance is good, although images do have a tendency to suffer from chromatic noise even at the lower ISO settings. At the top ISO 1,000 setting it becomes very noticeable, although it stops short of rendering the images unusable.

If you're prepared to make use of the manual controls, this camera is capable of some very creative results, although it's debatable whether it really needs all 10 megapixels to achieve this. It's telling that Samsung's flagship model – the NV7 – has fewer pixels, but is fitted with a higher quality lens.

Our review kit included a smart carrying pouch with magnetised clasp, a docking/charging cradle and a wireless remote control. These are, in fact, optional extras adding a total of about £55 to the price, making the NV10 a little expensive.

Paul Monckton

Details

Price £279

Best price www.pcw.co.uk/bestprices

Contact Samsung www.samsung.co.uk

Specifications 10 megapixels • 2.5in LCD monitor • ISO 100-1,000 • 640 x 480 movie mode at 30fps • 96.5x18.5x60mm (wxdxh) • 149g

Verdict

Pros Build quality; features; manual mode

Cons Tricky controls; some gimmicky features; image noise

Features	★★★★★
Performance	★★★★☆
Value for money	★★★☆☆

Overall The Samsung NV10 is a novel camera, with a good mixture of enthusiast and fun features

★★★★☆

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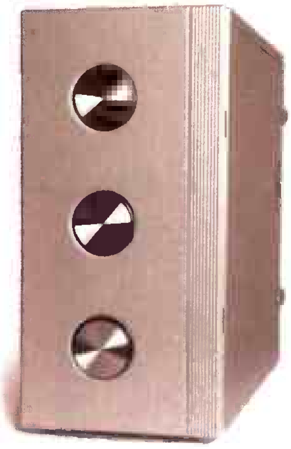

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- Genuine MS Windows® XP Home (OEM)
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intel Pentium 4 inside

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DIGITAL CAMERA

Fujifilm Z3

A stylish digital compact, with excellent build quality

Available in light blue and pink, the Z3 from Fujifilm is clearly aimed at the female market. However, men, and women who don't enjoy being stereotyped, will be pleased to hear it's also available in silver and that the benefits of its ultra-compact proportions go beyond its suitability for storage in a handbag.

The aluminium body features a sliding front cover to protect the lens and built-in flash, while to the rear the 2.5in LCD is coated with scratch-resistant glass. So, should you find yourself too lazy to pop it back in its handy suede-effect pouch, a journey spent in the intimate company of your house keys should see it emerge relatively unscathed. However, with the lens tucked into the postage-stamp corner of the camera, you'll need to take care or you may find your fingers feature in your photos a little too frequently.

That said, the Z3 isn't all about looks and convenience. Using a sensibly specified 5 megapixel sensor, this camera strikes a good balance between CCD resolution, lens size and storage capacity. Its shooting modes make good use of the camera's capabilities without confusing you with gimmicks.

Being simple enough not to require a mode dial, the Z3 is easy to use. Opening the cover turns on the power and the relatively small number of control buttons give access to commonly used functions without the need to enter the menu system.

A switch next to the shutter release selects either stills or VGA-resolution movie mode; while macro, flash and self-timer functions are accessed from a four-way cursor control pad. Although it has a manual shooting mode, this simply means you can alter more of the camera settings, such as ISO mode. You don't get full control over shutter speed and aperture.

These days, every digital camera has to have some sort of anti-blur system and the Z3 is no exception. While some high-end cameras come with mechanical optical-stabilisation systems, the Z3 relies on the fact that it's good at shooting in low light. It exploits its high sensitivity by automatically setting up the camera for a fast shutter speed with a high sensitivity. Any camera could do this, but only a camera as sensitive as the Z3 can do it with convincing results. This mode has a dedicated button, so even the novice photographer will be able to take crisp indoor photos with ease, even when flash photography cannot be used.

For most owners of a camera such as this, adding an ISO 1,600 mode to a digital camera isn't enough to ensure good-quality photos. While some image noise is present when shooting at ISO 1,600, it still produces impressively clean images – which is more than can be said for many cameras shooting at ISO 800 or less.

If you zoom in close, you can see that some image-processing has been used. It's possible to achieve similar results with other cameras by using noise-reduction filters on your PC, but users of the Z3 probably wouldn't want to go to such trouble and its in-camera processing creates good-looking pictures in low light, ready for printing straight from the camera.

In fact, in our tests, the Z3's image processing did adversely affect shots in normal, daylight conditions. For example, in one shot a large patch of lush grass lost its definition, leaving it looking like clumps of moss.

For those users who don't enjoy fiddling with ISO settings and shutter speeds in the middle of a party, Fujifilm has included a number of shooting modes designed specifically to leverage the high sensitivity of the camera while hiding away the technicalities.

In-camera flashes are generally pretty poor, especially on a camera of this size. In general you'll get far better-looking pictures if you can shoot without the flash. Natural light mode disables the flash to help you obtain true-to-life images. Unfortunately, camera shake and motion blur can still make shooting without flash a little risky. Fujifilm's new Natural Light + Flash mode addresses this issue by taking two shots in rapid succession: the first using available light and the second with flash. This gives you two shots to choose from when you review your photos.

The battery is recharged via the docking cradle, which must be used to transfer photos to your PC via USB, where you can use the supplied Finepix Viewer and Image Mixer VCD LE software to perform basic image enhancement, make prints or create CD-based slideshows or video discs.

The Fujifilm Z3 is an excellent blend of design and performance for the casual photographer who wants good-quality photos without having to think too much, and who isn't obsessed with megapixels and huge numbers of obscure functions. *Paul Monckton*

Details

Price £249.99

Best price www.pcw.co.uk/bestprices

Contact Fujifilm www.fujifilm.co.uk

Specifications 5.1 megapixels • f3.5-4.2, 36-108mm (35mm equivalent) • 1/2.5in CCD • 10MB internal memory • XD Picture Card compatible • 3x optical zoom • 8cm macro • Shutter speed 4–1/1,000sec • ISO 64-1,600 • 2.5in LCD screen • 90x20x55mm (wxdxh) • 130g

Verdict

Pros ISO 1,600; 'natural' shooting modes; fast startup

Cons No optical viewfinder; no true manual mode

Features	★★★☆☆
Performance	★★★★☆
Value for money	★★★★☆

Overall The Fujifilm Z3 is a stylish ultra-compact camera, with excellent build quality, good low-light performance and well-selected features targeted at producing quality photos without gimmicks

★★★★☆

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WIRELESS MEDIA STREAMING DEVICE

Philips SLM5500

Personal Computer World RECOMMENDED

Stream your video, music and photos with the minimum of fuss

Although it was announced some time ago, the Philips SLM5500 wireless media streamer has only just reached UK stores. It allows you to watch video stored on your PC on your television. You can also stream music and set up slideshows of your photos.

Philips' device itself is extremely compact. The front of the unit houses a single button to switch the unit on and off, while a series of LEDs indicate what the SLM5500 is up to. At the rear are Scart and component video outputs; the latter is able to output high-definition video.

Audio is taken care of by a digital coaxial socket, while a wireless antenna and Ethernet socket complete the ensemble. The remote control is reasonably compact. Although it takes a while to get used to its rather cluttered button layout, it feels comfortable and sits well in the palm of the hand.

Wireless streaming devices such as this frequently look impressive on paper but prove a total pain to set up – the Pinnacle Showcenter instantly leaps to mind. Thankfully, the SLM5500 bucked the trend for providing setup headaches, and we didn't experience any difficulties getting it up and running.

Novices might come a little unstuck when it comes to locating and connecting to a wireless network, but thanks to the clear on-screen instructions and the step-by-step nature of the installation process, anyone with even a limited knowledge of wireless networks should be able to set it up with ease.

The interface isn't the slickest we've seen, but we got used to it after a while. Besides, if you're going to be using it mainly to watch videos you're not going to spend that much time navigating through the menus.

The SLM5500 supports an impressive range of video format types and managed to play just about every file we threw at it – Mpeg1/2, Wmv (including Wmv HD), DivX, Xvid. If you try playing Wmv HD files over a wireless network you'll have to endure stop-start video, but compressed DivX and Xvid streamed wirelessly without any problems.

Audio support is provided in the form of mp3 and Wma (including those tracks with DRM – digital rights management). While listening to a track, it's possible to browse the rest of your library as well as watch a slideshow of your favourite photos.

Being UPnP-compatible, the SLM5500 is able to hook up with any UPnP Nas (network-attached storage) drive you might have. We tested it out with an Iomega Storcenter and it worked flawlessly, picking up all our stored media.

The benefit of using a Nas is that you don't have to have your PC switched on whenever you want to watch a movie or listen to some music from your library.

If you register your SLM5500 you will be able to access Philips' online portal via the device. Here you'll find a selection of music and some photos available for download, but not much else and, in truth, having to go through the rather laborious registration process really isn't worth it.

Philips could improve on its online content and the interface could do with a bit of jazzing up, but there's no getting away from the fact that this is one of the better wireless media streamers currently available.

Easy to set up and able to wirelessly stream DivX without breaks in video or sound, the SLM5500 comes highly recommended. *Will Stapley*

Details

Price £180
Best price www.pcw.co.uk/bestprices
Contact Philips www.consumer.philips.com/
Specifications Video support: DivX, Xvid, Mpeg1/2/4, Avi, Wmv, Wmv HD • Audio support: mp3, Wma, Wma DRM • Photo support: Jpeg • 10/100 Lan • 802.11g wireless • Outputs: Scart, component • Digital coaxial audio • Remote control • 207x152x40mm (wxdxh) • 840g

Verdict

Pros Easy to set up; good format support; DivX/Xvid wireless streaming works well
Cons Poor online content; interface could be better

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆

Overall It's not perfect, but the Philips SLM5500 is one of the better wireless media streamers we've tested

★★★★☆

LASER MOUSE

Logitech Revolution MX

A new attempt at the humble old mouse

Personal Computer World RECOMMENDED

Logitech's Revolution MX is an attempt at a seachange in mouse design. The idea is to make a clean break from the past and design a mouse that, once tried, you won't want to do without.

This laser mouse uses a non-visible laser to track movement, rather than an LED's red light. That means it's more accurate, as well as being able to operate on more surfaces than a standard optical mouse.

It's also wireless and there's a dock for recharging the mouse's internal, non-removable battery.

The big difference is in the wheels. The most obvious addition is a horizontally mounted scroll wheel on the left-hand side of the mouse. This doesn't scroll sideways (the top-mounted wheel already does that), but it's configured to switch applications. It can be changed to perform a zoom function instead.

The top wheel, in addition to scrolling in four directions, can be set to click or not, both at the same time. Some people prefer a clicking scroll wheel, allowing movement one line at a time, while others want a smooth scroll.

Cleverly, this mouse does both. The software can be set to detect the speed of scroll, so for a slow scroll it clicks, while if you give it a spin, the wheel unlocks and scrolls smoothly. This also comes in useful for games, when scrolling through weapons choices.

The best thing about the Revolution MX, however, is its design. The mouse's body fits snugly in the hand and it's hard to go back to an old-fashioned oval mouse after using one of these.

One qualm is the mouse's battery life – the Revolution MX requires a recharge every five days or so.

The price tag is higher than most optical mice, but for something that's going to sit in the user's hand so much and, in the case of the MX Revolution, fits so well, £80 isn't that expensive. *Anthony Dhanendran*

Details

Price £79.99
Best price www.pcw.co.uk/bestprices
Contact www.logitech.co.uk
Specifications 848nm laser mouse • USB interface (for RF receiver) • Charging dock • Windows XP/Vista compatible

Verdict

Pros Extremely well designed; fits snugly in the hand; auto-click scroll wheel

Cons Poor battery life; no left-handed model

Performance	★★★★★
Value for Money	★★★★☆
Features	★★★★★

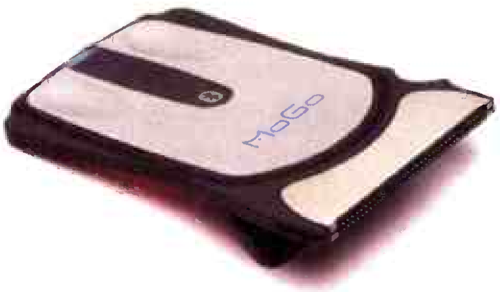
Overall For serious mouse users, there aren't many devices that fit as well as the Logitech MX Revolution and have as many features

★★★★★

TRAVEL MOUSE

Mogo Mouse

A Bluetooth travel mouse like no other



When we laid eyes on the Mogo Mouse, our first thought was that it would be uncomfortable to use. This impression wasn't helped when we couldn't get it to work.

The original mouse had an intermittent fault so, after we contacted the manufacturer, a new one was sent in its place.

The Mogo Mouse needs charging before it can be used, and that is done in the PCMCIA slot. That's right – it's the size, thickness and weight of any card that fits snugly in a laptop's PCMCIA slot, giving it an unusual look for a mouse.

Once charged, which didn't take long, it was simplicity itself to pair with our laptop via Bluetooth. And defying its flat shape, the mouse is surprisingly comfortable to use – more so than other travel mice we've tested in the past. A kickstand flips down to turn it on and it takes a couple of seconds to spring into life.

While more portable than other travel mice, it does have drawbacks. First, there's no scroll wheel – laptop screens are typically small, so there's a lot more scrolling needed.

Secondly, your laptop must be on for it to charge. This means occasionally slotting it back into the PC card slot when the laptop is on, rather than using it. However, in practice we found the battery life to be quite long.

Ergonomically, we're unsure if the Mogo Mouse would be suitable for people suffering with RSI – you'd need to check – and it's probably not advisable to use it as an everyday mouse.

It's also expensive, costing £50. But if you travel often, and want an easy-to-use, highly portable mouse, this is a good option.

You can see more on the mouse, its general look and how it works in our video review of the Mogo Mouse on the Test Bed blog (**www.tinyurl.com/o2ug7**).

Rob Jones

Details

Price £49.99
Best price www.pcw.co.uk/bestprices
Contact Newton Peripherals www.mogomouse.com
Specifications Bluetooth (notebook requires built-in Bluetooth or optional dongle) • Supports Windows 98 and above, Mac OSX 10.2.6 and above • 54x86x5mm (wxdxh) • 41g

Verdict

Pros Small; light; responsive; highly portable; more comfortable to use than its looks suggest

Cons No scroll pad or wheel; cost

Features	★★★☆☆
Performance	★★★★☆
Value for money	★★★☆☆

Overall The Mogo Mouse is small and light, with an inventive design that would be a good option for anyone who travels regularly with their notebook

★★★☆☆

MP3 PLAYER

Apple iPod Shuffle

The mini-marvel from Apple gets even smaller

Some might say that the craze to make the smallest mp3 player is just getting silly. The new version of the iPod Shuffle is so small it's little more than a silvery button with a clip, so you can attach it to your clothing.

The new Shuffle measures just 27mm high, 41mm wide and 10mm thick – and that includes the little tie-clip mechanism attached to the back of the unit.

It only weighs 15g, so you can just clip it on to a jacket lapel or shirt pocket and then just forget about it. They could probably have made it even smaller, but then the already tiny control button would have been too small to use comfortably.

The original plastic-stick Shuffle was available in both 512MB and 1GB sizes, but this new model is available in one size only – 1GB, costing a very reasonable £55. That should be able to store about 240 songs, and the battery lasts for about 12 hours (though we're baffled as to where they actually found room to fit a battery inside it).

The silvery grey aluminium case feels sturdy enough, though we're a little concerned it might pick up scratches after a while.

Needless to say, with a gadget this small there's no room for a display or any kind of menu system for choosing songs. This means you still have to rely on the shuffle approach, where you either play straight through a playlist (created on your Mac or PC using iTunes) or just shuffle through songs at random.

If you like having a bit more control over your music, then you might want to cough up a little more for the slightly more sophisticated iPod Nano (£99 for a 2GB model). However, at this price there's no doubt that the new Shuffle will fly off the shelves as Christmas approaches.

Cliff Joseph

Details

Price £55
Best price www.pcw.co.uk/bestprices
Contact Apple www.apple.com/uk
Specifications Supports mp3, AAC, Wav and AIFF audio formats • 3.5mm headphone jack (headphones included) • Li-ion rechargeable battery • Maximum 12-hour battery life • USB2 • 41x27x10mm (wxdxh) • 15g

Verdict

Pros Incredibly small and light; low price
Cons No display or menu system

Features	★★★☆☆
Performance	★★★★☆
Value for money	★★★★☆

Overall The new iPod Shuffle is a low-price mp3 player and ups the ante for rival manufacturers

★★★★☆

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19IN TFT

Hyundai N91W

A cheap 19in widescreen monitor, but can it stand out from the crowd?

PERSONAL COMPUTER WORLD
HYUNDAI

Hyundai, the Korean company better known in the UK for its cars, also has a division called Hyundai IT, which makes TVs and monitors.

The Hyundai N91W, a widescreen 19in LCD, is the company's latest model. Like most widescreen displays of this type, the Hyundai N91W has a native resolution of 1,440x900 at 60/75Hz and a square pixel pitch of 0.285mm.

Despite the lightness of its round, clip-on base, the monitor is quite stable and tilts easily on the wide flat arm that joins the back in a hinge. Two analogue VGA connectors and one DVI-D connector are mounted across the back of the monitor on a downward-facing ledge that sits about 8cm from the bottom edge.

On the left there's an IEC mains connector (the standard kettle-plug type), while the three video connectors sit on the far right, along with a 3.5mm stereo socket for the built-in 1W speakers.

The 20mm black bezel has a 3mm silver trim. Five narrow, rectangular, user-control buttons are mounted in the centre of the bezel, below the screen, where it broadens to 24mm.

A continental and UK mains lead, 3.5mm jack audio lead, VGA lead, install leaflet and a CD-Rom containing the user guide in multiple languages and generic ICM colour profile are all supplied with the monitor.

Apart from the colour depth restriction, this display is hard to fault. The auto function on analogue inputs locks accurately and doesn't drift, and the display is bright and sharp. Even on non-native resolutions the internal image processing results in a surprisingly acceptable image.

The N91W is a decent monitor at a good price, but there really isn't that much to differentiate it from the countless other 19in TFTs available. *Terry Relph-Knight*

Details

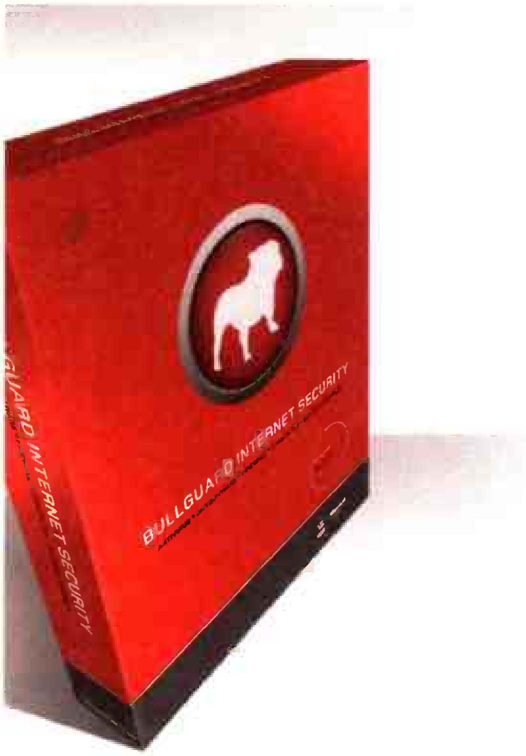
Price £165
Best price www.pcw.co.uk/bestprices
Contact Hyundai IT www.hyundaiit.com
Specifications 19in widescreen TFT (16:10 aspect ratio) • 1,440x900 native resolution • 5ms response time • 800:1 contrast ratio • 300 cd/m2 luminance • 170°/155° viewing angles (horizontal/vertical) • 1 DVI-D, 2 VGA connectors • 524x132x472mm (wxdxh) • 5kg

Verdict

Pros Good image quality
Cons Non-swivel base

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆

Overall A good quality monitor, but there's no shortage of similar 19in monitors and there's little to differentiate this Hyundai from other similar models
★★★★☆



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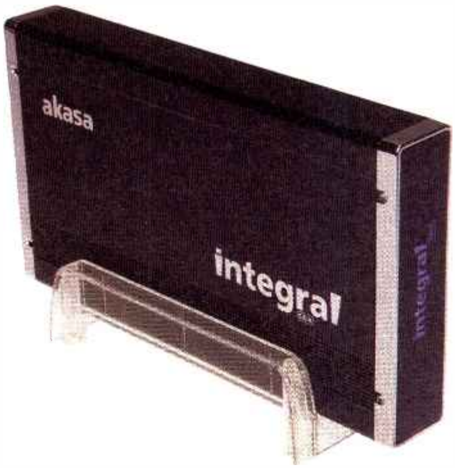


Akasa Integral P2 E-Sata

Price £32.44 **Contact** www.vadim.co.uk **Overall** ★★★★☆

There isn't exactly a shortage of external drive enclosures around at present, but what makes the Akasa Integral P2 E-Sata stand out is its flexibility with the type of drive you want to install and its dual interface. Built from piano-black finished aluminium, which helps keep the drive cool, the unit can be stacked to save space.

It accepts either parallel ATA or serial ATA (Sata) hard drives (up to 400GB). Simply undo two screws at the back of the unit to get access to the inside, then mount the drive with the four screws provided.

At the back of the unit sit USB2 and external serial ATA sockets, with a switch to alternate between the two.

Overall A decent, dual-interface drive enclosure *Simon Crisp*

Enermax Galaxy

Price £233.83 **Contact** www.enermax.com.tw **Overall** ★★★★☆

It seems only yesterday that we thought a 450W PSU was overkill, but Enermax has certainly surpassed that with the Galaxy 1000W.

Each rail is rated at 17A, and there's a dedicated rail for your dual-core processor. This PSU is a modular supply, so all the cables plug into sockets on it, apart from the main loom. All the extra cables are neatly held in a pouch and include three serial ATAs, five 4-pin Molex connectors, two PCI Express cables and a pair of dual 12V connectors for quad CPU systems. Two smart fans keep the PSU cool. The intake fan is a massive 13.5cm diameter, while the exhaust fan is a mere 8cm.

Overall Will suit those with SLI and other power-sapping components, but it comes at a price *Simon Crisp*

Zalman CNPS8000

Price £33 **Contact** www.quietpc.com **Overall** ★★★★☆

At just 62.5mm tall, Zalman's latest CPU cooler – the CNPS8000 – has been designed for installation in lower-profile cases. The CNPS8000 is compatible with both Intel's Socket 775 (Pentium D and Pentium 4 all speeds) and all speeds of AMD's Athlon 64 (Socket 754, 939 and 940) processors.

More functional than stylish, it uses four copper heatpipes to transfer heat away from the base to the top of the aluminium fins. On top of the cooler sits a quiet 92mm Zalman fan, the speed of which can be altered by the included Fanmate controller. Quoted noise levels for the fan range from 18dB (decibels) up to a maximum of 30dB when running at full pelt.

Overall Zalman CNPS8000 is a good cooler for home-theatre PCs *Simon Crisp*

Zalman VF-900-CU

Price £28.99 **Contact** www.quietpc.com **Overall** ★★★★☆

Zalman's latest VGA cooler has been designed to replace the stock coolers on ATI's Radeon X1900 and Nvidia's Geforce 7900 series.

Beautifully crafted from copper, the VF-900-CU uses two heatpipes attached to the base plate that go around the circumference of the cooler fins to dissipate the heat away from the GPU. The cooler is compatible with all cards that have push pins around the GPU, but just to be sure it's best to check the compatibility list on Zalman's website.

Sitting on top of the cooler is a 92mm Zalman fan that, by using a Fanmate2 controller, can be adjusted from a quiet (18.5dB) 1,350rpm up to 2,400rpm for ultimate cooling (25dB).

Overall Another beautifully crafted cooler from Zalman *Simon Crisp*

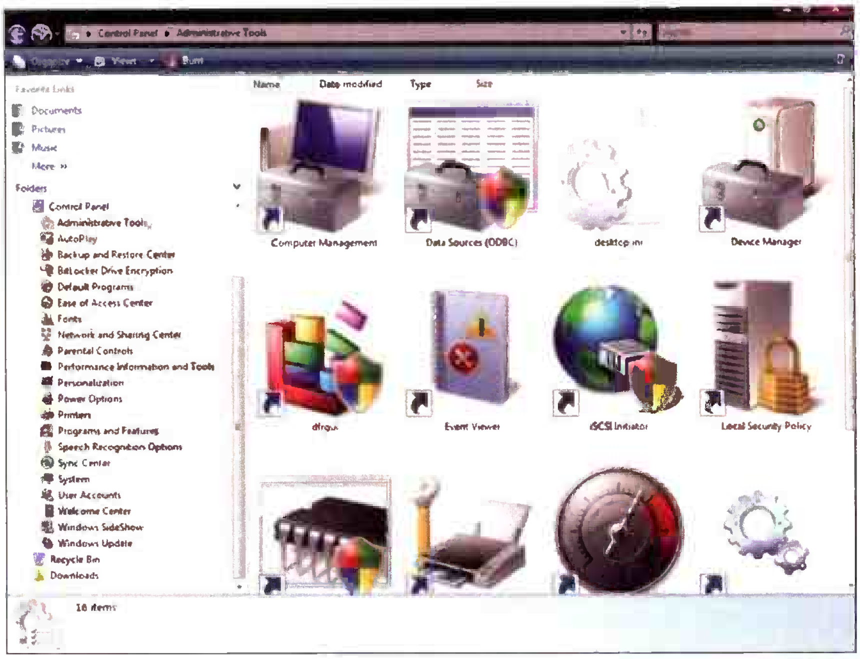
Personal Computer World
RECOMMENDED
ZALMAN

OPERATING SYSTEM

Windows Vista RC1

PREVIEW

The latest release of Microsoft's new OS is now available for download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Welcome Center
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Computer Management
Data Sources (ODBC)
desktop.ini
Device Manager
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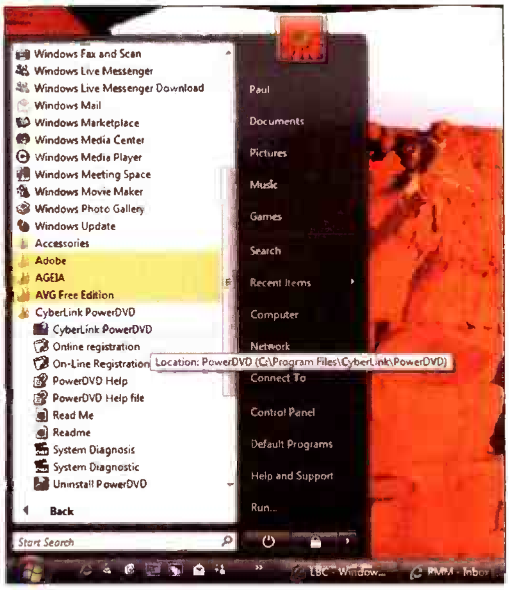
Event Viewer
iSCSI Initiator
Local Security Policy
16 items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PowerDVD Help
PowerDVD Help file
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Readme
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System Diagnostic
Uninstall PowerDVD
Back
Start Search
Paul
Documents
Pictures
Music
Games
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Recent Items
Computer
Network
Connect To
Control Panel
Default Programs
Help and Support
Run...

Vista's new Aero interface takes full advantage of modern graphics hardware to look very pretty and run much faster

Windows XP has been the standard Microsoft operating system since 2001, and little has changed bar some minor differences when SP2 was released. Windows Vista Release Candidate 1 is now available to download for free, and is about as different as possible from its incumbent. When compared with Beta 2 – the previous version of Vista – RC1 comes with 'adjustments' rather than sweeping changes.

There are tweaks to the user interface, more device drivers and performance enhancements. If you are tempted to install and run Vista RC1, it can be downloaded via Microsoft's Windows Vista Customer Preview Program, although there are some restrictions.

But before you put it on your hard drive, be warned: it may not carry the 'beta' tag, but there will be changes before the final release, and there are still bugs. In our longer online review (**www.pcw.co.uk/2163791**) we've listed warnings we recommend you read before installing.

Provided you have a compatible system, Windows Vista is the easiest, most hands-off installation yet and uses disk imaging technology to keep installation times down. After entering a minimal set of details, you leave it alone until it reaches the password prompt.

If you're new to Windows Vista, the first thing you'll notice after installation is how different it looks. It's very difficult to find a reference to Vista without the words 'eye' and 'candy' appearing early on in the proceedings. The new Aero interface requires, and takes full advantage of, the capabilities of modern graphics hardware to provide an environment that not only looks pretty but is also faster and smoother. Windows Vista is quite demanding of system memory, and some PCs are easier than others to upgrade. By using the power of low-cost Flash memory devices, ReadyBoost allows you to take a compatible USB key or Flash card and use it as a sort of disk cache to dramatically improve disk performance for a minimal financial outlay. We tried ReadyBoost out with a 512MB iPod Shuffle and it worked well.

One of the first things a new user of Windows Vista will notice is that the system won't let you make serious changes willy-nilly. Even if you're set up with Administrator privileges, certain tasks cannot be completed without additional user confirmation.

Also, programs can't perform restricted operations without your say-so, unless you elect to launch them with administrator privileges. These pop-ups are annoying, but a vital step in protection from malicious code.

Unfortunately, this is one area where some tweaking is still required. When Windows wants to switch you to administrator mode the whole screen is greyed out, interrupting your work and allowing only input to this one dialog. On our test PC this caused the screen to blank completely for a couple of seconds each time.

Vista RC1 is time limited and will cease to run on 1 June 2007. Remember, you can't go back to XP easily, but by then the full version will have been available for some time. It's worth noting that RC1 is the flagship version of Vista, so if you wish to keep all its features when the preview is over, be prepared to pay for it.

It's likely that some of your software, peripherals and components won't work with Windows Vista, so check beforehand for driver compatibility with the respective vendors. This also applies to Microsoft products. If you've installed Beta 2 of Microsoft Office 2007, a 'technical refresh' is required for compatibility with Vista RC1. You should also be aware that RC1's version of Windows backup uses a different directory structure from the Beta 2 version. *Paul Monckton*

Details

Price Free for RC1
Best price www.pcw.co.uk/bestprices
Contact Microsoft www.microsoft.com/windowsvista
System requirements 1GHz processor • 1GB Ram • 128MB graphics card

Verdict

Pros Easy to use; many new features; better security
Cons Intrusive security measures; bug fixes, drivers and compatibility need improvement

Features	n/a
Ease of use	n/a
Value for money	n/a

Overall A worthy successor to XP. It will change the way you work, if your system is powerful enough to run it

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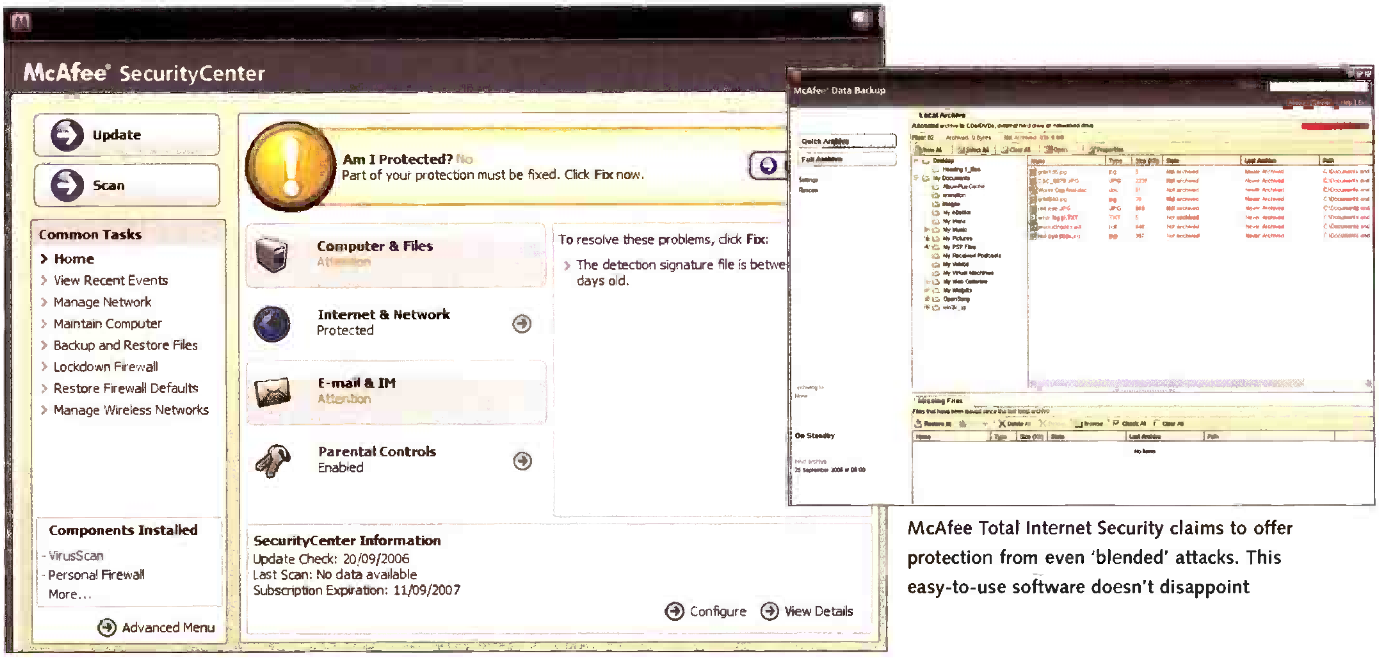
INTERNET SECURITY

McAfee Total Protection 2007

Personal Computer World
RECOMMENDED

A suite offering full security – both on and offline



Am I Protected? No
Part of your protection must be fixed. Click Fix now.

To resolve these problems, click Fix:
The detection signature file is betwe
days old.

Components Installed
- VirusScan
- Personal Firewall
More...

SecurityCenter Information
Update Check: 20/09/2006
Last Scan: No data available
Subscription Expiration: 11/09/2007

McAfee Total Internet Security claims to offer protection from even 'blended' attacks. This easy-to-use software doesn't disappoint

With the diversification of security risks on the internet, it can be attractive to use security products from just one company, especially with the rise of so-called 'blended' attacks. McAfee Total Internet Security ambitiously claims to offer full protection, as well as some useful extras.

Installation is straightforward, but McAfee does request the manual removal of other programs such as Ad-Aware. The Security Center has been redesigned to give a larger and more obvious status marking: a large green tick indicates that it considers the computer protected. In some instances, when it thinks the computer is not protected, it will be able to rectify the problem automatically.

The Security Center splits areas of security into computer & files, internet & network, email & IM and parental controls. Some software, such as anti-virus, covers more than one area. Clicking on each section reveals which programs provide the relevant security, with a link to change various options.

McAfee searches for updates once a day, but extra updates can be downloaded to respond to new threats.

As the different parts of McAfee Security are integrated, a scan of your computer looks for spyware as well as viruses – a convenient feature for those who want to be protected with the minimum of fuss.

McAfee Site Advisor is installed separately and works with Internet Explorer and Mozilla Firefox. Site Advisor sits in the bottom-right of the browser and indicates the security status of the current website. It tests each site's ability to generate spam and checks whether it has links to sites known to be suspicious.

As well as protection software, McAfee Total Internet Security includes Databackup. This can be used to make scheduled backups of important files to a variety of locations, including external hard disks and network drives, as well as CD or DVDs.

Rather than back up the entire hard disk, Databackup monitors folders for selected file types. These are sorted by function and even include the new XML-based Office 2007 files. Databackup shows all the files that have been marked for archiving along with the latest backup made. A guide to how much space this will take up is also shown. You can also compress and encrypt files, but this locks you into using McAfee Databackup to retrieve your files.

Other useful utilities include McAfee Quick Clean, for removing old System Restore points and redundant shortcuts. If required, these can be removed with Shredder to prevent recovery. One noticeable omission is the lack of a hard disk defragmenting tool.

Networking is often a source of both frustration and worry, but McAfee makes setting up and monitoring a network much easier than relying on the tools supplied with Windows.

The Easy Network gives a graphical representation of all the computers on the network and internet connection. Wireless networks get a similar treatment, although this does require the McAfee software to be installed on all the computers on the wireless network.

Other computers running McAfee software on the network can be managed remotely from this screen, which is a good way of making sure younger users have not disabled any security settings. And, if you have more than one PC, McAfee sells a three-licence pack.

It lacks some components, but overall we're very impressed with McAfee's latest internet security package.

Tim Smith

Details

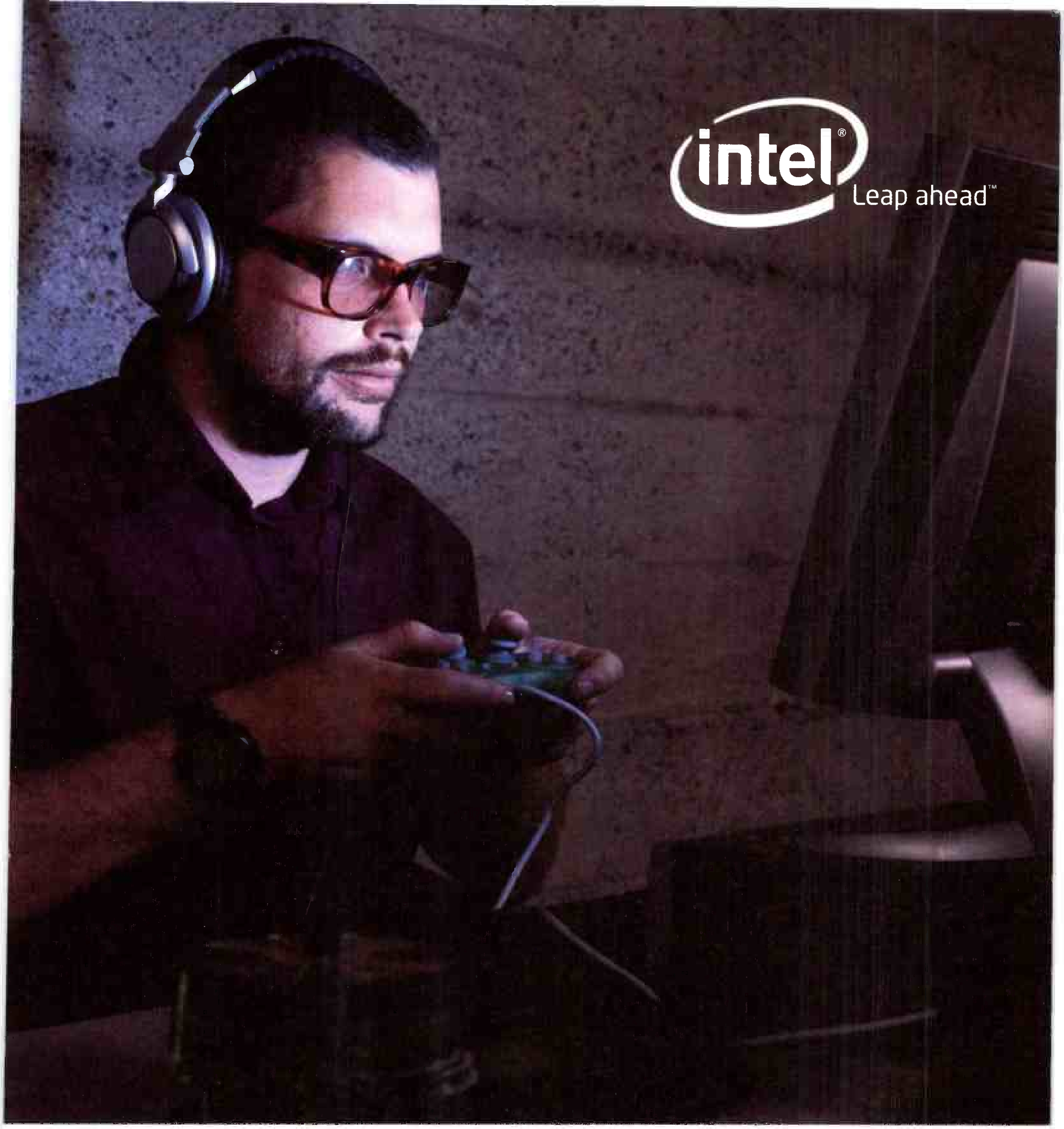
Price £60
Best price www.pcw.co.uk/bestprices
Contact McAfee
www.mcafee.com/uk/
System requirements 500MHz processor or higher • 256MB Ram • 275MB hard disk space • Windows XP/2000

Verdict

Pros Covers all elements of home security; simple interface that integrates different elements
Cons Uses Windows defrag; advanced users may want more information on changes required

Features	★★★★☆
Ease of use	★★★★☆
Value for money	★★★★☆

Overall McAfee Total Protection 2007 provides excellent online security, without compromise or complication
★★★★☆



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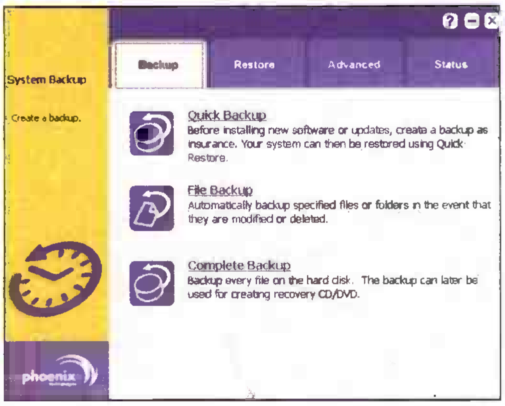
FILE RECOVERY SOFTWARE

Phoenix Recover Pro 6

A complete backup and restore utility for Windows

Personal Computer World RECOMMENDED



Quick Backup
Before installing new software or updates, create a backup as insurance. Your system can then be restored using Quick Restore.

File Backup
Automatically backup specified files or folders in the event that they are modified or deleted.

Complete Backup
Backup every file on the hard disk. The backup can later be used for creating recovery CD/DVD.

Most PC users have enough forethought to install a firewall and virus checker to protect against everyday threats. For this reason, it isn't always necessary to invest in a dedicated recovery suite.

Phoenix Recover Pro 6 offers a more versatile solution to the standard Windows System Restore tool and is aimed at those who want a more reliable way to recover from disaster scenarios, offering far more control over every area.

When you first set up the software it creates a protected area on your hard drive in which it places a dedicated tamperproof recovery application. It also creates a safe area in which to store backups.

You can then revert to this environment if Windows suffers a catastrophic failure. This takes up a fair chunk of disk space, so you may need to free up some room to get the software set up correctly.

Through your Windows environment, the Recover Pro tools will help you create regular backup and restore points for your system, in a similar way to Microsoft's System Restore.

There's also a File Backup tool you can set up to automatically create backups of all files with specific extensions, whenever they are changed. These backups are stored in your protected area; when it reaches its capacity you can choose to automatically remove older file backups, or be notified that you should clean it up.

You can make complete backups of your hard drive, build a startup disc, and manage and explore the backups at any point to recover or analyse files.

In short, you get more control over the entire process than you have with Windows' built-in tools, and there's enough here to justify a purchase if you're concerned about system security. *Paul Lester*

Details

Price £27.95
Best price www.pcw.co.uk/bestprices
Contact Phoenix www.phoenix.com
System requirements Pentium III equivalent • 256MB Memory • Windows XP/2000

Verdict

Pros Works silently backing up your files; protected recovery console; good control over backups and restore
Cons Takes up a fair chunk of your hard drive setting up its protected area

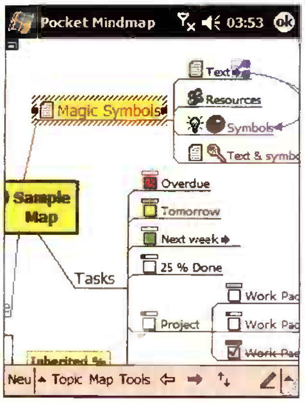
Features	★★★★☆
Ease of use	★★★★☆
Value for money	★★★★☆

Overall A low-cost yet powerful utility, offering concerned users peace of mind
★★★★☆

MIND-MAPPING SOFTWARE

Pocket MindMap

Organise your thoughts on the move



Pocket MindMap is a mobile software package that allows you to apply mind-mapping techniques on a Pocket PC. If you're new to mind mapping, it's a good way to visualise topics on all kinds of subjects, or take notes that make sense even after a long time.

Blank mind maps have just the single central topic from which all other topics branch off. It's possible to change the text in a topic in the main view, or a double-click opens up more detailed options where related hyperlinks can be entered and fonts changed. These advanced options can also be used to add scribbles (using the stylus like a pen) to topics.

The software is compatible with the symbols used in MindManager to mark maps, which are great for describing topics and branches. Multiple symbols can be assigned to a topic and then used to filter them.

Pocket MindMap is not just about creating maps, but also about being able to view maps that have already been created. It can import mind maps from the default MindManager file format and from the XML versions.

Exporting is more flexible with HTML, text and image files; this is important when sharing documents with anyone who does not have MindMap, and for moving work from mind maps into finished work.

Ultimately, Pocket MindMap is hamstrung by the typically small size of Pocket PC displays; mind mapping works best with lots of screen space. It might be easier if there were a rotate option, although this would rule out some of the text entry methods.

To offer the maximum amount of space, a full-screen mode is available. Therefore, the Transcriber tool is the best option for input, as this leaves the most space for the MindMap. *Tim Smith*

Details

Price £33.80
Best price www.pcw.co.uk/bestprices
Contact Pocket MindMap www.pocketmindmap.com
System requirements Pocket PC 2000/2002/2003(SE)/Windows Mobile 5 • approximately 2.4MB of memory (can be installed to memory cards as well as main memory)

Verdict

Pros Good for organising thoughts; integrates with Outlook and MindManager
Cons Small screen of Pocket PC limits usability

Features	★★★★☆
Ease of use	★★★★☆
Value for money	★★★☆☆

Overall A very good mind-mapping tool that does the best within the constraints of the Pocket PC operating system
★★★★☆

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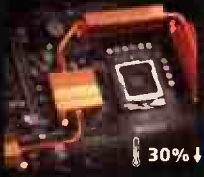

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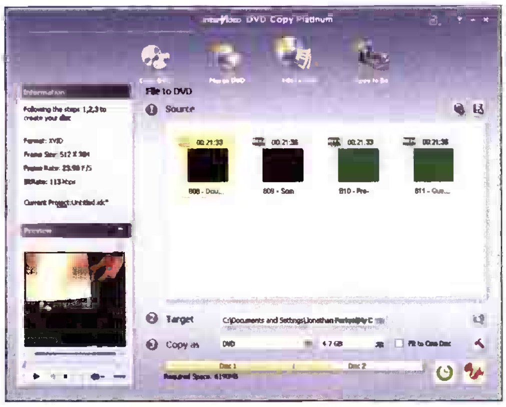
DVD COPYING

InterVideo DVD Copy 5 Platinum

A versatile utility, especially for iPod and PSP owners, but with limited appeal for most



Following the steps 1,2,3 to create your disc

Format: XVID
Frame Size: 512 X 384
Frame Rate: 23.98 F/S
BitRate: 113 Kbps

Current Project:Untitled.idc*

Target: C:\Documents and Settings\Jonathan Parkyn\My C
Copy as: DVD · 4.7 GB · ☐ Fit to One Disc
Required Space: 619MB

Most DVD writers come with basic DVD-copying software of some kind, but InterVideo DVD Copy 5 Platinum offers a whole toolkit of useful utilities for copying, transcoding and converting DVD movies.

We use the word 'useful' advisedly here. Like many other applications of this type, DVD Copy 5 cannot copy DVD movies that you buy over the counter. It is, of course, illegal to make copies of copyrighted material and DVD Copy 5 cannot natively decrypt the copy protection that manufacturers usually implement on shop-bought titles.

That's not to stop someone using something like AnyDVD to decrypt the disc in the background while DVD Copy 5 works, although doing so would be breaking the law. This means DVD Copy 5 is only really of any use when copying homemade DVDs.

Those who create a lot of DVDs, either from home movies or from a DVD video recorder or PVR, will find a fine selection of options at their disposal.

Essentially, there are four parts to the program: Copy DVD, Merge DVD, File to DVD and Copy to Go. Each one is presented as a series of simple steps, although more advanced settings are available. The program can make like-for-like copies, compress a dual-layer DVD to fit on 4.7GB single-layer media, or rip them to a file on your hard disk.

Most useful of all is its built-in ability to convert DVDs to iPod and PlayStation Portable-friendly H.264 Mpeg4 video.

With broad format support (including DivX and HDV), intelligent folder monitoring and WinDVD 7 player included, DVD Copy 5 Platinum has more on offer than many programs of its ilk, but it still has limited usefulness for most users. *Jonathan Parkyn*

Details

Price £29.99
Best price www.pcw.co.uk/bestprices
Contact InterVideo www.intervideo.com
System requirements 600MHz processor • 128MB Ram • 125MB hard disk space (additional space required when copying DVDs) • DVD writer • Windows 2000/XP

Verdict

Pros Easy to use; useful for iPod/PSP owners; supports different formats
Cons Won't rip copy-protected DVDs; freeware/shareware equivalents available

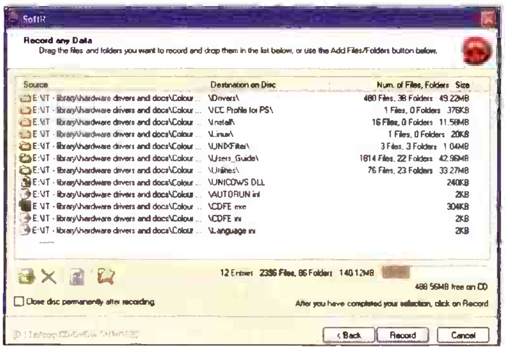
Features	★★★☆☆
Ease of use	★★★★☆
Value for money	★★★☆☆

Overall Useful for anyone with both a DVD video recorder and an iPod/PSP, but with limited appeal for most people
★★★☆☆

CD BURNING KIT

Orlogix Automagic CD-R

Burn CDs with virtually no effort at all



Record any Data
Drag the files and folders you want to record and drop them in the list below, or use the Add Files/Folders button below.

Source	Destination on Disc	Num. of Files, Folders	Size
E:\NT - library\hardware drivers and docs\Colour ...	\Drivers\	480 Files, 38 Folders	49.22MB
E:\NT - library\hardware drivers and docs\Colour ...	\ICC Profile for PS\	1 Files, 0 Folders	376KB
E:\NT - library\hardware drivers and docs\Colour ...	\Install\	16 Files, 0 Folders	11.58MB
E:\NT - library\hardware drivers and docs\Colour ...	\Linux\	1 Files, 0 Folders	20KB
E:\NT - library\hardware drivers and docs\Colour ...	\UNIXFilter\	3 Files, 3 Folders	1.04MB
E:\NT - library\hardware drivers and docs\Colour ...	\Users_Guide\	1814 Files, 22 Folders	42.96MB
E:\NT - library\hardware drivers and docs\Colour ...	\Utilities\	76 Files, 23 Folders	33.27MB
E:\NT - library\hardware drivers and docs\Colour ...	\UNICOWS.DLL		240KB
E:\NT - library\hardware drivers and docs\Colour ...	\AUTORUN.inf		2KB
E:\NT - library\hardware drivers and docs\Colour ...	\CDFE.exe		304KB
E:\NT - library\hardware drivers and docs\Colour ...	\CDFE.ini		2KB
E:\NT - library\hardware drivers and docs\Colour ...	\Language.ini		2KB

12 Entries 2396 Files, 86 Folders 140.12MB
488.56MB free on CD
☐ Close disc permanently after recording
After you have completed your selection, click on Record

Automagic CD-R from Orlogix is for people who want to put their stuff on to CDs, but don't know, or perhaps don't want to know, how to do it.

In the box you get a quick start guide, a CD-labelling pen and 15 discs. These are, in fact, specially created discs containing a CD-Rom section and a 700MB recordable area. The CD-Rom section contains simple CD recording software that launches automatically when the disc is inserted.

The opening menu gives you four recording options: Photos, Music, My Documents and Any Data. Further options allow you to learn more about the software, explore the CD or simply select your operating language.

Selecting Photos lets you drag and drop images or automatically scan your hard drive for pictures. You can then preview and optionally rotate images before hitting the record button, which records your pictures to disc.

There are no options or settings to deal with – it just gets on with it. Re-inserting the disc allows you to run the software again and add additional files in a similar manner.

Keeping everything ultra-simple means you can't create audio or video CDs, and the system's not suitable for making direct copies of CDs. Ease of use is the only reason for this product to exist; all you need to do is select from short menus and obey instructions.

At £20 for 15 discs, the Starter Kit is a lot more expensive than learning how to burn CDs for yourself. However, the refill pack contains 50 discs for £34.99. That's approaching half the price per disc.

The very purpose of the software is to make items such as the manual superfluous, so if you don't need the marker pen, you may as well just go straight for the refill pack. *Paul Monckton*

Details

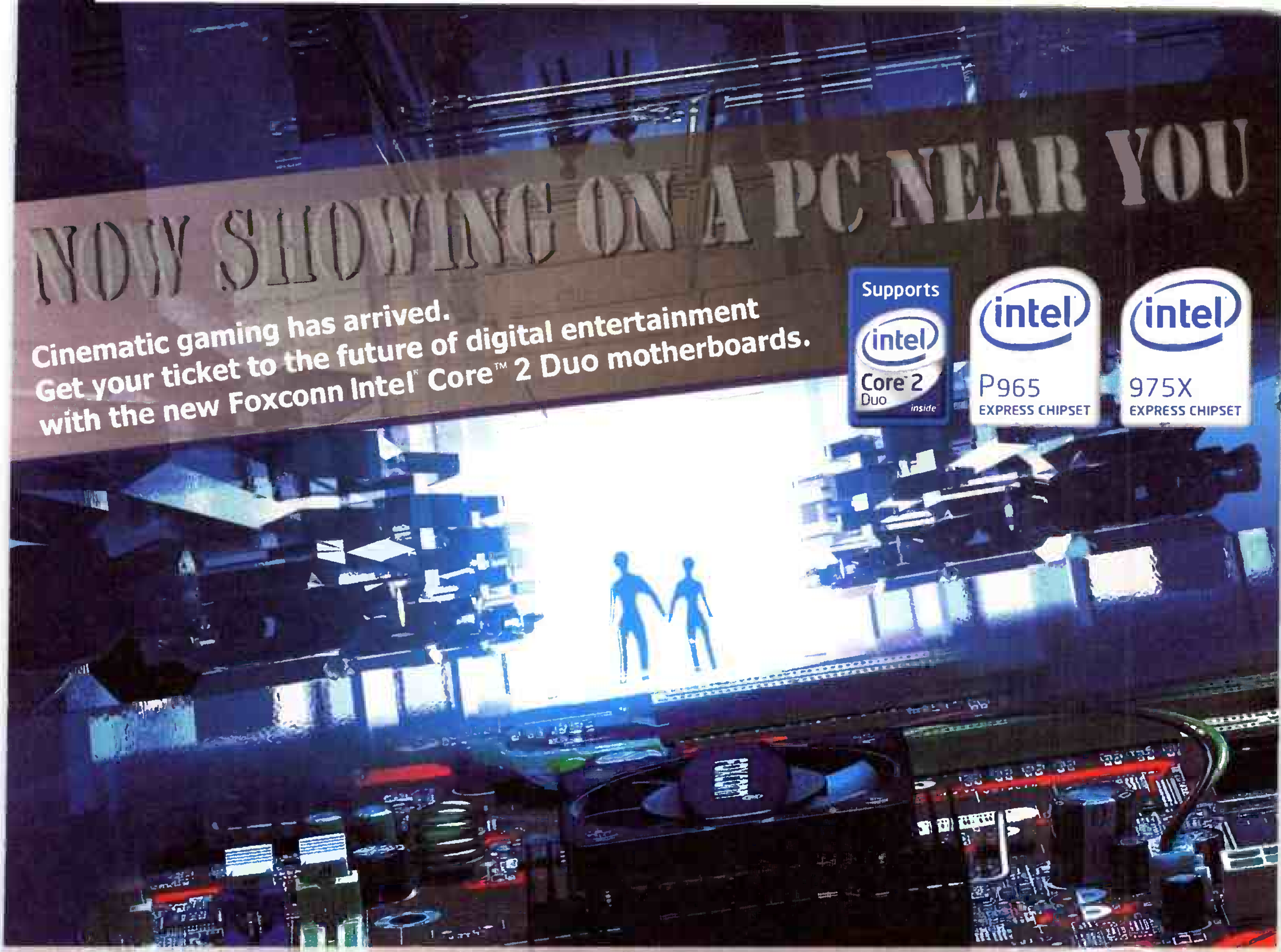
Price £19.99 for the starter kit
Best price www.pcw.co.uk/bestprices
Contact Orlogix www.orlogix.com
System requirements Requires a CD writer • Windows 2000/XP

Verdict

Pros Easy to use
Cons Restricted functionality; expensive discs

Features	★★☆☆☆
Ease of use	★★★★★
Value for money	★★★☆☆

Overall If burning CDs has been too tricky for you in the past, this will appeal, but for everyone else there's very little reason to purchase it
★★★☆☆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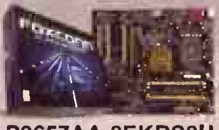
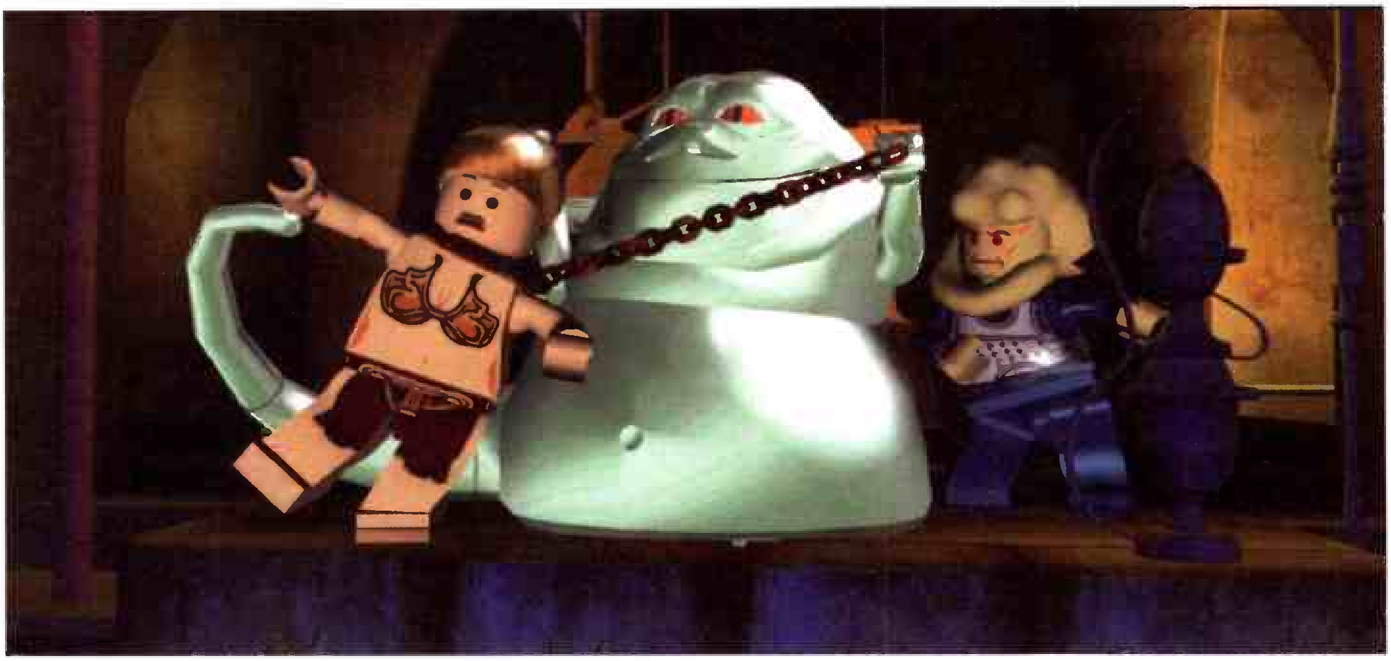


3D ACTION

Lego Star Wars II

Personal Computer World RECOMMENDED

Force-based fun for the entire family



Lego Star Wars II: The Original Trilogy is the follow-up to last year's multi award-winning surprise hit. Confusingly, while the original Lego Star Wars game dealt solely with the prequel movies, its sequel focuses on the original trilogy.

Rest assured, however, that this is pretty much the only point at which Lego Star Wars II gets anywhere near anything resembling complexity.

The game ties in neatly with the DVD re-release of *A New Hope*, *The Empire Strikes Back* and *Return of the Jedi* in their untampered, pre-Special Edition formats. But you don't have to be the sort of person who loses sleep worrying about whether Han or Greedo shot first to enjoy this engaging action title.

Indeed, while the Lego connection might suggest that it's aimed at a younger audience, Lego Star Wars II – like its predecessor – is sure to find itself played by gamers of all ages.

Split into three episodes (one per film), and then again into separate bite-size chapters within each episode, the basic idea is that you, as a Lego-ised version of one of the trilogy's heroes, tackle Lego-ised versions of the main set pieces from the films – from C-3PO and R2-D2's initial escape at the beginning of *Star Wars*, to the final Ewok attack at the close of *Return of the Jedi*. Minor tweaks are made to the storyline along the way in order to accommodate gameplay but, by and large, the game stays pretty close to the plot of the movies.

Different characters have different abilities: Jedi can use the force and wield lightsabres, for example, while blaster-toting characters can, for some reason, rappel up to higher levels.

There are often several playable characters available at any one time, and a simple button press allows you to switch from, say, Chewie to R2, should you require the droid's skills to open a particular door.

The game's puzzle element does get slightly more involved than simple door opening, but is rarely taxing and certainly never frustrating. Occasionally, you may need to get your character to physically assemble something out of a nearby pile of Lego bricks in order to continue. This isn't nearly as complicated as it sounds, however, since it simply involves pressing the 'build' button until construction is complete.

Combat, too, is very simplistic, largely involving single-button mashing skills and auto aim. Instead, the emphasis here is squarely on the fun side of things – something that's frequently underscored by the game's surprisingly irreverent sense of humour.

Once you've worked your way through the game's basic levels, there's plenty of replay value to be had by going back to each one and playing in free mode. Play as a different character and you may be able to use their special talents to reach previously inaccessible areas and unlock secrets.

Also amusing is the ability to mix-n-match Lego body parts to create mutant characters. Perhaps most fun of all is the game's co-op mode, which allows two players to work through the whole game as a team.

A perfect family game, Lego Star Wars II might sit better on a console than on the desktop (multi-platform versions are available) and definitely benefits from a gamepad. Hardcore gamers will undoubtedly find it far too simplistic (getting killed, for example, results in instant reincarnation with virtually no penalty), but it's hard to resist the game's pick-up-and-play charm.

Jonathan Parkyn

Details

Price £29.99
Best price www.pcw.co.uk/bestprices
Contact Lucas Arts www.lucasarts.com
System requirements 1GHz processor • 256MB of Ram • 3.5GB hard disk space • Windows 2000/XP

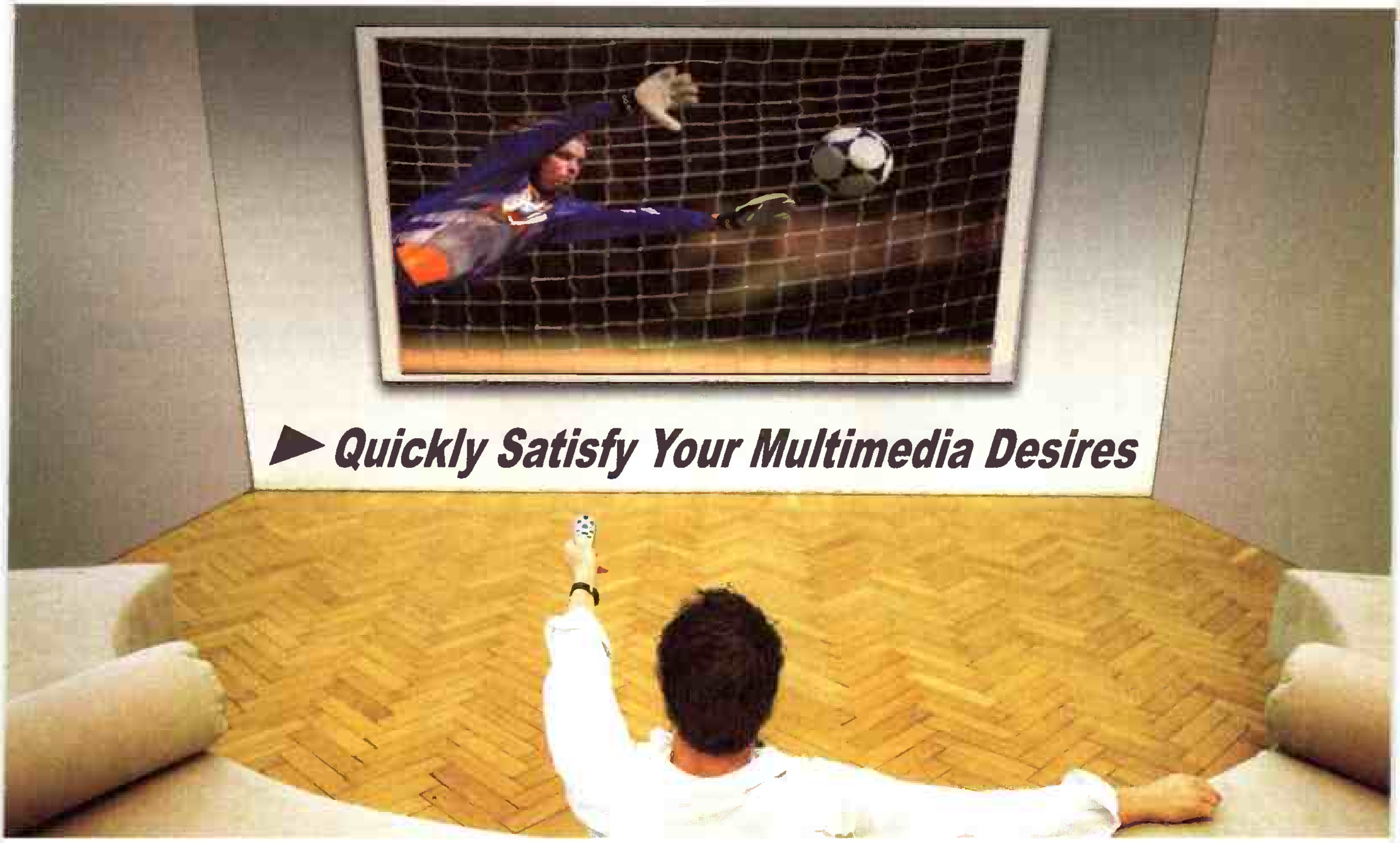
Verdict

Overall Simple and occasionally simplistic, this game has the same innocent, throwaway appeal that made the original movies so enjoyable

★★★★☆

ELITEGROUP

Simply Smart



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COMBAT FLIGHT SIMULATION

Wings Over Europe: Cold War: Soviet Invasion

Dogfight your way through Empire Interactive's airborne adventure

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What if the Cold War weren't cold at all, but instead uncomfortably hot – particularly in the skies above us? Well, that's precisely the question posed by this new combat flight sim, which labours under the curiously multi-faceted title of Wings Over Europe: Cold War: Soviet Invasion.

The what if? premise is, in essence, just an excuse for a spot of air-to-air combat involving some of the coolest planes of the 1960s and 70s. Throughout the game's three main campaigns – multiple one-off missions, and network or online multiplayer – you'll be able to hop into the cockpit of 12 different jet fighters, including the F-100 Super Sabre, the F-4 Phantom and, of course, the Harrier jump jet.

The first thing you'll notice on starting the game is that its presentation values are markedly lower than those of most modern games. Cheesy, compressed rock music greets you as the very basic opening menu screen appears. And things don't get much better.

Even at the highest quality settings, the in-game graphics are distinctly unimpressive; detail is low and textures are blocky and bland. On the upside, the game's basic visuals and audio mean you don't need a jet-powered PC to play it. However, we would expect a lot more from a full-price, non-budget title.

The game's designers have attempted to make Wings Over Europe a pick-up-and-play experience, cutting out a lot of the complexity associated with flight simulators in the hope of broadening the game's appeal. In doing so, however, they seem to have created a hybrid game that's too crude for true flight sim fanatics and equally unappealing to casual gamers.

Consequently, Wings Over Europe is likely to crash and burn with almost anyone who plays it.

Jonathan Parkyn

Details

Price £29.99
Best price www.pcw.co.uk/bestprices
Contact Empire Interactive
www.empireinteractive.com
System requirements 650MHz processor • 256MB Ram • 1.3GB hard disk space • Windows 2000/XP

Verdict

Overall The premise is promising, but in trying to be all things to everyone, Wings over Europe misses its target by a mile
★★☆☆☆

REAL-TIME STRATEGY

Company of Heroes

Yet more war – but is this a fresh strategy or just history repeating itself?

Personal Computer World RECOMMENDED

It could be argued that the video games industry has a somewhat unhealthy obsession with the Second World War. But just when you thought the conflict in question had been milked for all its worth by the legions of WWII-theme, first-person shooters, combat flight sims and squad-based games out there, developer Relic comes along and uses it as the backdrop for a remarkable real-time strategy (RTS) title.

From the traditional RTS viewpoint, players must fortify encampments, upgrade weaponry and command troops in battle. In the single-player campaigns you're put in charge of a company of US troops during the D-Day invasion and proceeding hostilities. Multiplayer allows up to eight players to split into teams and go head-to-head as either Axis or Allied forces.

Basic strategy involves getting your troops to secure various resource points that are dotted around the map. Taking command of these ensures a steady flow of the three vital resources – manpower, munitions and fuel – that are required for a successful outcome. Company of Heroes is very action-oriented, meaning you often have to think fast and act even faster.

Extremely impressive artificial intelligence, graphics and sound all help to generate a uniquely immersive, often unsettling, experience. Gentle birdsong is abruptly replaced by deafening explosions as an artillery strike is called in, for example, while the sight of fully destructible environments crumbling under fierce bombardment, or individual soldiers in their final death throws, can be genuinely disturbing.

Veteran real-time strategists will love Company of Heroes, but the game is accessible enough to appeal to those less familiar with the genre. The game is definitely a challenge, but one that's well worth taking on, despite its war-torn setting.

Jonathan Parkyn

Details

Price £34.99
Best price www.pcw.co.uk/bestprices
Contact THQ
www.companyofheroesgame.com
System requirements 2GHz processor • 512MB Ram • 6.5GB hard disk space • DVD-Rom drive • Windows XP

Verdict

Overall Detailed, focused and fast paced, this is the best strategy game to come along in ages
★★★★★

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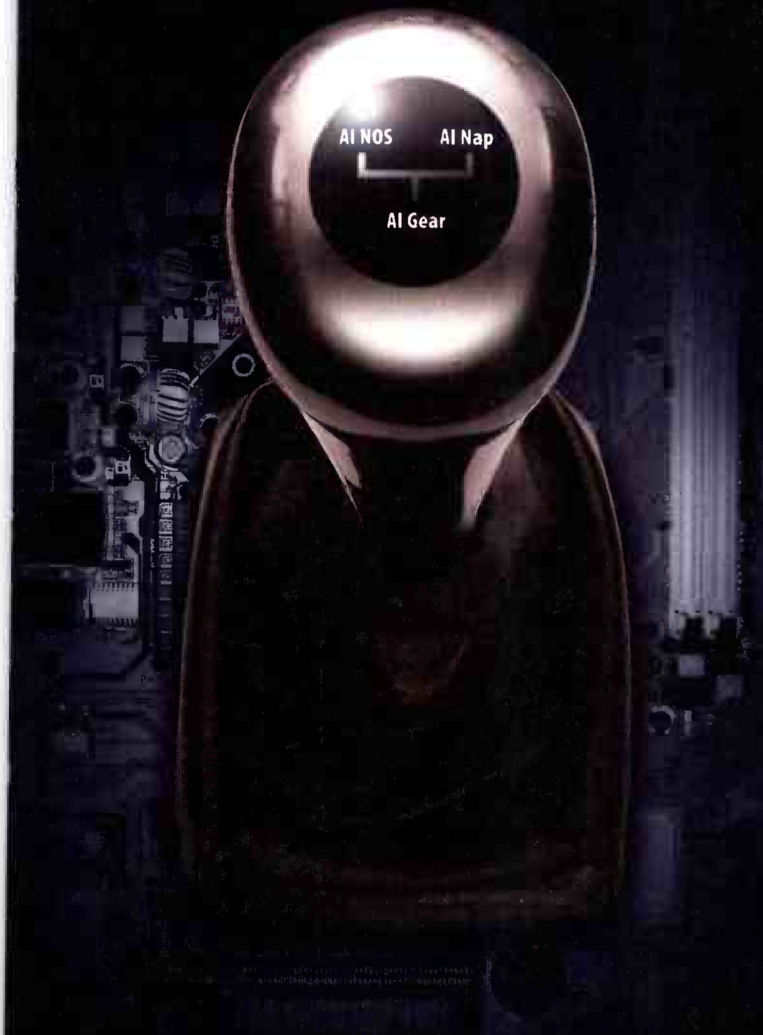

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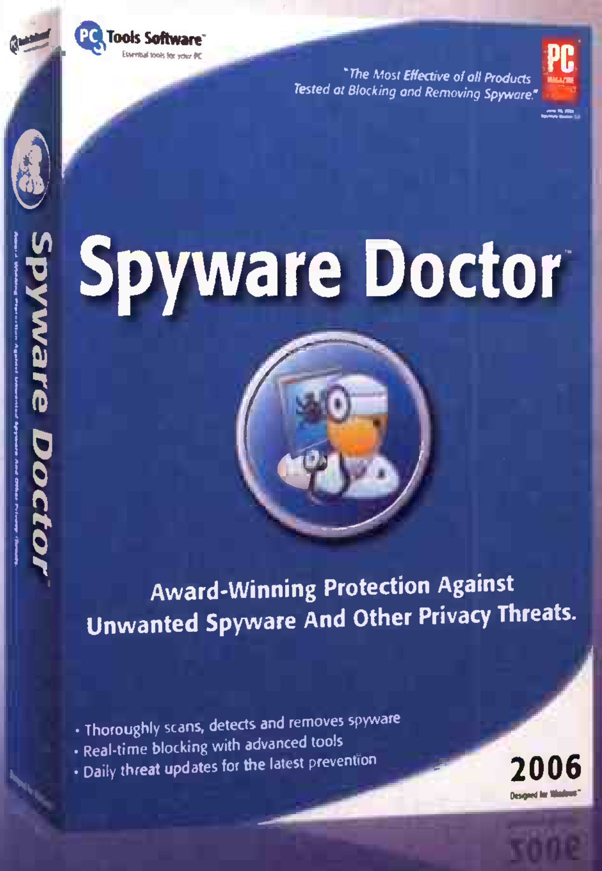
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PC Magazine Editors' Choice June 19, 2005, Spyware Doctor V3.2
PC Magazine Best of the Year 2005 - Anti Spyware 27 December 2005, Spyware Doctor V3.2

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Spyware Doctor 3.2
Issue 237, December 2005

Spyware Doctor 3.5
Issue 157, April 2006

Spyware Doctor 3.2
Issue 71, 2006

Spyware Doctor 3.8
Issue 139, July 2006

Spyware Doctor 3.8
August 2006

Spyware Doctor 3.2
September 2005

Spyware Doctor 3.8
August 2006

Spyware Doctor 3.5
May 2006

Personal Computer World

vnu labs

How we test

Performance testing is an important part of PCW's reviewing process and to obtain our authoritative results we use the UK's best PC testing resource – VNU Labs. Here we explain why you can trust our results and give you a tour of our most frequently used benchmark programs.

One of the main reasons people upgrade their PCs is because their old model seems 'too slow'. But how do you tell whether the one you're going to replace it with is any faster? At *PCW* we take PC testing very seriously and we have the UK's best PC testing labs – VNU Labs – on tap to help us give you reliable, authoritative performance figures, to help you with your purchasing decisions.

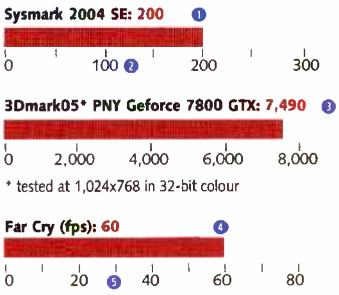
It's true that speed isn't everything, but it's an important part of the buying equation, especially when there are so many components out there. As many of our PC group tests are based on price bands, checking the performance is even more important – if the core system is underperforming, you need to know before you part with your hard-earned cash.

In VNU's UK Labs, which is part of the European VNU Labs network, our staff have over 20 years of combined testing experience. We know all the perils and pitfalls of practical benchmarking and we contribute to the development of industry-standard benchmarks through our full membership of Bapco (www.bapco.com), the non-profit benchmark consortium. We are also a media member of the Futuremark Benchmark Development Program (www.futuremark.com). Listed below are the main benchmarks we use for testing PC systems and components.

- Bapco Sysmark 2004 SE – an application-based benchmark that tests real-world system performance.
- Futuremark 3Dmark03 – a 3D graphics benchmark designed to test the performance of DirectX 8 graphics cards.
- Futuremark 3Dmark05 – the latest version of 3Dmark that tests DirectX 9 3D graphics performance.
- Ubisoft Far Cry – we use the Fort level timedemo to see how graphics cards perform in a real DirectX 9 game.
- Futuremark PCmark05 – a synthetic benchmark used to test the performance of a PC's major subsystems.
- Bapco Mobilemark 2005 – used to assess the battery life of notebooks using real-world applications and usage scenarios.
- Test beds – we use standardised AMD and Intel-based test rigs to test components and peripherals.

There's more information about our testing procedures and benchmarks on our Labs site at www.reportlabs.com/testbed/bguides/benchmarks.php.

Performance



* tested at 1,024x768 in 32-bit colour

① A score of 200 indicates that the system is twice as fast as the reference PC

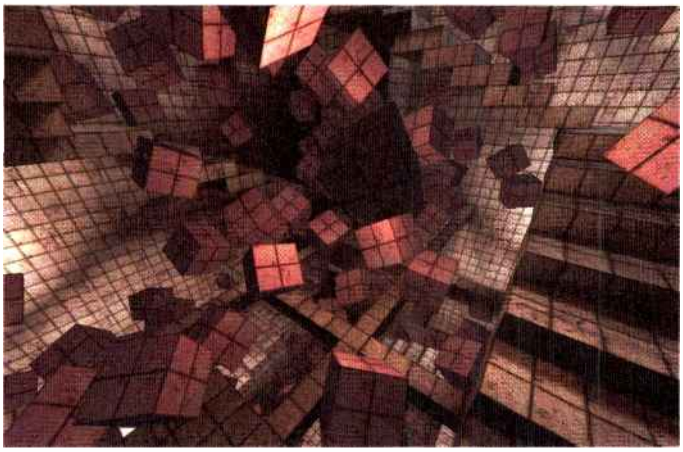
② The reference PC (2GHz P4 512MB of Ram) scores 100

③ A Geforce 7800 GTX would score in the region of 7,490

④ A score of 60fps (frames per second) or higher is most desirable

⑤ A result of 30fps or above means the machine can produce playable frame rates at the tested resolution

Far Cry is a real-world DirectX 9 test



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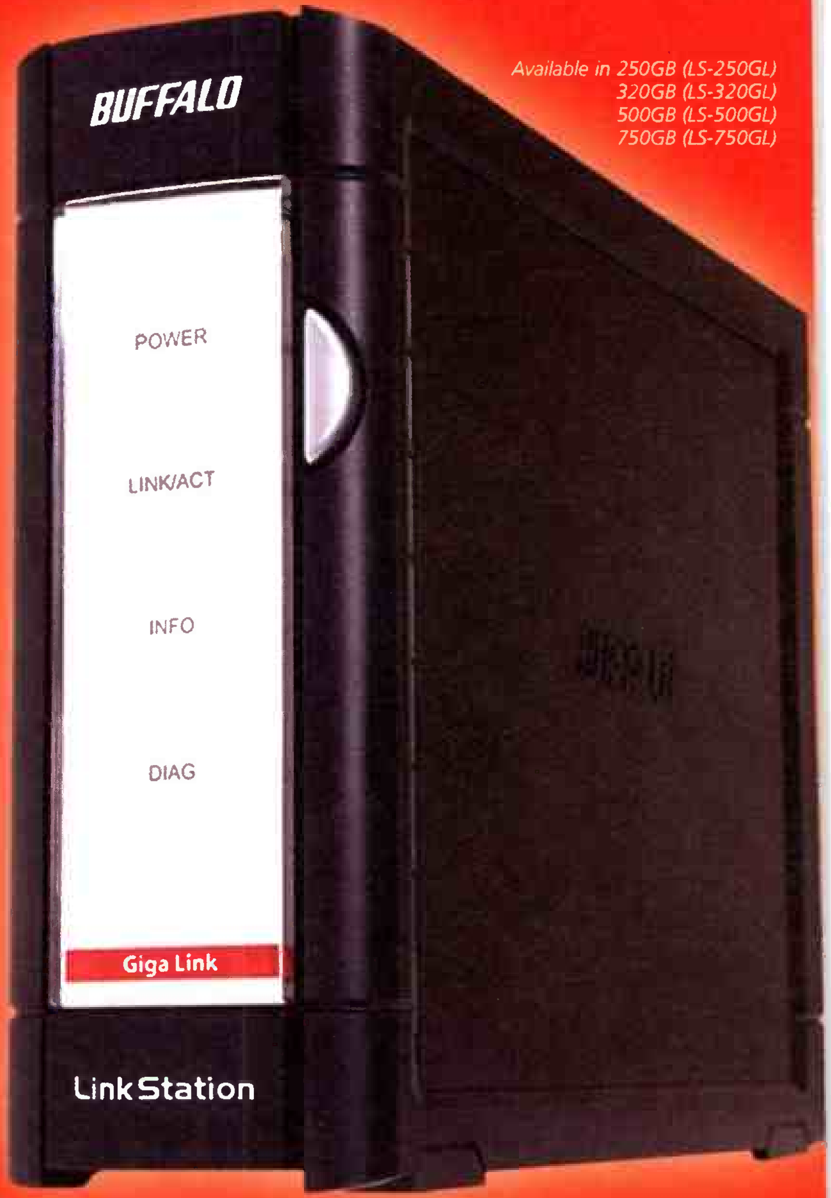

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Personal Computer World RECOMMENDED

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* LinkStation Pro is up to 5X Faster than Buffalo LinkStation and other competing products; based on Buffalo Technology internal testing. For maximum data speeds, Gigabit networking must be used (JumboFrame recommended). Maximum speed is also based on network activity and protocols.

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ON TEST

104 **Asus F3F**
Evesham Quest A430
105 **Hi-Grade Ultinote A9700**
MSI MegaBook M662
106 **MV Mobeus 13"**
Toshiba Satellite A110-275

107 Performance results
108 Table of features
110 Upgrading a laptop
Editor's Choice

> **'Some are equipped with 17in widescreens and 1GB of Ram, and more than half are Vista Capable'**

£699 laptops

Once the preserve of business people, laptops are becoming a popular choice for home users, too, thanks to wireless networks and falling prices. Luke Peters looks at six for under £700

With the launch of a new Intel processor, there are often side effects – and one is a drop in the price of systems built on the older chips. It may not be good news if you've just bought a new computer, but bargain hunters will find plenty of PC manufacturers dropping the price of their system by using older processors. So, we've rounded up half a dozen of the best-looking £699 notebooks to see exactly what bargains are available.

The laptops on test feature both Intel and AMD processors but, predictably, there was no sign of the latest Core 2 Duo technology, and some manufacturers gave the switchover as the reason for not participating in the group test. Nevertheless, the notebooks we've included show what is available for under £700. Not only are some equipped with 17in widescreens and 1GB of Ram, more than half are Vista Capable, which is good news for those with an eye on the future.

The biggest compromise at this price point is with graphics; you'll be hard pushed to find a laptop for under £700 that can play 3D games with a respectable resolution and level of detail. However, for general computing tasks, video-editing and DVD playback, systems such as these should be more than sufficient. When you're shopping for laptops on a budget, key factors to consider are the amount of Ram (1GB will make a world of difference), the battery life and the screen quality. So, with those features in mind, we've put six systems through their paces.

↘

Asus F3F

Personal Computer World
EDITOR'S CHOICE

Price £699 **Contact** http://uk.asus.com

PERSONAL COMPUTER WORLD

Recent Asus notebooks have left us impressed; they look much better than previous generations and offer good value for money. The F3F keeps up the good work in a number of ways.

Under the lid is an Intel T2050 (1.6GHz) Centrino Duo processor and 1GB of Ram. There may be faster processors in this roundup, but that extra memory helped the F3F to achieve a Sysmark score of 194 and a PC Mark of 2881. These scores may sound puny when compared with Core 2 Duo processors, but compared with most others in this group test, the Asus proves its worth.

Its main selling point, however, is incredible battery life. Asus has equipped the F3F with a 7,200mAh battery pack – bigger than anything else in the group. It enabled the F3F to run for more than six-and-a-half hours while performing general computing tasks – more than twice the time managed by its closest rival – the MV – and 408 minutes when playing DVDs. This should make it appeal to those wanting to work away from the confines of a desk and means you can even sit through a complete Oliver Stone epic without needing a recharge.

The 80GB hard disk is standard fare for a notebook at this price, and the F3F also carries a Vista Capable sticker, which means there should be no upgrade problems when the new operating system arrives.

Other notable features include a multiformat DVD writer, a 15.4in bright widescreen display, a 1.3 megapixel webcam built into the lid, a good-size track pad with a scroll slider and integrated Bluetooth V2.0+EDR, which can reach transfer rates of 3Mbits/sec.

The graphics aren't really up to much, though, thanks to the choice of Intel's integrated 945 chipset, but overall the F3F is well designed, looks good and, at 3.05kg, it's relatively portable too.

Verdict

Pros Amazing battery life; good design; good performance for the price

Cons Poor graphics; heavier than other notebooks on test

Features	★★★★★
Performance	★★★★☆
Value for money	★★★★☆

Overall If you're looking for something to take away from the desk and on the road, the Asus' battery life is hard to ignore

★★★★★

Evesham Quest A430

Price £699 **Contact** www.evesham.com

PERSONAL COMPUTER WORLD

Evesham's £699 offering is the Quest A430. With a matte black and silver chassis and weighing 3.5kg, it's based on AMD's Turion 64 X2 TL-50 (1.61GHz) processor and 512MB of DDR2-533 Ram. Our benchmarks yielded some surprising results, with the Quest finishing second to bottom in Sysmark, although it made up points in PCmark, scoring 2,865.

Bolstered by the dedicated 256MB Nvidia Geforce 6100 graphics, the Quest A430 was the only notebook to (barely) surpass 10fps in the graphics benchmarks, which won't thrill games fans but shows that, at this price, graphics are usually sacrificed for other features.

A Sata hard disk, which is becoming commonplace in notebooks, has been squeezed into the case. At 80GB it's adequate, but there's a likelihood more space will be needed later on. That will happen sooner rather than later if you take advantage of the Windows Media Center to record multimegabyte TV programmes – though the Quest lacks the TV tuners necessary for PVR use. A multiformat DVD writer is at hand for archiving your files and documents, though.

The Quest includes a superb X-Bright 17in LCD widescreen display, which is capable of a maximum resolution of 1,440x900, and a good selection of ports and sockets dotted around the case. The big screen, however, does have implications for battery life. At about 2 hours 26 minutes before needing a recharge, the A430 may not be the best choice for road warriors.

Design-wise, this notebook has a lot of room to rest hands when typing, and a dedicated numeric keypad. However, some keys have been truncated to fit, including the Enter button, which takes getting used to. The case itself is well made, with shortcut keys above the keyboard and memory card slots, audio and a Firewire port in a cut-out panel on the front.

Verdict

Pros 17in widescreen display; Windows Media Center Edition; dedicated graphics card

Cons No TV tuner for Media Center; not the greatest battery life

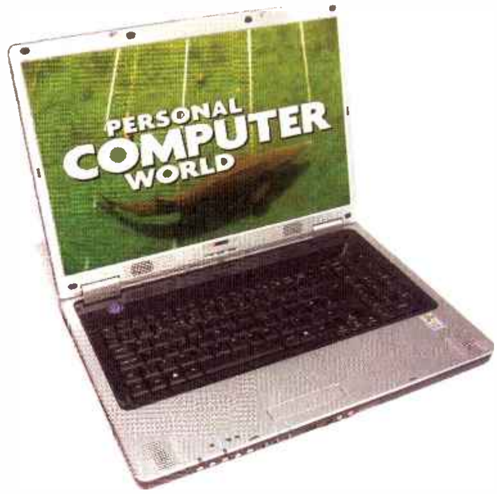
Features	★★★★☆
Performance	★★★☆☆
Value for money	★★★☆☆

Overall Lovely big screen and some good features, but it's not the fastest notebook in this group test, nor is it ready to take full advantage of Windows Media Center out of the box

★★★☆☆

Hi-Grade A9700

Price £699 **Contact** www.higrade.com



Hi-Grade notebooks usually fare well in *PCW* group tests, so we had high hopes of the A9700. A first look suggests good things; there's a big, bright 17in widescreen display, lots of space to rest your hands while typing and a minimalist design once the lid is up. The inside doesn't sound bad either, with an AMD Turion 64 Mobile ML-37 (2GHz) processor, 1GB of Ram and a dedicated ATI Radeon Xpress 200M graphics card (even though it steals 64MB of system memory). Nevertheless, when we put the A9700 through benchmarks, several weaknesses became apparent.

Achieving the lowest results in all but one of our tests, the Hi-Grade managed 137 in Sysmark and a PCmark score of 1,775. Granted, for many office, internet and Windows tasks this is perfectly adequate, but with Windows Vista around the corner and software becoming increasingly demanding, those scores mean this notebook could feel the pinch very quickly.

Hi-Grade has decided to use a relatively old processor. As most other manufacturers have made the jump to dual-core technology, you can't help wondering if this is a case of old stock being used up to make way for the next big thing.

Even with its dedicated graphics card, the A9700's attempt at running Far Cry resulted in a no-show, while a 3Dmark score of 454 speaks for itself. Battery life was also dire, lasting just 1 hour 15 minutes.

On the up side, there's a multiformat Sony DVD writer and six USB ports embedded into the sides of the case, and media playback buttons on the front lip. It's also the only notebook here with a DVI port. These gestures, however, are not enough to make up for the lacklustre performance. And, at 3.4kg, the A9700 is unlikely to live anywhere but on a desk, with the battery life ensuring it's permanently tethered to the mains.

Verdict

Pros Dedicated graphics card, DVI port, 17in widescreen display
Cons Heavy, poor battery life

Features	★★★☆☆
Performance	★★☆☆☆
Value for money	★★★☆☆

Overall Compared with the other notebooks here the Hi-Grade just doesn't cut the mustard; it's bottom of the class in most tests and bulky to boot

★★★☆☆

MSI Megabook M662

Price £699 **Contact** http://msicomputer.co.uk

PERSONAL
COMPUTER
WORLD

MSI's Megabook M662 is one of a few notebooks in this test to benefit from Intel's Centrino Duo technology. At 1.67GHz, the T2300 processor doesn't have the fastest clock speed, but with 1GB of Ram to support the processor, the MSI managed to achieve benchmark results similar to systems with faster processors.

Scoring 185 in Sysmark and 2,782 in PCmark means that Windows and most software gallops along. Deploy some hardcore tasks such as video encoding and rendering, and the MSI will slow down to a canter.

The 80GB hard disk should be adequate if you don't have a huge media collection, but it may be a consideration for those who do. Along with the Hi-Grade, Toshiba and Asus, the Megabook M662 proudly displays a Vista Capable sticker, which will please those looking to upgrade.

The 15.4in widescreen display is powered by Intel's unexciting GMA950 graphics chipset, but can still display at 1,280x800 pixels. The screen is quite flimsy and for a decent view of DVD movies, you need to position it dead ahead – so it's no use for group viewing.

As we expected, there's no chance of playing the latest 3D games at a respectable frame rate or detail setting, an assumption reinforced by its 3Dmark score of 437 and 5.94 frames per second.

Another let-down is the battery life; at just over two hours for general Windows use before needing a recharge, it's not suitable for travellers. The usual smattering of ports and sockets can be found around the chassis, and there's also a multiformat DVD writer. Expansion comes in the form of a PCI Express Card expansion slot for attaching compatible peripherals.

The keyboard is similar to the Evesham with its tightly packed buttons. At 2.5kg, it's not the lightest notebook here, but is still very portable.

Verdict

Pros 1GB of Ram; good system performance; Vista Capable
Cons Poor graphics; tightly packed keyboard layout; poor battery life

Features	★★★☆☆
Performance	★★★☆☆
Value for money	★★★☆☆

Overall Almost a good all-rounder, if it weren't for the short battery life

★★★☆☆

↘

MV Mobeus 13"

Price £699 **Contact** www.go-mv.com

PERSONAL COMPUTER WORLD

Making a change from the rest of the systems on test, MV has plumped for ultra-portability. The Mobeus has a 13in display, weighs 2.1kg and features Intel's battery-saving Centrino Duo technology.

It topped almost 2 hours in our battery tests and still managed respectable scores of 183 in Sysmark and 2980 in PCmark, which are impressive compared with the bulkier offerings from Evesham and Hi-Grade.

The Intel T2400 (1.83GHz) processor and 512MB of memory obviously had a lot to do with this and, once again, proves how much of an impact Core Duo technology has made.

There's an 80GB hard disk fitted and the 13in screen can display a maximum resolution of 1,280x768, which makes Windows, applications and DVDs look crisp. A multiformat DVD writer is integrated into the side of the chassis, sitting alongside a brace of USB ports and a memory card slot.

The Mobeus' weak graphics prowess (courtesy of Intel's 945GM chipset) was expected. Low frame rates in games and a score of 457 in 3Dmark mean that unless you have a penchant for Solitaire, you'll need to look elsewhere to satisfy your 3D cravings.

Typing on this notebook is comfortable; however, the right side of the hand rest heats up significantly while in use. Battery life was one of the best, scoring almost 3 hours in general Windows use. MV also uses its own technology for increasing battery life. Press the 'stealth' button and the processor slows down, so you can extend your time away from the mains.

Like all the other systems on test, the Mobeus has built-in wireless networking but, as an added bonus, it also includes Intervideo's Instant On software, which allows digital media to be accessed without booting the Windows XP Home operating system first.

Personal Computer World RECOMMENDED

Verdict

Pros Good battery life; small and lightweight; good screen
Cons Poor graphics

Features	★★★★☆
Performance	★★★★☆
Value for money	★★★★☆

Overall A great effort by MV. Small and compact while being relatively powerful, with good battery life

★★★★☆

Toshiba Satellite A110-275

Price £650 **Contact** http://uk.computers.toshiba-europe.com

PERSONAL COMPUTER WORLD

Some recent Toshiba notebooks left us feeling distinctly ambivalent, but they've turned the corner and started to impress once more.

The A110-275 achieved a Sysmark score of 200 and a PCmark of almost 3,000, which is excellent, especially when you consider that it's £50 cheaper than all the other systems on test.

Aided by Intel's T2400 (1.83GHz) processor and 1GB of memory, the A110-275 is also Windows Vista capable. Unfortunately, the integrated graphics means that all the flashy bits of Vista probably won't work, but it's nice to know this notebook is equipped for future developments, which can't be said of some entrants in this group test.

The 60GB hard disk is smaller than that found on all the other systems, perhaps showing where that £50 saving has gone, and potentially a problem for the media-hungry. The 15.4in screen is nice and bright, but the integrated graphics aren't powerful enough to play the latest 3D games.

Design-wise, as you'd expect from Toshiba, it's one of the best-looking models on test. A solid keyboard, a column of media shortcut buttons and snazzy trackpad buttons look and feel appealing, while the build quality feels a lot more rugged than most of the competition. And, at 2.7kg, it's easily portable. If we have one slight criticism, it's the size of the trackpad, which is considerably smaller than others and has no scroll bar.

Battery life wasn't that impressive, but the A110-275 still managed 1 hour 40 minutes in Windows. Our DVD test ran to just under 2 hours, which, apart from the Asus, is about average from the notebooks that we looked at. However, this notebook still has a lot of plus points in its favour and a decent software bundle.

Verdict

Pros Good relative system performance; lightweight; well built, Vista capable
Cons Small trackpad; DVD playback will only last a couple of hours; smaller hard disk than most.

Features	★★★★★
Performance	★★★★☆
Value for money	★★★★☆

Overall The cheapest notebook here, but among the best performing. Toshiba has impressed us again

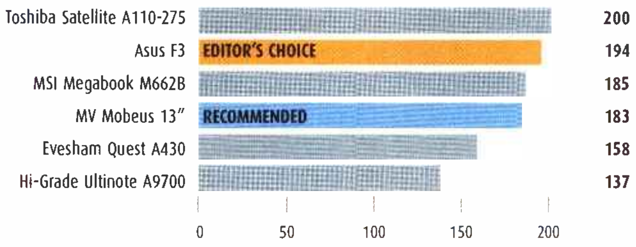
★★★★☆

Lab results

Overall, the technical specifications of the laptops we tested are very similar. Even those with AMD processors offer little variation on the theme

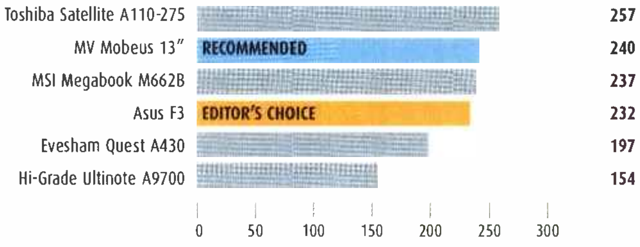
Sysmark 2004 SE Overall

Bigger is better



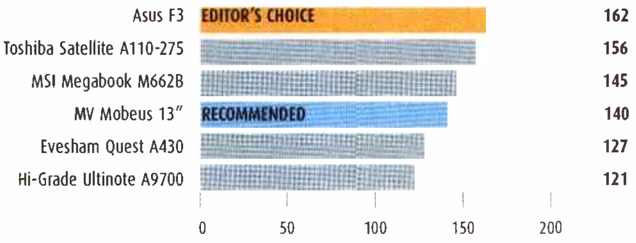
Sysmark 2004 SE Internet Content Creation

Bigger is better



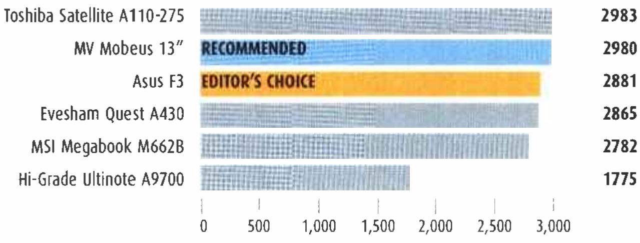
Sysmark 2004 SE Office Productivity

Bigger is better



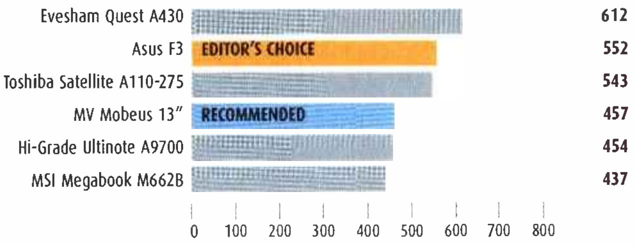
PCmark 05 Overall

Bigger is better



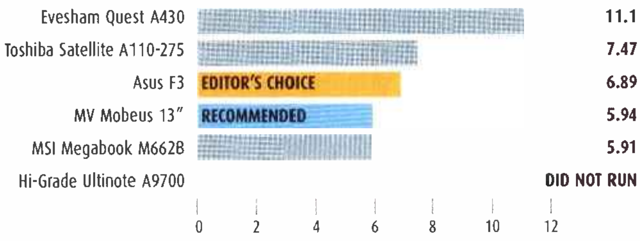
3Dmark 05 (1,024x768, 32-bit colour)

Bigger is better



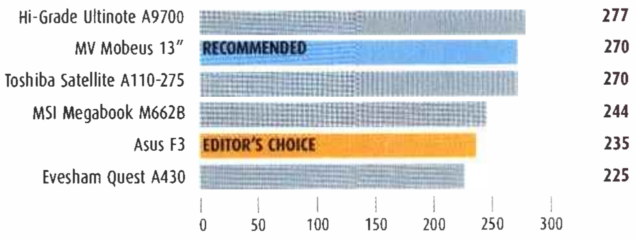
Far Cry (1,024x768, 32-bit colour)

Bigger is better



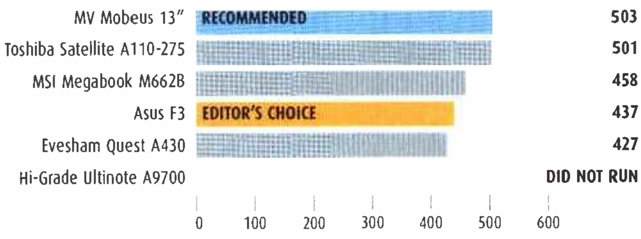
Cinebench Single CPU

Bigger is better



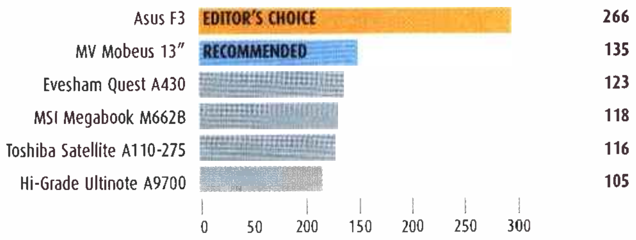
Cinebench Dual CPUs

Bigger is better



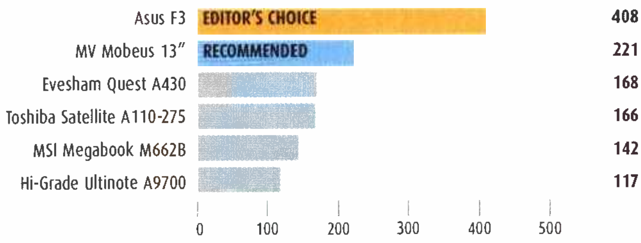
Mobilemark 2005 DVD Playback

Bigger is better



Mobilemark 2005 Reader

Bigger is better



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Please see page 101 for an explanation of how we tested the PCs

Laptops

	Personal Computer World EDITOR'S CHOICE PERSONAL COMPUTER WORLD	PERSONAL COMPUTER WORLD
MANUFACTURER	**ASUS**	**EVESHAM**
Model name	F3F	Quest A430
Price inc VAT	£699	£699
Sales telephone	0870 120 8340	0870 160 9500
URL	http://uk.asus.com	www.evesham.com
HARDWARE		
Processor	Intel Core Duo T2050 (1.60GHz)	AMD Turion64X2 TL-50 (1.6GHz)
Chipset	Intel 945GM/ICH7-M	Nvidia Geforce GO 6100/Nvidia Nforce 430
Available memory/type	1GB PC2-667 DDR2	512MB PC2-533 DDR2
Occupied/spare memory slots	2/0	2/2
Max memory supported	2GB	2GB
Hard disk manufacturer and model	Hitachi HTS541080G9SA00	Fujitsu MHV2080BH
Hard disk size	80GB	80GB
No of Express card slots	1	1
No of PC Card slots	0	1
No of Firewire/serial/parallel/PS/2 ports	1/0/0/0	1/0/0/0
No of USB ports	4	4
MULTIMEDIA		
Optical drive	Hitachi GMA-4082N	Sony DW-Q520A
Optical drive formats and speed (Max)	8x DVD,8x DVD+/- R, 4x DVD -/+RW, 3x DVD-RAM, 2.4x DVD +R DL	8x DVD, 8x DVD -/+ R, 8x DVD +RW, 6x DVD -RW, 4x +R DVD DL, 6x -R DVD DL
Soundchip	SigmaTel STAC9200	Realtek ALC883
Graphics type/memory	Integrated Intel GMA950 /224MB shared	Nvidia Geforce GO 6100/256MB
Screen size and (maximum resolution)	15.4in WXGA/1,280x800	17in WXGA/1,440x900
OTHER INFORMATION		
Misc hardware/modem	7-in-1 card reader, 1.3MP camera, 10/100 Lan, modem	4-in-1 card reader, 10/100/1000 Lan, modem
Wireless technology	802.11a/b/g	802.11b/g, Bluetooth
Weight including AC adapter (kg)	3.45	3.85
Dimensions (wxdxh) mm	365x269.5x28	395x278x26.5
Operating system	MS Windows XP Home SP2	MS Windows Media Center
Bundled software	Asus utilities, Norton Internet Security, Nero 7 Suite (OEM version), Asus DVD, Microsoft Works	Microsoft Works 8.5, Bullguard Internet Security 5, Roxio Easy Media Creator 7, Adobe Acrobat Reader 6, Cyberlink PowerDVD 6
Standard warranty (RTB = return to base, C&R = collect and return)	Two-year C&R	One-year on-site; second and third years RTB
SCORES		
Features	★★★★★	★★★★☆
Performance	★★★★☆	★★★☆☆
Value for money	★★★★☆	★★★☆☆
OVERALL	★★★★★	★★★☆☆

Vendors of group test products are only obliged to sell them at the prices quoted here (which include delivery and credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances.

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Personal Computer World RECOMMENDED

PERSONAL COMPUTER WORLD

HI-GRADE	MSI	MV	TOSHIBA
Ultinote A9700	MegaBook M662	Mobeus 13	Satellite A110-275
£699	£699	£699	£650
020 8532 6111	No UK number	0871 855 4668	0870 444 8944
www.higrade.com	http://msicomputer.co.uk	www.go-mv.com	http://uk.computers.toshiba-europe.com
AMD Turion64 3700+ (2.0GHz)	Intel Core Duo T2300E (1.66GHz)	Intel Core Duo T2400 (1.83GHz)	Intel Core Duo T2400 (1.83GHz)
ATI RS480/ULI M1573	Intel 945GM/ICH7-M	Intel 945GM/ICH7-M	Intel 945GM/ICH7-M
1GB PC2700 DDR333	1GB PC2-667 DDR2	512MB PC2-533 DDR2	1GB PC2-533 DDR2
2/0	1/1	1/0	2/0
2GB	2GB	2GB	2GB
Fujitsu MHV2080AT	Hitachi HTS541080G9SA00	Hitachi HTS541080G9SA00	Toshiba MK6034GSX
80GB	80GB	80GB	60GB
0	0	0	0
1	1	1	1
1/0/0/0	1/0/0/0	1/0/0/0	1/0/0/0
6	4	3	3
Sony DW-Q520A	Hitachi GMA-4082N	Sony DW-Q520A	Hitachi GMA-4082N
8x DVD, 8x DVD -/+ R, 8x DVD +RW, 6x DVD -RW, 4x +R DVD DL, 6x -R DVD DL	8x DVD,8x DVD+/- R, 4x DVD -/+RW, 3x DVD-RAM, 2.4x DVD +R DL	8x DVD, 8x -/+ R, 8x +RW, 6x-RW, 4x +R DVD DL, 6x -R DVD DL	8x DVD,8x DVD+/- R, 4x DVD -/+RW, 3x DVD-RAM, 2.4x DVD +R DL
Realtek ALC880(D)	Realtek ALC883	Realtek ALC861	Realtek ALC681
Integrated ATI Xpress 200/64MB	Integrated Intel GMA950/128MB shared	Integrated Intel GMA950/224MB shared	Integrated Intel GMA950/128MB shared
17in WXGA+/1,200x800	15.4in WXGA/1,280x800	13.3in/1,280x768	15.4in/1,280x800
4-in-1 card reader, 10/100/1000 Lan, modem	4-in-1 card reader, 1.3MP camera, 10/100/1000 Lan, modem	4-in-1 card reader, 10/100/1000 Lan, modem	4-in-1 card reader, 10/100 Lan, modem
802.11g	802.11b/g	802.11a/b/g	802.11
3.94	3.25	2.06	3.25
393x280x38	358 x 259 x 27	316x224x35	356x262x39
MS Windows XP Home SP2	MS Windows XP Home SP2	MS Windows XP Home SP2	MS Windows XP Home SP2
Sonic RecordNow, Sonic CinePlayer, Bullguard AV (90-day trial), Open Office	Cyberlink software suite comprising Power DVD, PowerProducer, Power2Go, PowerDirector, Medi@Show, PhotoNow. Norton Internet Security 90-day trial	Microsoft Works 8, Office 2003 (60-day trial), BullGuard AV/Firewall/Backup, Roxio Creator 8	Intervideo WinDVD Creator (2Platinum), Norton Internet Security 2006 (with free internet updates for 90 days), InterVideo WinDVD Toshiba Disc Creator Microsoft Works 8.5 (with Office Student and Teacher Edition 2003 Trial and Microsoft Digital Image Starter Edition 2006 Trial) ConfigFree
One-year C&R	Two years C&R	Three years: year one C&R parts and labour; years two and three labour only	One-year C&R
★★★☆☆	★★★☆☆	★★★★☆	★★★★★
★★☆☆☆	★★★☆☆	★★★★☆	★★★★☆
★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
★★★☆☆	★★★☆☆	★★★★☆	★★★★☆

Vendors of group test products are only obliged to sell them at the prices quoted here (which include delivery and credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances. ↘

Upgrading a laptop

From one point of view, a modern notebook computer has the edge over its desktop cousins. It's portable, compact and powerful enough to operate the latest software and tackle processor-hungry tasks. And, over the past 18 months, the upgrade process has become much easier. Rather than dismantle the keyboard and/or chassis, as was often the case in the past, now it's often possible to just unscrew a few panels on the notebook's underbelly and replace components as easily as you would in a desktop computer.

Even cheaper notebooks, such as those reviewed in this group test, are pretty versatile when it comes to replacing things such as memory, the hard disk or even the processor.

If it's Ram that you want to upgrade, the hardest part is often finding out where the SO-Dimm (Small Outline Dimm) socket is. If the underside of the case doesn't have an individual Ram compartment, it's likely that you'll need to remove a larger panel (as on the Hi-Grade, pictured) to reach it. It's then a case of matching the extra Ram with what's already fitted, such as DDR2-667, for example. All of the notebooks featured in this test can be upgraded to 2GB and have two SO-Dimm slots, each of which can accept up to a 1GB module.

Adding a new hard disk is also simple; just remove the panel and replace the 2.5in drive with a new one – but remember to take file and document backups before you do, as well as making sure you have original installation media for all the software you use, including the operating system. You may need to tinker with the Bios settings too to make sure the new drive is recognised.

Upgrading the processor is theoretically possible for some models, but it's not easy, and it's impossible to give a general guide as every model is different. Mobile CPUs are generally expensive and you won't be able to upgrade between CPU generations (Pentium III to Pentium 4, for example). Laptops that use desktop CPUs are a slightly better bet, but even then you might end up using a CPU that's too hot for the chassis. You're better off spending money on more memory or storage.

Upgrading the graphics on smaller, cheaper notebooks is almost always impossible, usually because they're all equipped with onboard graphics, which means there's no dedicated slot into which a new card can be fitted. Bigger notebooks, which have space for mini-SLI slots, are much easier to deal with.

Some notebooks (none of the ones here), also boast hot-swappable optical drives, meaning a slimline CD-combo drive can be replaced with a DVD writer very easily. Just slide one out and the other one in. A general rule of thumb, though, is that if it needs to be forced out, it shouldn't be replaced.

All of these upgrades will help to extend the life of a notebook and allow compatibility with more elaborate operating systems and software that requires more processing power. An alternative for some types of upgrade, particularly storage, is to take the external route and connect new devices via USB, Firewire or even Express Card slots.

Editor's Choice

Editor's Choice Asus F3F
Recommended MV Mobeus 13"

Personal Computer World
EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

Asus F3F has a battery life that is second to none

Personal Computer World
RECOMMENDED
PERSONAL COMPUTER WORLD

MV Mobeus 13" is small, compact and powerful

It doesn't seem that long ago when we were extolling the virtues of Intel's Core Duo technology. Six months ago it was commonplace to see these processors in £1,000 notebook computers, but since the release of Core 2 Duo, prices have fallen and budget laptops are benefiting from the trickle-down effect.

Overall, the notebooks tested were very similar in technical specification, even those sporting AMD processors. In essence, £699 will get you a dual-core laptop with 1GB of memory and an 80GB hard disk from a range of suppliers. There may be some variations on the theme, but that's the core spec to keep in mind when making your choice.

One of the three laptops to impress us this month was the Toshiba Satellite A110-275. Its tough design may suggest it belongs in the business sector, but it comes with a decent amount of software for the general computer user and has features more akin to what you'd expect to find in the home. It was the best-performing notebook on test, scoring well in both Sysmark and PCmark.

The 60GB hard disk may raise a few eyebrows, but with external hard disks available very cheaply, the £50 saved on the purchase price could easily be put towards a much bigger storage device.

For a completely different type of user, the MV Mobeus 13" is a great example of portable computing on a budget. It may have only a 13in screen, but its system performance and battery life (although no match for the Asus) make it very attractive, and so it's the winner of a *PCW* Recommended award. The 2.1kg weight will appeal to seasoned travellers and the small size means it will fit into a bag with room to spare.

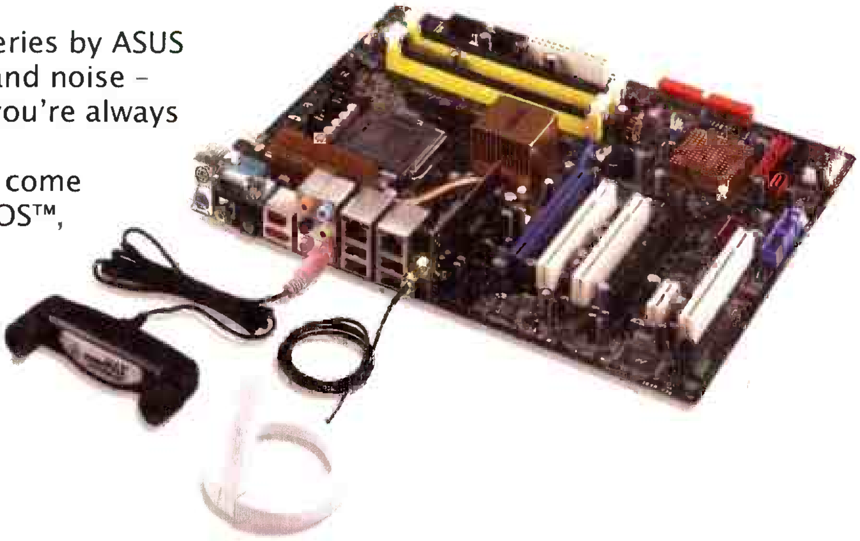
Rather than sourcing notebooks from the Far East and selling them on without thought, MV continues to innovate by adding unique features such as power-saving and power-boosting modes. This may not sound like much value to add, but when trying to choose between half a dozen very similar laptops, it's features such as this that stand out from the crowd.

The winner of our Editor's Choice award, however, is the Asus F3F. Not only does it look great and have consistent system performance scores, but the battery life is absolutely superb. Six-and-a-half hours for general computer use and DVD playback is something we'd expect to find in a far more expensive notebook that uses the latest power saving techniques. Granted, the graphics aren't great but nothing else at this price proved otherwise. The bright, 15.4in widescreen display and well-balanced feature set are the icing on the cake.

Advertisement

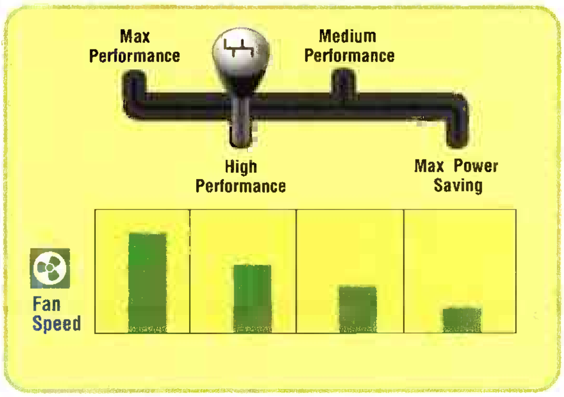
Get the right balance between Speed and Sound

With the launch of the P5B motherboard series by ASUS you don't have to choose between speed and noise – dynamically adust your system to ensure you're always getting the most from your PC.
Both boards based on Intel's P965 chipset come equipped with ASUS exclusive tools – AI NOS™, AI Gear and AI Nap – giving you control on the fly of your PC's performance.
Isn't it time your PC broke the sound barrier?



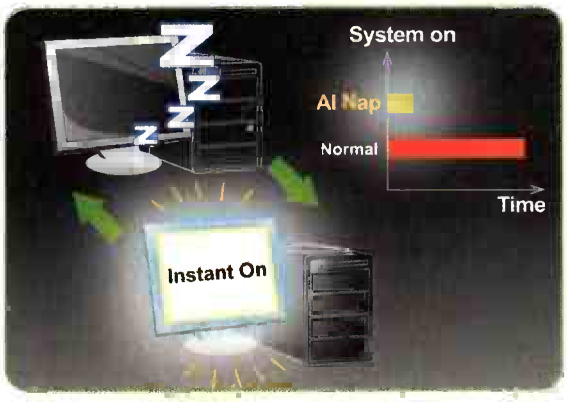
AI Gear – choose the right Gear for whatever you're doing

AI Gear lets you choose a profile to suit whatever you're doing – minimise system noise when you're using office apps, turn the volume up on games and enjoy the best performance your PC can give. AI Gear dynamically adjusts CPU freuqency and vCore voltage on the fly to optimise performance, noise and power consumption.



AI Nap – Send your PC to sleep

AI Nap lets you "relax" your PC without turning it off – Your system will continue to operate at minimum power and noise enabling you to download files & run applications. When you need to use your PC properly again, simply click your mouse to wake it up in seconds!



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Relief for space headaches

If your hard disks are overflowing with digital video or music, a network-attached storage device could relieve the pressure and give you more space. Cliff Joseph tests 10 devices

ON TEST

114 Adaptec Snap Server 110
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Editor's Choice

Corporations and other large organisations have been using network-attached storage (Nas) devices for years to back up important data or simply provide staff with a bit of extra storage.

Now, of course, many of us have our own network setup at home, so family members can access the internet and share music, photos and other files. And, as the age of music and video downloads has arrived, Nas devices are coming in handy for home users too.

In their simplest form, Nas devices are simply hard disks with an Ethernet interface attached to them so the disk can be plugged into a router or network switch. However, configuring the drive so it can be used by everyone on the network can be tricky. Home users and small businesses won't have trained IT staff to help them out, so ease of use and well-designed software will be important factors when choosing a Nas product.

Other features can come in handy, too, such as wireless capabilities, or USB ports that allow everyone on the network to share a printer.

So, if your hard disk is bulging with digital videos and music downloads, take a look at these Nas drives to see if they can make life easier for everyone in your household or office.

> **'As the age of music and video downloads has arrived, network-storage devices are handy for home users too'**

BUFFALO
BUFFALO
TeraStation
LinkStation
ETCENTER
iomega

↘

Adaptec Snap Server 110

Price: £350 **Contact**: www.adaptec.co.uk

Adaptec's Snap Server will be a case of overkill for home users, but it's a versatile – if rather complex – option for business users.

Priced at £350 for a relatively small 160GB of network storage, the Snap Server is obviously a lot more expensive than any of its rivals. It has four USB2 ports for adding network printers and extra storage, but those features are matched by less expensive rivals such as the Freecom Storage Gateway.

However, the Snap Server isn't just a glorified hard disk. It's a full-scale file server running its own operating system – Adaptec's GuardianOS. Fortunately, you don't need to get to grips with an entirely new operating system to use the Snap Server. When you insert the supplied CD-Rom, an HTML manual appears and presents you with an 'initial startup wizard' that allows you to specify basic settings, such as the name of the drive and the main administrator password.

You can use your web browser to configure additional settings, such as user accounts and passwords, or you can use Adaptec's SSM – Snap Server Manager – software. This is a Java program that will run on most platforms, including Windows, Mac and Linux, so it's a good option for cross-platform organisations.

However, you'll need a fairly extensive knowledge of networking technology to make use of features such as these. Even business users will probably want to leave the Snap Server to their IT department. The three-year warranty is attractive, though, especially to business users.

It may be technically impressive, but the Snap Server really is an enterprise-level device. Home and small-business users will almost certainly prefer to opt for a more user-friendly device such as Iomega's Storcenter.

Verdict

Pros Sophisticated file server and administration features

Cons Requires extensive knowledge of networking

Features	★★★★★
Ease of use	★★★★☆
Value for money	★★★☆☆

Overall Too complex and expensive for home users or small businesses

★★★☆☆

Buffalo Linkstation Multimedia Home Server

Price £196.25 **Contact** www.buffalotech.com

We've included two products from Buffalo because they represent two distinct product lines.

The distinguishing factor of the Linkstation is its support for a standard called Digital Living Network Alliance (DLNA). This is similar in some ways to the UPnP standard (see Living with Nas, page 121) that allows media players and storage devices to interact with each other. At the moment, however, DLNA isn't as widely supported as UPnP, so this isn't really a major selling point.

Even so, the Linkstation can stand on its own as a perfectly good network-storage device. It's reasonably priced, offering 300GB of storage for just under £200, and includes useful extras such as two USB ports for network printing or connecting additional hard disks for extra storage. There are also some nice details, such as the warning light on the front of the unit that tells you when the drive is getting full.

Our only minor criticism is that the documentation and installation process are a bit of a mess. When you insert the Buffalo CD-Rom, it displays a setup screen that lists a number of different installation options. However, the slim manual only mentions the main IP setup program, leaving you to install some of the other bits of software just to see what they do.

The IP setup program also mentions that a firewall is available, but doesn't say how you can use it. It also mentions that the drive includes a shared folder designed specifically for Mac users. However, there are no instructions on how to use the drive with a Mac, so we could only really recommend the Home Server on straightforward PC networks.

Still, aside from the sloppy documentation, the Home Server works well and provides plenty of shared storage at an attractive price.

Verdict

Pros 300GB of shared storage at a competitive price

Cons Poor documentation and cross-platform support

Features	★★★★☆
Ease of use	★★★☆☆
Value for money	★★★★☆

Overall The poor quality of the documentation is annoying, but the Linkstation is still good value for money

★★★☆☆

Buffalo Terastation Home Server

Price £554.60 **Contact** www.buffalotech.com

Buffalo's second entry in the Nas category is really quite impressive. The Terastation's resemblance to a small bank vault is surely intentional – Buffalo wants you to feel that your data is as safe as cash in the bank.

Like Maxtor's Shared Storage II drive, the Terastation provides a full terabyte of storage. However, the Terastation is more than £100 cheaper than its Maxtor rival, so it's the best option if you really want to go the whole hog and add as much capacity as you can. Inside the Terastation are four separate 250GB drives (which accounts for its thumping 7.2kg weight). This allows you to use an option known as Raid 5, which sacrifices one of the drives (reducing overall capacity to 750GB) but provides additional reliability.

Home users may prefer to treat the Terastation as an ordinary 1TB drive, but the extra reliability of Raid 5 will appeal to business users.

The installation process was quite straightforward. A small program called the Client Utility locates the drive on your network, checks its IP address and then adds it to the list of Network Places. All the other options, such as user accounts, shared folders and Raid settings, are configured via a web browser. You can also add network printers or extra storage using the four USB ports – two each on the front and back of the unit. There are even separate indicator lights for each of the four drives, telling you when they're in use and when each drive is full.

Buffalo has clearly put a lot of thought into the design of the Terastation. The one big disappointment is the lack of cross-platform support for Macs or Linux. Still, if you've got a PC-only network that needs plenty of shared storage, the Terastation is a real thoroughbred solution.

Verdict

Pros The cheapest 1TB Nas drive that we've come across

Cons Big and heavy; no cross-platform support

Features	★★★★★
Ease of use	★★★★☆
Value for money	★★★★☆

Overall A well-designed Nas device, although a little expensive for home use

★★★★☆

Freecom Storage Gateway WLAN

Price £209.99 **Contact** www.freecom.com

Most of these Nas devices are similar in terms of their basic hardware features, and it tends to be the bundled software (or lack thereof) that determines the overall versatility and ease of use of each product.

However, Freecom's Storage Gateway WLAN is a different beast altogether. As well as providing 160GB of network storage, the Storage Gateway also includes a full-scale wireless router. Unfortunately, it doesn't include an ADSL modem, so you'll still need to hang on to your existing modem/router and then connect the Storage Gateway to your router. Once that's done, you can use the Storage Gateway to provide wireless access to the network. It also has three Ethernet ports for PCs that don't have wireless capabilities.

Throw in no fewer than four USB ports, which allow you to connect a network printer or additional storage devices, and a Serial ATA (Sata) connection for external Sata drives and you've got an extremely versatile network-storage device.

Freecom's Gateway Assistant program provides easy configuration options for setting up user accounts and shared folders, and there's a copy of the Acronis True Image backup program as well.

It's a shame the Storage Gateway doesn't have its own ADSL modem built in, as that would make it a truly complete network/wireless/storage system, but perhaps that's asking a lot for £210. Of course, adding in all those extra features does push up the price a bit, so some people may prefer to opt for a more barebones device, such as the low-cost La Cie drive. However, the Storage Gateway becomes more cost-effective when you look at the 250GB and 500GB models, and its versatile networking and expansion options make it a very attractive choice for both home users and small businesses.

Verdict

Pros Built-in wireless router; USB and Sata expansion ports

Cons Relatively expensive; no printed manual

Features	★★★★★
Ease of use	★★★☆☆
Value for money	★★★★☆

Overall A bit expensive, but the wireless and expansion capabilities are impressive

★★★★☆

↘

Iomega Storcenter Network Hard Drive

Price £365 **Contact** www.iomega.com/uk

After all these years, Iomega is still best known for its Zip and Jaz drives. That experience in the consumer market comes in handy for the Storcenter Network Hard Drive and ensures that it's very easy to set up and use.

That said, the manual is a bit vague – simply telling you to "connect the drive to your network", without telling you whether you need to connect the drive to your router, an Ethernet switch or a spare Ethernet port on one of your computers. Fortunately, the drive worked first time when we connected it to the switch on our test network.

We also liked the Discovery Tool program supplied with the Storcenter, which proved equally easy to use. When you launch this program it locates the drive on the network automatically and assigns it a drive letter. Initially the entire drive is 'public', allowing it to be used by anyone on the network. This means you can get started right away, and then take your time exploring the Discovery Tool and learning about additional features such as user accounts and shared folders. The Discovery Tool also runs on Macs and Linux PCs, so the Storcenter is a good option for households with a mix of Macs and PCs.

The Storcenter consists of two 250GB drives that are set up for striping (Raid 0) by default, although you can quickly set it to either spanning or mirroring (Raid 1) by selecting these options in the Discovery Tool. Iomega also includes its own Automatic Backup Pro software (for Windows only), which can perform a complete system backup, as well as just backing up ordinary data files.

Admittedly, the Storcenter isn't the cheapest drive in this group, but its range of features and admirable ease of use make it a very good choice for both home users and small businesses.

Personal Computer World
EDITOR'S CHOICE

Verdict

Pros Easy to use; and good cross-platform support
Cons Poor documentation; relatively expensive
Features ★★★★☆
Ease of use ★★★★★
Value for money ★★★★☆

Overall The Storcenter's standout feature is its sheer ease of use, which makes it a good choice for home users ★★★★☆

La Cie Ethernet Disk Mini

Price £149 **Contact** www.lacie.com/uk

La Cie's Ethernet Disk Mini isn't the most sophisticated product in this group, but it's a good option if you're looking for an affordable way of adding some extra shared storage to your network.

Housed in La Cie's trademark silvery-grey livery, the Ethernet Disk Mini is, in essence, a perfectly ordinary hard disk with an Ethernet interface slapped on to the back so that you can connect it to your network. It doesn't have the dual drives or Raid support found in most of its rivals, but that's probably not a crucial factor for most home users. It doesn't support Gigabit Ethernet either, although its 10/100 support will be perfectly adequate for most home users and small businesses.

What will appeal to home users, however, is the drive's attractively low price – just £149 for our 250GB review unit (and less than £300 for its 500GB bigger brother). You don't get much in the way of added features, though. There's a single USB2 port that allows you to connect the drive directly to a PC, but you can't use it to connect a printer or an additional USB hard disk.

There's not much to shout about in the way of bundled software, either. This merely consists of La Cie's IP configurator program, which assigns an IP address to the drive. The drive then appears within the 'Network Places' window on your desktop, rather than as a conventional drive in the 'Your Computer' window. This point isn't clearly explained by the rather skimpy manual, and a few other points – such as using your web browser to configure the drive – could use some clarification here as well.

La Cie could do with rewriting the manual to improve ease of use, but the Ethernet Disk Mini still stands out thanks to its value for money.

Personal Computer World
RECOMMENDED

Verdict

Pros One of the cheapest Nas devices available
Cons Poor documentation; limited features
Features ★★★☆☆
Ease of use ★★★★☆
Value for money ★★★★★

Overall A no-frills option for network storage – but the price is hard to beat ★★★★☆

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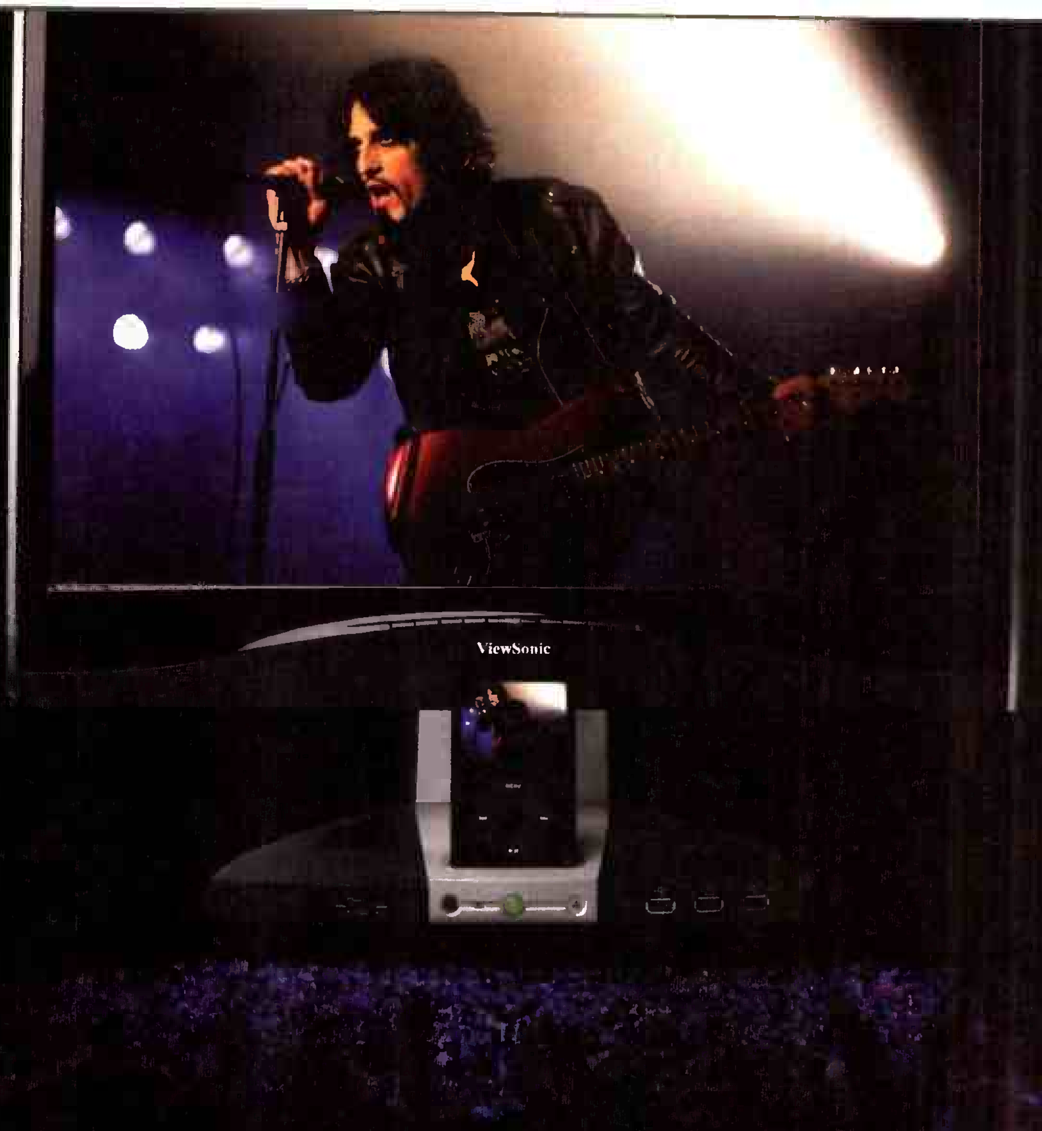

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- 2 years manufacturer's warranty as standard

Available Models :
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- Bundles Include DVD authoring software
- 2 years manufacturer's warranty as standard

Available Models :
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CD-RW 52x32x52x

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Linksys EFG120

Price £370 **Contact** www.linksys.com/uk

The EFG120 is something of an oddity. Its design seems curiously dated and it is relatively overpriced given it has the lowest storage capacity of any product in this group.

The most obvious feature is its size. The unusual design of the EFG120 means that it is much larger than any of its rivals, measuring almost 8cm wide, 20cm deep and 30cm high. It has a single 120GB hard disk built in, but also contains a second drive bay that allows you to insert a second hard disk of the same size – providing a quick and easy upgrade route to 240GB. However, the design seems to hark back to the days (before video downloads) when 120GB was considered 'top of the range' and seems rather old-fashioned when you realise that even the smallest of its rivals – the Freecom Storage Gateway – provides 160GB of storage, along with wireless-networking features for a much lower price.

Another oddity is the inclusion of a printer port for networking printing – not a USB port as you'll find in most of these Nas devices, but an old-fashioned parallel printer port. Many modern printers don't have parallel ports any more, so this will be of limited use for many potential users. There's no support for Macs or Linux PCs either, which may deter some users.

To be fair though, the installation and setup process was admirably straightforward. When you insert the Linksys CD-Rom a setup wizard starts automatically, then detects the drive on the network and even puts a shortcut icon on your desktop for you.

Other settings, such as user accounts and passwords can be easily configured via your web browser. Unfortunately, despite its undoubted ease of configuration and use, it's hard to recommend the EFG120 when there are so many less expensive options on the market.

Verdict

Pros Easy to install and use; upgrade slot for additional drive
Cons Low capacity; high price

Features	★★★☆☆
Ease of use	★★★★☆
Value for money	★★☆☆☆

Overall A product that looks like it's been sitting on a shelf for far too long

★★★☆☆

Maxtor Shared Storage II

Price £719.90 **Contact** www.maxtor.com

It's a little on the pricey side, but the weighty and solid design of Maxtor's Shared Storage II certainly makes you feel as though your data is being well protected.

Before you can use the Shared Storage II drive you need to create at least one user account. You can also create separate user accounts for each additional person who has access to your network. Each user account can create 'public' folders that are shared with other users, and 'private' folders that can be protected by a password. This means you can share files with other people on the network while still maintaining security for other files you may want to keep private and safe.

We like the flexibility that this approach to file management provides, although the Windows version of the Easymanage software did seem to have one or two rough edges. Our first attempt at creating a user account on our PC gave us an error message saying "network path could not be found", even though a Mac on our network had already located the drive and mounted the public folders for that account on its desktop. We had to repeat the setup process on the PC to gain access to our user account. Fortunately, that problem didn't recur after the initial installation.

Also, like most of its rivals, Maxtor does a poor job of its documentation. A number of features – such as the 'Drag and sort' option, which attempts to sort files automatically as you copy them on to the drive – are poorly explained and we struggled to understand how they work.

However, the solid design of the drive and the versatility of its Easymanage software make the Shared Storage II a good option for the more knowledgeable home or small-business user.

Verdict

Pros Versatile drive-management software; good security options
Cons Poor documentation; slightly clumsy setup process

Features	★★★★☆
Ease of use	★★★☆☆
Value for money	★★★☆☆

Overall Its ease of use could be improved, but this is a robust and versatile network-storage device

★★★★☆

↘

Plextor PX-EH25L

Price £198.60 **Contact** www.plextor.com

In some ways, Plextor's PX-EH25L is easier to use than any of its rivals. But in other ways, it's much more complex and confusing.

The PX-EH25L isn't supplied with any software. There are no drivers or configuration utilities on the CD-Rom that you find in the box, merely a manual in HTML format. Once you have connected the drive to your network, all you have to do is right-click on the 'My Network Places' icon on your desktop and select the 'Search for Computers' option. Windows will then locate the drive and list it under Network Places, or you can use the 'Map Network Drive' option to assign a drive letter so that it is listed within the My Computer window.

Unfortunately, that's where things start to go downhill. Any other features you might want to use require you to wade through the HTML manual – which is poorly written and confusing. The initial setup procedure only works with Windows PCs. It is possible to use the PX-EH25L with a Mac, but the process outlined in the manual is too long-winded and confusing for most home users, or even for business users who don't have considerable knowledge of networking.

Of course, that's not a problem if you're using a purely PC-only network. However, other features are equally difficult to use. Like most of these Nas devices, the PX-EH25L allows you to set up individual user accounts and shared folders. Unfortunately, figuring out how to do this involved ploughing through page after page of the HTML manual.

So while the initial installation of the PX-EH25L was easy enough, the absence of a simple configuration utility means that proper use of the drive's features really is too complicated for most home users or small businesses.

Verdict

Pros Initial installation is very easy
Cons Poor documentation; no configuration program

Features	★★★★☆
Ease of use	★★☆☆☆
Value for money	★★☆☆☆

Overall Requires too much technical knowledge to be recommended to home or small-business users

★★☆☆☆

Western Digital Netcenter 500

Price £269 **Contact** www.westerndigital.com

Like La Cie's Ethernet Disk Mini, Western Digital's Netcenter is an affordable product that provides plenty of extra storage at a very competitive price. It also provides a few extra features that the La Cie drive lacks. However, its cross-platform support is poor and its security features aren't as reliable as they could be.

Another similarity with the La Cie drive is that the Netcenter doesn't provide Raid support, so options such as Raid 1 mirroring aren't available. That may deter business users who need that extra level of protection for their data, but it's probably not a big problem for home users. One advantage over the La Cie drive is that the Netcenter has two additional USB2 ports that allow you to connect a printer for network-printing or to use a USB hard drive to provide even more storage.

Those features are certainly welcome, and with 500GB of storage for well under £300 the Netcenter is undoubtedly good value for money.

It does have weaknesses, though. The Mac software supplied with the drive crashed frequently during our tests, so this isn't a good option for households or offices with a combination of Macs and PCs. More worryingly, we found that the drive's security features were far from foolproof. The Easylink software provided with the Netcenter allows each user on the network to create their own folders on the drive. These can either be 'public' shared folders or 'private' folders protected with a password. But although a password is needed to gain access to the contents of private folders we found we were able to delete entire private folders, without needing a password.

While the Netcenter is certainly good value for money, Western Digital needs to take another look at its drive-management software.

Verdict

Pros Very competitive price per gigabyte
Cons Poor cross-platform support; limited security features

Features	★★★☆☆
Ease of use	★★★☆☆
Value for money	★★★★☆

Overall A cost-effective network-storage device marred by poor drive-management software

★★★☆☆

Living With Nas

A network-attached storage (Nas) drive is more than just a hard disk. The fact that the drive is connected to your entire network – rather than being directly connected to a PC – adds another level of complexity to the situation.

To use the drive, each computer on the network will need to know the IP (Internet Protocol) address of the Nas drive so it can connect and send data back and forth between the computer and the drive.

Most of the products in this group test include some sort of configuration software that will determine the drive's IP address. You can then enter that address into a web browser and configure the drive through a series of web pages stored on the drive itself and accessed through an ordinary browser. This process can be confusing for people with less experience of networking, so it's hats off to Iomega for automating the process with the Discovery Tool software that it includes with its Storcenter drive. This program does all the work for you, so that installing the Storcenter is no more complicated than connecting an ordinary USB drive to your PC.

Share and share alike

You may be happy to share the Nas drive with everyone else on your network, but a good Nas drive will also allow you to create 'shares'. These are individual user accounts – similar to the user accounts you can create for Windows itself, except that each account has its own set of folders on the shared Nas drive. Each user should be able to create 'shared' or 'public' folders that are open to other users, as well as 'private' folders that can be protected by a password. This ensures that you've got a degree of privacy for your important files, even though the drive itself is physically being shared by several people.

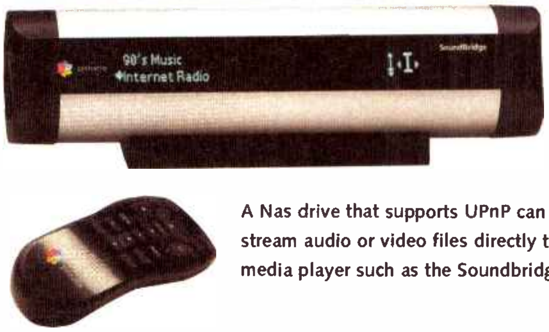
Technically speaking, any computer that can be connected to the internet can be connected to a Nas drive. You just need to know the drive's IP address so that you can tell the computer to connect to it. In practice, though, you'll need to know a fair bit about your computer's networking features to do this. Many home users won't have that degree of knowledge, so it's really up to the manufacturer of the Nas drive to provide support for different operating systems, such as Windows, the Mac OS and Linux. Some of the products in this group test don't bother to do that, which means they can only be used on 'homogeneous' networks that consist purely of Windows PCs. So if you're a Linux fan, or one of your kids has a Mac, you need to ensure that any Nas drive you buy can support those operating systems.

It's a Raid

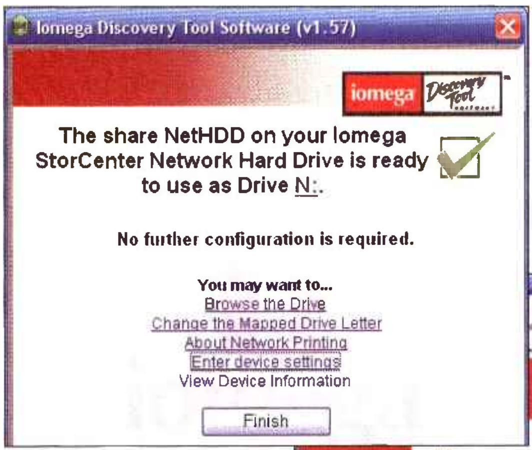
Another important feature for more knowledgeable users is Raid – redundant array of independent (or inexpensive) disks Many Nas drives consist of two or more drives linked together (the 500GB Storcenter includes two separate drives of 250GB each). Using Raid can increase the performance and reliability of your Nas drive and is a topic worthy of a feature of its own – and one we looked at in our September issue. You can find more information on the topic on our website (**www.pcw.co.uk/2160752** and **www.pcw.co.uk/2160511**).

Other features to look out for include built-in USB ports. Some drives, such as the La Cie Ethernet Disk Mini, have a single USB port that merely allows you to connect the drive to a USB port on your PC (effectively treating it like an ordinary external USB drive). However, other drives have multiple USB ports that allow you to connect additional devices to the drive itself. If you connect a USB printer to your Nas drive you will be able to treat it as a 'network printer' that can be used by everyone on the network. You can even add more storage to your network by buying an ordinary USB hard disk and connecting it to the Nas drive. The storage capacity of the USB drive will be added to that of the Nas drive, and can be shared by everyone on the network.

One other interesting feature that is increasingly being added to Nas drives is support for universal plug and play (UPnP). This is a standard that allows many types of device to communicate with each other, without requiring a PC to act as an intermediary. Many media players, such as Pinnacle's Soundbridge wireless music player, support UPnP. So if your Nas drive supports UPnP you can store music on the Nas drive and then stream the music directly to the Soundbridge over the network without having to turn on your PC.



A Nas drive that supports UPnP can stream audio or video files directly to a media player such as the Soundbridge



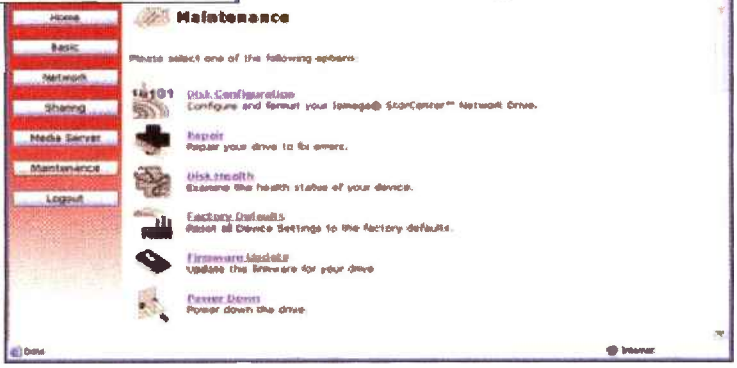
The share NetHDD on your Iomega StorCenter Network Hard Drive is ready to use as Drive N:.

No further configuration is required.

You may want to...

- Browse the Drive
- Change the Mapped Drive Letter
- About Network Printing
- Enter device settings
- View Device Information

Left: Iomega's Discovery Tool automatically locates the Nas drive and assigns it a drive letter



Below: Most Nas drives can be configured and managed by using a web browser interface

Network storage

MANUFACTURER	**ADAPTEC**	**BUFFALO**	**BUFFALO**	**FREECOM**
Model	Snap Server 110	Linkstation Multimedia Home Server	Terastation Home Server	Storage Gateway WLAN
Price (inc. VAT)	£350	£196.25	£554.60	£209.99
Telephone	01276 854 500	01753 555 000	01753 555 000	01423 704 700
URL	www.adaptec.co.uk	www.buffalotech.com	www.buffalotech.com	www.freecom.com
HARDWARE				
Disk capacity	160GB	300GB	1TB	160GB
Disk configuration	1 160GB	1 300GB	4 250GB	1 160GB
Drive speed	7,200rpm	7,200rpm	7,200rpm	7,200rpm
Other capacities available	250GB - £410/ 500GB - £586	400GB - £260	2TB - £1,110	250GB - £229.99/ 500GB - £344.99
RAID SUPPORT				
Spanning	N/A	N/A	✔	N/A
Raid 0 (striping)	N/A	N/A	✘	N/A
Raid 1 (mirroring)	N/A	N/A	✔	N/A
Other	N/A	N/A	Raid 5	N/A
Ethernet interface (Mbytes/sec)	10/100/1,000	10/100/1,000	10/100/1,000	10/100
Wireless networking	✘	✘	✘	✔ (802.11g/b)
Other interfaces/connectors	4 USB2	2 USB2	4 USB2	4 USB2, 1 Sata
SUPPORTED OPERATING SYSTEMS				
Windows	Windows 98SE or later	Windows 98SE or later	Windows 98SE or later	Windows 98SE or later
Mac	Mac OS 9.0 or higher	✘	✘	Mac OS 9.0 or higher
Linux	Red Hat 7 or later, Fedora	✘	✘	Linux 2.2 or later
ADDITIONAL FEATURES				
Supports network printing	✔	✔	✔	✔
Supports UPnP media players	✘	✘	✘	✔
Bundled software	Snap Server Manager	IP Setup, Memeo Auto Backup	Terastation Client Utility, Memeo Auto Backup	Storage Gateway Assistant, Acronis True Image 8
Warranty (RTB = return to base)	3 years RTB	2 years RTB	2 years RTB	2 years RTB
SCORES				
Features	★★★★★	★★★★☆	★★★★☆	★★★★★
Ease of use	★★★★☆	★★★☆☆	★★★★☆	★★★★☆
Value for money	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆
OVERALL	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆

Personal Computer World EDITOR'S CHOICE	Personal Computer World RECOMMENDED				
IOMEGA	**LA CIE**	**LINKSYS**	**MAXTOR**	**PLEXTOR**	**WESTERN DIGITAL**
Storcenter Network Hard Drive	Ethernet Disk Mini	EFG120	Shared Storage II	PX-EH25L	Netcenter 500
£365	£149	£370	£719.90	£198.60	£269
020 7216 0003	020 7872 8000	0800 026 1418	01923 712 448	00 32 2725 5522	01372 360 055
www.iomega.com/uk	www.lacie.cm/uk	www.linksys.com/uk	www.maxtor.com	www.plextor.com	www.westerndigital.com
500GB	250GB	120GB	1TB	250GB	500GB
2 250GB	1 250GB	1 120GB	2 500GB	1 250GB	1 500GB
7,200rpm	7,200rpm	7,200rpm	7.200rpm	7,200rpm	7,200rpm
250GB - £178/ 1TB - £650	300GB - £179/ 500GB - £289	Upgradable to 240GB	300GB - £259.90/ 500GB - £349.90	160GB - £TBA/ 400GB - £TBA	160GB - £139/250 - £149/320GB - £179
✔	N/A	N/A	✔	N/A	N/A
✔	N/A	N/A	✘	N/A	N/A
✔	N/A	N/A	✔	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A
10/100/1,000	10/100	10/100/1,000	10/100/1,000	10/100	10/100
✘	✘	✘	✘	✘	✘
2 USB2	USB2 (for direct connection to PC)	Parallel printer port	2 USB2	2 USB2	2 USB2
Windows 98SE or later	Windows 98SE or later	Windows 98SE or later	Windows 2000/XP	Windows 98SE or later	Windows 98SE or later
Mac OSX 10.3 or higher	Mac OS 9.0 or higher	✘	Mac OSX 10.3.9 or higher	Requires manual configuration	Mac OSX 10.1.5 or later
Redhat 9, Mandrake 10, Debian 3.0, Gentoo, Fedora Core 3	Linux 2.4	✘	✘	✘	✘
✔	✘	✔	✔	✔	✔
✔	✘	✘	✔	✘	✘
Discovery Tool, Automatic Backup Pro, Photoshop Album Starter Edition	IP configurator	Setup wizard	Easymanage	N/A	Easylink, Retrospect Express
2 years RTB	2 years RTB	2 years RTB	2 years RTB	2 years RTB	2 years RTB
★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆
★★★★★	★★★★☆	★★★★☆	★★★☆☆	★★☆☆☆	★★★☆☆
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↘

DIY Nas

You don't have to spend hundreds of pounds on a Nas drive to get some extra shared storage for your network.

It's actually quite easy to take an existing hard disk – either an internal or external model – and connect it your network. The most common option here is to buy an 'enclosure' or 'caddy'. This is simply an empty box that can hold one or more internal disk drives, and which has an Ethernet adapter for the network connection.

Netgear's Network Storage Central SC101 is one of the most well-known options here. It costs about £70 from online stores such as dabs.com, and can hold two IDE drives for a total capacity of up to 2TB.

Another good option is D-Link's DSM-G600 (**www.dlink.co.uk**). This is a bit more expensive, costing about £120, and can only hold a single drive. However, it has wireless capabilities so you can easily connect it to a wireless network or use it to extend an existing wired network. It also has two USB2 ports on the back, which enable you to add more storage in the form of ordinary USB hard drives. It even supports the UPnP standard, allowing you to stream music or video files to a UPnP-compatible media player, such as Pinnacle's Soundbridge. And, for the hardcore techies among you, the DSM-G600's built-in firmware is based on open-source code, so you're free to modify it – perhaps setting it up to run as an email or web server.

But perhaps the most convenient option we've come across is the Network Storage Link from Linksys, which costs just £58 from **www.broadbandbuyer.co.uk**. Instead of providing you with an empty enclosure for an internal disk drive, the Storage Link acts as an Ethernet adapter for external USB disk drives. It has an Ethernet port that allows you to connect it to your network, and two USB2 ports. Any USB hard disk – or other devices such as a USB memory stick – will automatically be connected to your network via the Storage Link. The Storage Link includes good backup software and some useful extra features, such as an email alert when the disk is almost full. In fact, we wonder why the other Linksys Nas offering – the EFG120 – isn't equally well designed.

Netgear's SC101 provides an easy way of connecting low-cost IDE drives to your network

Connect an existing USB hard drive to a network with the affordable Storage Link from Linksys

Editor's Choice

Editor's Choice Iomega Storcenter Network Hard Drive
Recommended La Cie Ethernet Disk Mini

Personal Computer World
EDITOR'S CHOICE

Iomega Storcenter Network Hard Drive

Personal Computer World
RECOMMENDED
LACIE

La Cie Ethernet Disk Mini

There are two factors that people look for when considering a network-storage device – price and storage capacity.

In terms of cost per gigabyte, Western Digital's Netcenter 500 is the best bargain, providing 500GB of storage for just £269. Its poor cross-platform support isn't a problem if everyone in your household or office uses a PC, but we also felt its security options weren't as robust as they might have been.

For value for money, La Cie's Ethernet Disk Mini is our Recommended choice. At just under £150 for 250GB of storage, it's a good option for home users or small businesses on a budget. It also works with Windows PCs, Linux and Macs, so it will be suitable for a range of users.

Aside from cost, additional features play an important part as well. One standout product here is Freecom's Storage Gateway WLAN. Its built-in wireless router and multiple USB ports make it a truly versatile network-storage device. However, its high price is a disadvantage – especially if you've already got a wireless network setup.

Many of the products we tested were marred by poor documentation and software that assumed far too much prior knowledge of networking technology. In this area, Iomega's Storcenter stood out from the crowd thanks to its Discovery Tool software. The Discovery Tool automatically searches your network, locates the Storcenter and detects its IP address. It then assigns a drive letter and displays the Storcenter as another drive in the My Computer window. You are then free to configure individual user accounts and shared folders at your leisure.

The Storcenter scores well in other areas too. Its cross-platform support encompasses Windows PCs, Macs and several versions of Linux. It has two USB ports that allow you to share a printer on the network or add extra storage. It supports Raid and the UPnP standard for working with media players.

The Storcenter's superior ease of use and wider range of features justifies its £365 price, and so the Storcenter earns our Editor's Choice award this month. **PCW**

Evesham Technology recommends Windows® XP Media Center Edition

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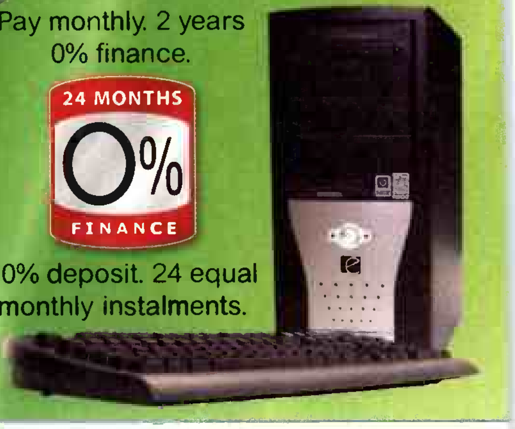

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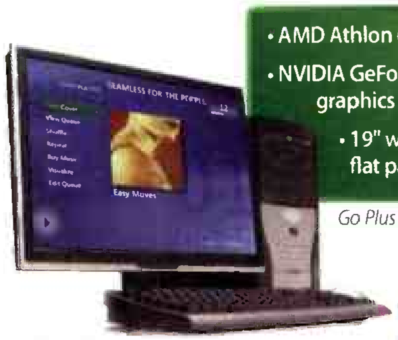
>> Dual Core



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- Creative I-Trigue 3220 2.1 speakers
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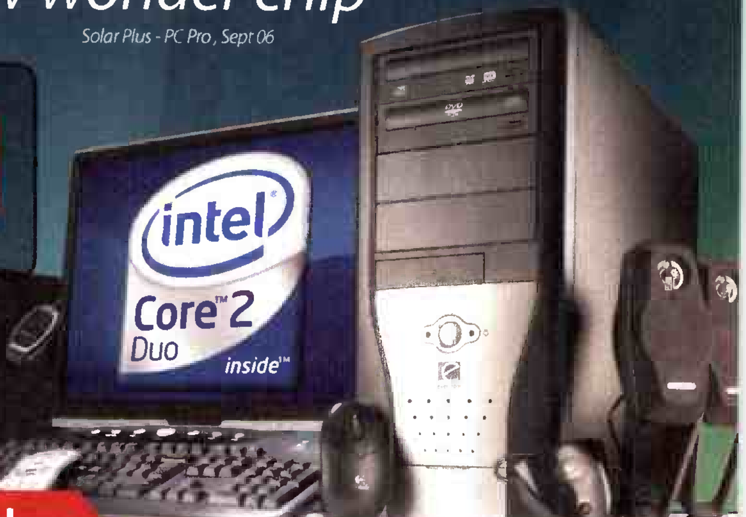

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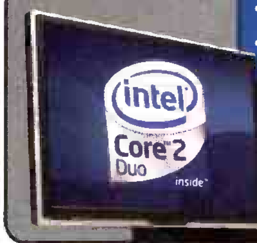

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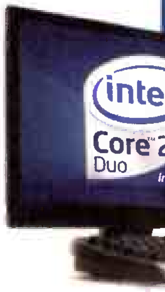

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- 1GB DDR 2 RAM 533MHz (2x512MB)
- 320GB Serial ATA 7200rpm hard drive with 8MB buffer
- Multi Format Dual Layer DVD Writer (16x)/CD-RW (40x) drive
- Creative SB X-Fi Xtreme Audio sound card
- Creative Inspire 3220 2.1 speakers
- Xpider or Sleek midi tower case (453x222x495mm) 420w PSU, 6xUSB2.0 & 10/100/1000 LAN
- Logitech Internet Pro cordless keyboard and mouse
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Solar Plus upgrades

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- 512MB DDR II RAM, 533MHz
- 80GB SATA 5400rpm hard drive
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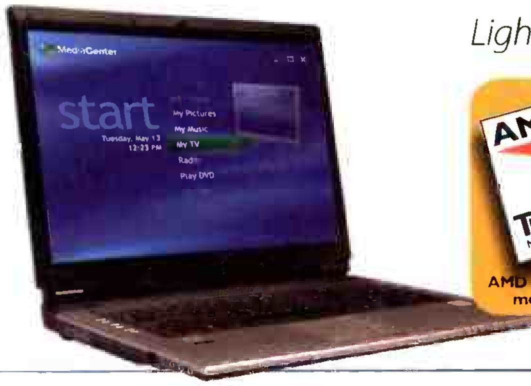
- 7 in 1 card reader (MMC/RSMMC/SD/MiniSD/MS/MSPro/MSDuo)
- 6 cell Li-Ion battery (life up to 3 hours approx)
- 3xUSB2.0, Firewire, Serial, VGA, Express Card & 10/100 LAN
- Weight - 2.6kg Dimensions - 360x267x34mm
- Silver 3 year warranty



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- 1GB DDR II RAM, 533MHz (2 x 512MB)
- 60GB SATA 5400rpm hard drive
- DVD/CD-RW/Dual Layer DVD-RW drive
- Wireless Mini PCI 802.11bg (54Mbps) LAN & Bluetooth
- 1.3M Pixel camera with rotation
- 4 in 1 card reader (SD, MMC, MS/Pro)
- 6 cell Li-Ion battery (life up to 3 hrs approx)
- 4xUSB2.0, Firewire, VGA, TV-out, DVI, PCMCIA, Express Card, IR, 10/100/1000 LAN
- Weight - 2.9kg Dimensions - 358x259x33mm
- Gold 3 year Parts & Labour warranty

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17" widescreen

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- 512MB DDR II RAM, 533MHz
- 17" WXGA X-Bright widescreen display (1440x900)
- 512MB DDR II RAM, 533MHz
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- Wireless Mini PCI 802.11bg (54Mbps) LAN & Bluetooth
- 4 in 1 card reader (SD, MMC, MS/Pro)
- 6 cell Li-Ion battery (life up to 3 hours approx)
- 4xUSB2.0, Firewire, VGA, PCMCIA, Express Card & 10/100/1000 LAN
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- Silver 3 year warranty

"A superb package"

PC Pro, 2006

PC PRO A LIST
17" widescreen

Quest A620

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£1499 inc VAT (£1275.74 ex VAT)

- AMD Athlon 64 X2 processor 3800+
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- 256MB NVIDIA GeForce Go 7900 GTX graphics
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- 1GB DDR RAM, 333MHz (2 x 512MB)
- 100GB, 5400rpm SATA hard drive with 8MB buffer
- DVD/CD-RW/Dual Layer DVD-RW drive
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PC Plus, Oct 06
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Custom PC, Oct 06
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- Wireless Mini PCIe 802.11abg (54Mbps) LAN
- 6 cell Li-Ion battery (life up to 3hrs approx)
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COMPILED BY ALAN STEVENS

BUSINESS

IT'S A VIRTUAL WORLD . . .

The Business section this month is dedicated to all things virtual. OK, not dedicated exactly, but virtualisation is a hot topic and our feature explains what it's is all about, what's in it for the small business and what you might need to 'go virtual' in your company.

We've also reviewed a number of virtual products, including the new VMWare Infrastructure 3 which is, arguably, the role model when it comes to hosting production systems. A security appliance from Astaro is available as a ready-to-run virtual machine, and Altiris Software Virtualization makes it easier to distribute and run desktop applications.

Back in the real world, we see what Sage Start-Up has to offer those starting out in business, and we review other products of interest to small-business buyers.

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132 Virtual solutions
Virtualisation – the use of software to emulate other devices and applications – is a hot topic in the technology world. We explain exactly what it means and look at the benefits it could bring to business and the products that exist to realise them

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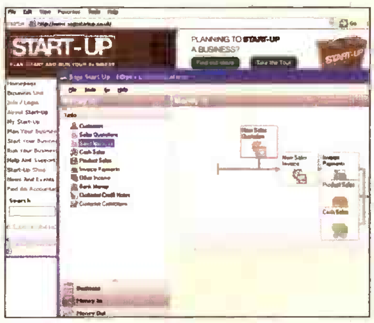
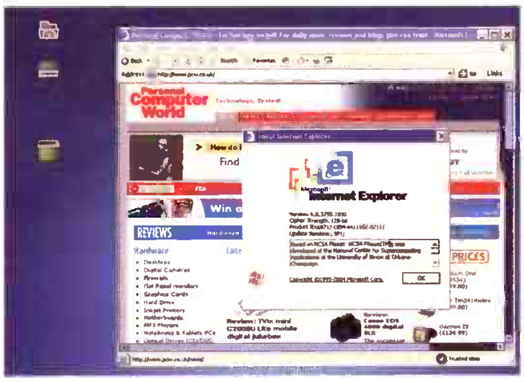




OUR SCORING

Excellent ★★★★★ Very good ★★★★☆ Good ★★★☆☆ Below average ★★☆☆☆ Poor ★☆☆☆☆

OUR AWARDS

Editor's Choice: The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.
Recommended: A product that combines great features, usability and value for money.
Great Value: Not the best in class, but a product that has superior features and performance for the price.

Editor's Choice Business

Recommended Business

Great Value Business

The business awards are used for products that are more suited to home offices or small businesses.

'Cheap, thin client hardware can be used to connect to virtual desktop VMs on a secure remote server'

Read the feature on page 132

Virtual solutions

How much do you know about virtualisation and its benefits? Alan Stevens fills you in

Judging by the column inches devoted to it, virtualisation is one of the hottest technologies around. But do you really know what it does and, more importantly, what it has to offer a small business?

In this feature we'll help you to fill any gaps in your knowledge, providing a full picture of what's meant by virtualisation, its benefits for small businesses and the products available to realise them.

Virtualisation explained

The term virtualisation can be applied to many subtly different technologies, but all are based on the same concept – the use of software to emulate another hardware or software resource.

Hard disks, for example, have long been virtualised through the use of software to sub-divide available storage space into partitions, each of which can be treated as an individual physical drive. An operating system is in fact a form of virtualisation, although nowadays the term is more commonly used to describe the virtualisation of a complete PC or server – a virtual machine (VM) – which can be run alongside other VMs on the same host hardware.

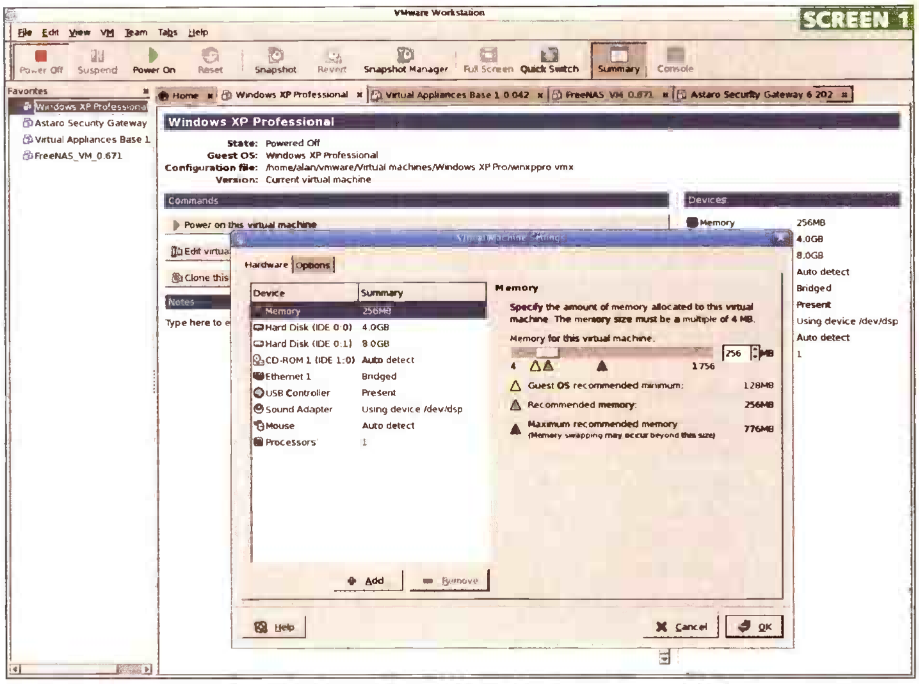
Virtual machines run like applications, sharing access to the physical processors, memory, disk space and other resources on the host system. As far as each VM is concerned, however, it appears to have sole access to the resources allocated to it. It can therefore run a standard operating system, installed, configured and used in exactly the same way as on a 'real' machine.

Virtual benefits

So, what are the benefits? Well, it depends on who you are.

If you're a software developer, virtualisation lets you test and debug your code on all the platforms you want to support, without buying or configuring lots of kit. It also makes it easier to handle inevitable lock-ups and crashes, as they won't affect other virtual machines. If you get really stuck, you can simply start again with another copy of the VM.

Virtualisation also allows you to check out new applications, updates and patches without affecting production systems, and it makes better use of hardware resources, particularly servers, many of which sit doing very little most of the time. It's this efficiency that makes most small-business managers take notice.



Windows XP Professional

State: Powered Off
Guest OS: Windows XP Professional
Configuration file: /home/alan/vmware/Virtual machines/Windows XP Pro/winxppro vmx
Version: Current virtual machine

Device	Summary
Memory	256MB
Hard Disk (IDE 0:0)	4.0GB
Hard Disk (IDE 0:1)	8.0GB
CD-ROM 1 (IDE 1:0)	Auto detect
Ethernet 1	Bridged
USB Controller	Present
Sound Adapter	Using device /dev/dsp
Mouse	Auto detect
Processors	1

Memory

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine: 256 MB

Guest OS recommended minimum: 128MB
Recommended memory: 256MB
Maximum recommended memory (Memory swapping may occur beyond this size) 776MB

Virtualisation tools such as VMWare Workstation allow developers to simulate different platforms and network conditions

For example, virtualisation would allow you to take existing file and print, email and database servers – possibly running on out-of-date hardware – and consolidate them onto a single machine. You can do that anyway, but the virtual approach means you don't have to worry about compatibility, doing away with the need to upgrade or change your applications to get them to work together. Instead you migrate the existing physical setups lock stock and barrel to separate VMs. Tools to do this are available from most virtualisation vendors.

Virtualisation also offers savings in terms of power and cooling, and there are availability and management benefits too. Virtual machines are defined in files that can be copied and cloned as needed to bring new servers online in minutes. You can balance loads across servers more easily, and recover faster from system failures and other problems. Most virtualisation tools, for example, let you take snapshots of running VMs that can be used for backups or to roll back configuration changes that have caused problems.

On the downside you will have to obtain, install and manage the virtualisation software, as it isn't commonly included as part of the operating system. But it's not that difficult and there are lots of good products to choose from, many designed specifically for small businesses.

Virtual products

The market leader is VMWare (part of EMC, **www.vmware.co.uk**) with the biggest and longest-established portfolio of products, followed by Microsoft and a number of smaller developers. Most notable of those is Xen Source, whose open-source Xen virtualisation software is bundled with several Linux distributions.

Many of the products are now free, and a good starting point is the free VMWare Player (see screen 2), which you can download and use to run pre-built virtual machines (see Virtual appliances explained box).

To create virtual machines of your own, you'll need VMWare Server (see screen 3),

Virtual inside

Chip makers Intel and AMD are doing their bit by building extra virtualisation functionality into their processors. Referred to as VT by Intel and AMD-V by rival AMD, the technology is essentially the same, but with small differences in implementation.

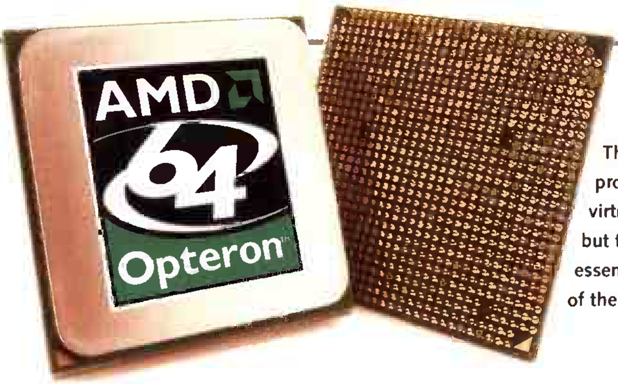
To enable several virtual machines to share the same processor or processors, virtualisation vendors use what's referred to as a Virtual Machine Monitor (VMM). One of the things this does is broker operating system requests made to the privileged Ring 0 core of the processor, as defined in the original x86 architecture.

Previously implemented in software, Intel VT and AMD-V add a hardware VMM on the processor itself, potentially enhancing performance and giving greater reliability through better virtual machine separation. They also make life easier for both virtualisation developers and customers, as there's no need to patch the VMM every time a new or updated guest operating system is released.

On the downside virtualisation vendors have had to update their software twice to use these new hardware extensions because software written for one won't work with the other. However, the leading vendors do offer support for both Intel and AMD platforms.

Customers also need to upgrade their processors to take advantage of the technology. For Intel that means the latest Pentium and Xeon chips, while for AMD it's Revision F Opterons.

However, it's worth remembering that you don't have to buy new processors, PCs or servers to reap the benefits of virtualisation. VMWare, Microsoft and others continue to support existing processors using a software VMM and will do so for a long time to come.



The latest AMD and Intel processors feature onboard virtualisation extensions, but these chips aren't essential to take advantage of the technology

which is also a free download. VMWare Server is also more scalable (it supports two-way virtual SMP) and it comes with tools to take VM snapshots for backup and recovery.

VMWare Player and Server are both available for use on Windows and Linux hosts and include support for a wide range of Windows, Linux and Unix guest operating systems, including 64-bit implementations.

Among its chargeable products, VMWare Workstation is aimed at application developers and has tools to debug code and simulate a variety of network types (see screen 1). For all-out production use, VMWare Infrastructure 3 is based on the highly scalable VMWare ESX Server platform and requires servers with a minimum of two processors. It is installed directly onto the server hardware rather than a host OS (see review on page 143 for details).

Microsoft solutions

Microsoft has two virtualisation products, Virtual PC 2004 for use on desktop PCs and Virtual Server 2005 for servers (see screen 4). Both are easy to install and use, and can be downloaded free (**www.microsoft.com/downloads**). They only run on Windows hosts, although you can configure Linux as a guest OS. With the R2 release of Virtual Server 2005, Linux is now officially supported, with add-on tools for use with the open-source platform.

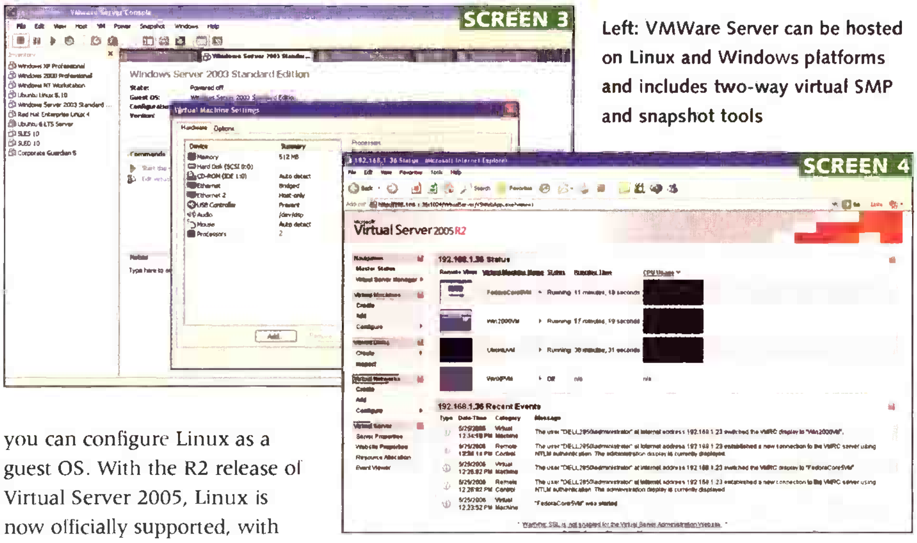
These products will continue to be developed and are increasingly being used by small businesses. They will be joined by a new implementation called Windows Server Virtualisation, which, like VMWare ESX Server, will be a 'hypervisor' solution. This means it can be installed directly onto a host server rather than on top of an existing OS, for enhanced performance and reliability.

Windows Server Virtualisation will be bundled with Longhorn, the next version of Windows Server, due out in 2007. It will be 64-bit only, require processors with virtualisation extensions and is aimed at big companies looking to virtualise production servers.

Other products

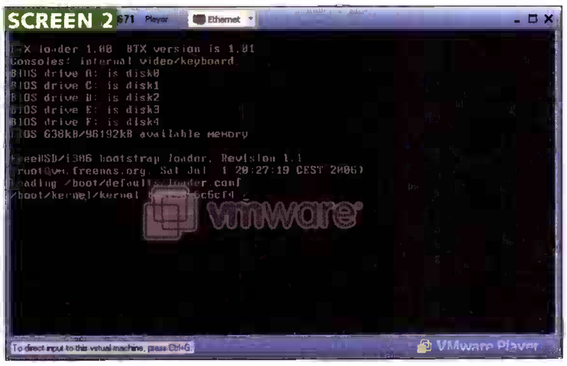
Among the smaller developers you'll see a lot written about Xen Source (**www.xensource.com**) and its open-source Xen virtualisation solution. Xen lacks the maturity of rivals VMWare and Microsoft, with most current implementations only able to host Linux, which even then has to be modified to run in a Xen VM – so-called para-virtualisation.

Xen, however, is included in the recently released Suse Enterprise Linux 10 distro from Novell and will also be in Red Hat Enterprise Linux 5 (see screen 5). The latest implementation can also host off-the-shelf guests, including Windows, although only ↘



Left: VMWare Server can be hosted on Linux and Windows platforms and includes two-way virtual SMP and snapshot tools

Microsoft Virtual Server needs Windows to run but Linux is now officially supported as a guest OS



```
-X loader 1.00  BTX version is 1.01
Consoles: internal video/keyboard
BIOS drive A: is disk0
BIOS drive C: is disk1
BIOS drive D: is disk2
BIOS drive E: is disk3
BIOS drive F: is disk4
OS 638kB/96192kB available memory

FreeBSD/i386 bootstrap loader, Revision 1.1
root@vm.freenas.org, Sat Jul  1 20:27:19 CEST 2006)
oading /boot/defaults/loader.conf
/boot/kernel/kernel         c6cf4
```

The free VMWare Player can run pre-built virtual machines but doesn't have tools to build VMs of your own

Virtual appliances explained

Virtual appliances are pre-built, ready-to-run, virtual machines, complete with guest operating system and application software. They come already configured to perform a specific task, just like a hardware appliance, so all you have to do is load them onto a host server and power them on.

Most virtual appliances are for use with VMWare. They can be used with the free VMWare Player or VMWare Server applications running on Linux or Windows and, for full production use, with VMWare Infrastructure and ESX Server platforms. Some virtual appliances are also available for use with Xen virtualisation.

Virtual appliances cover a wide variety of tasks. You can get virtual Nas (network-attached storage) appliances, virtual routers, virtual firewalls and other security appliances, such as the Astaro Security Gateway reviewed on page 147. Virtual Web, email, groupware and CRM servers are also available.

Like their physical counterparts, most virtual appliances can be managed via a web interface, but unlike the 'real' boxes there's no need for specialised hardware. Virtual appliances can also be deployed very rapidly, and you can host multiple appliances on a single server for load balancing and redundancy.

On the downside you have to trust the developer to deploy a secure implementation of the guest operating system involved. The software is likely to come from a variety of sources and may not be directly supported.

Most of the virtual appliances currently available are based on Linux and other open-source operating systems, typically running open-source applications. Many can be downloaded and used free of charge, although licensing may be required to use some of the applications. Virtual Windows appliances are also possible, but you won't find very many because the need to license the Microsoft OS means they are difficult to distribute.

The following links are worth checking if you're looking for virtual appliances and you should also look for virtual appliance implementations on vendor websites.

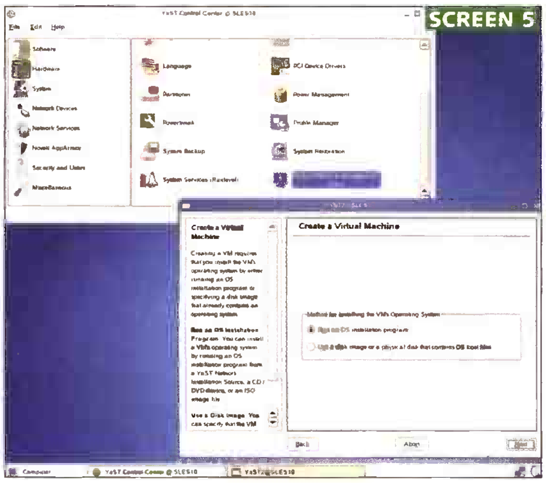
www.vmware.com/vmtn/appliances
www.virtualappliance.net

The Astaro Security Gateway is also available as a virtual appliance for use with the VMWare platform

Astaro Security Gateway 220
astaro

when run on processors with hardware virtualisation (see Virtual inside box).

There are more specialised virtualisation products and technologies, such as operating system 'containers' where applications run in isolated environments within one operating system, and application virtualisation tools such as the Altiris Software Virtualization reviewed on page 138. Instead of virtualising a whole PC, these use virtualisation to distribute and run applications. Microsoft recently bought into this use of the technology (through its acquisition of Softricity – **www.softricity.com**), as have other companies.



Xen virtualisation is bundled with several Linux distros, including the latest Suse Linux Enterprise 10 product

Virtual desktops

Virtualisation can also be applied to PC desktops. Host them in dedicated VMs running on a server and you get all the benefits of thin-client computing, but instead of a shared terminal server, each user gets their own virtual PC, accessible using cheap thin-client hardware.

VMWare is keen to promote this use of its virtualisation technology under its Virtual Desktop Infrastructure (VDI) initiative, which is gaining a lot of industry support. Wyse has introduced a VDI version of its S10 thin client, designed to act as a front end to virtual desktops hosted by a VMWare Server.

Thin-client hardware can connect users to virtual desktop VMs hosted on a secure remote server

The S10 connects to the virtual PC using Microsoft's RDP (Remote Desktop Protocol) with a feature Wyse calls "power on to work", whereby you're automatically connected to your virtual PC as soon as it's switched on.

Special brokering and management software is required for this to happen, but there are lots of products to choose from, such as Virtual Desktop Connection Broker from Leostream (**www.leostream.com**), Propero Workspace (**www.propero.com**) and Clearcube Sentral (**www.clearcube.com**). These products can be configured to connect users to the same dedicated PC each time or to allocate virtual machines dynamically based on user requirements and availability.

Virtual licensing

Virtualisation has crucial implications for software vendors that licence their products per CPU or per server. With open source it doesn't matter, as you can install most Linux distros and many open-source applications on as many virtual machines as you want without buying additional licences. However, there are exceptions and with proprietary software in particular you need to check the licensing terms to see if virtualisation is covered.

Most of the big-name developers have altered their terms to account for virtual deployment and many have afforded big concessions, including Microsoft.

Microsoft no longer requires the purchase of a licence for every stored Windows VM. Instead, licences are only required when a VM is turned on, and virtual machines running Windows can be moved between licensed servers without limitation.

Companies running Windows Server 2003 R2 are allowed up to four virtual machines per server at no extra cost. The Datacenter Edition of the next Longhorn implementation will allow unlimited virtual systems per machine. Other Microsoft products licensed by processor, such as SQL Server, Biztalk and ISA Server, can be used on multiple VMs. They are licensed for the number of virtual processors used, not physical processors on a host server.

With the efficient use of hardware and reasonable licensing terms, virtualisation really is a hot technology. No matter what size your company, it's worth looking into. **PCW**

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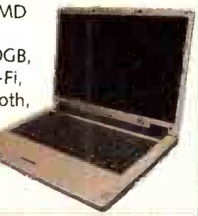

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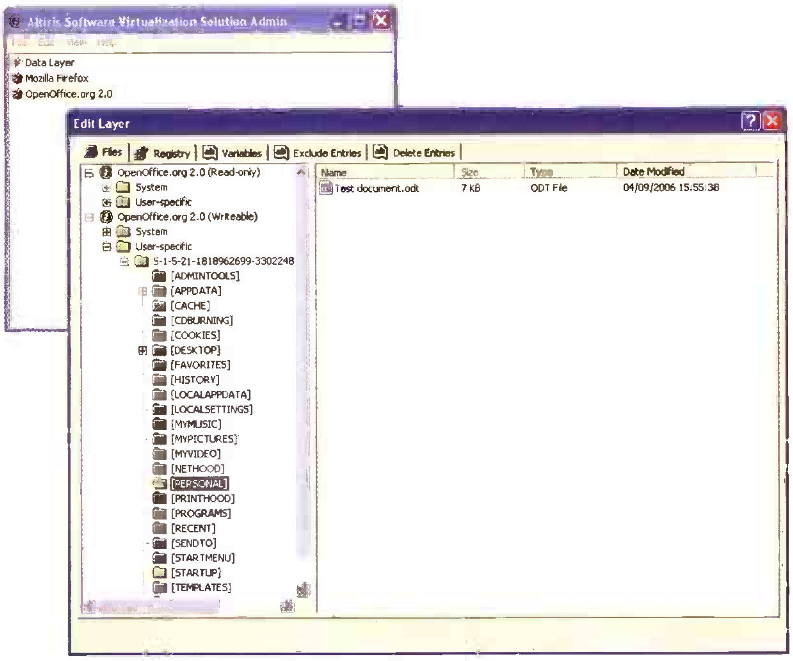
PCNB04a 12/6 (PCW)

APPLICATION VIRTUALISATION

Altiris Software Virtualization

Personal Computer World BUSINESS GREAT VALUE

Install and remove packages fast, avoiding conflicts


Altiris Software Virtualization Solution Admin
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Data Layer
Mozilla Firefox
OpenOffice.org 2.0
Edit Layer
Files
Registry
Variables
Exclude Entries
Delete Entries
OpenOffice.org 2.0 (Read-only)
System
User-specific
OpenOffice.org 2.0 (Writeable)
System
User-specific
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[COOKIES]
[DESKTOP]
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[HISTORY]
[LOCALAPPDATA]
[LOCALSETTINGS]
[MYMUSIC]
[MYPICTURES]
[MYVIDEO]
[NETHOOD]
[PERSONAL]
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[PROGRAMS]
[RECENT]
[SENDTO]
[STARTMENU]
[STARTUP]
[TEMPLATES]

Name	Size	Type	Date Modified
Test document.odt	7 KB	ODT File	04/09/2006 15:55:38

SVS applications are installed into a non-corruptible, read-only virtual layer with a separate read/write layer for data and configuration files

Don't confuse the Altiris Software Virtualization Solution (SVS) with products that let you build complete virtual machines. SVS concentrates solely on applications, providing tools to create virtual software packages that can be distributed, installed and removed in seconds, and run without affecting other software on the host PC.

A special agent is used by SVS to redirect file and Registry calls made by an application to a self-contained virtual environment, known as a 'layer' – with two such layers per Virtual Software Package (VSP). The first, created when the VSP is installed, is read-only so can't be corrupted, with an associated read/write layer to hold program data, configuration files and so on. Should you, therefore, want to undo a configuration change or fix a corrupted application, you have only to delete the data layer to return it to its just-installed condition.

To create a VSP you'll need a freshly installed Windows PC, preferably with all the latest service packs and security updates applied, on which to load the optional Admin console included in the package. Using this you then browse to and run the setup program for the application required.

And that's about it. The setup program runs as normal but any file and Registry changes are captured and stored in a VSP folder, rather than installing the application directly.

Once built, a VSP can be exported and distributed to any other Windows PC equipped with the SVS agent. It's then activated, optionally on boot-up, causing the expected icons, Windows Start menu entries and so on to appear on the desktop ready to use. Deactivate it again, and it's as though the application never existed.

We used SVS to install and run the Open Office productivity suite and found the process both quick and easy to follow. From an end-user point of view the suite ran exactly as if installed normally.

Of course there are limitations. With suites, for example, you need to create a VSP containing all the necessary components that might be required. Plus some programs can't be virtualised at all, such as anti-virus scanners which bypass the standard Windows APIs. Some anti-spyware utilities also identify the agent as a root-kit and stop it working.

File redirection can also cause problems, especially if an application needs to be reset, when anything in the read/write layer will be lost. Fortunately network I/O isn't redirected so you can save everything to network drives. Another is to create standalone virtual data layers.

Standalone data layers just redirect file I/O, and do so independently of the applications that use them, whether virtual or real. Files can also be copied back and forth between real storage and virtual data layers associated with specific local folders or file types to capture new files and updates automatically. On the downside, management can be an issue, and the concept confusing for non-technical users.

SVS has minimal impact on application performance and for companies with large networks to manage it's worth considering. It doesn't circumvent licensing and activation requirements, but does avoid DLL and other conflicts associated with more normal deployment methods. It can also be integrated with other Altiris management tools. Plus consultants and contract workers can use it for free to run their own applications on customer sites, with no worries about the effect it may have on what's already there. *Alan Stevens*

Details

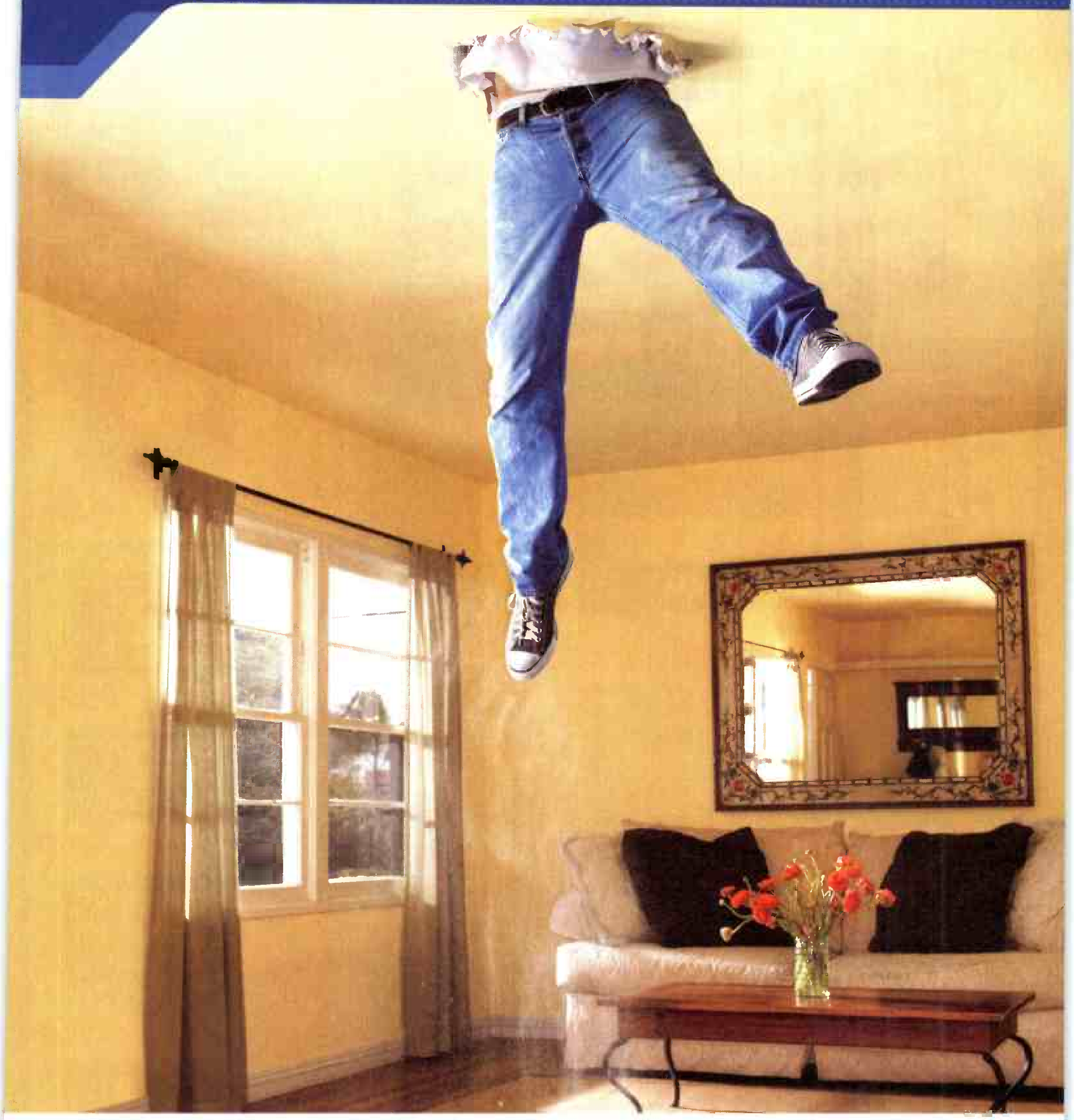
Price From £22.12 (£18.90 ex Vat) per client, but free for personal use
Best price www.pcw.co.uk/bestprices
Contact Altiris 00800 0258 4747 www.altiris.com
System requirements SVS agent needs Windows 2000 Professional (SP4), Windows Advanced Server (SP4), Windows XP (SP1), Windows Server 2003 or later

Verdict

Pros Eliminates DLL and other software conflicts; applications can be deployed and removed in seconds; fast recovery from application corruption; virtual data layers for portability
Cons Some applications can't be virtualised; additional data layers add to complexity; no tools to assist with application licensing

Features	★★★☆☆
Ease of use	★★★★☆
Value for money	★★★★☆

Overall A unique approach to application deployment with benefits for companies, contractors and independent consultants
★★★★☆



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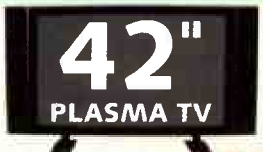

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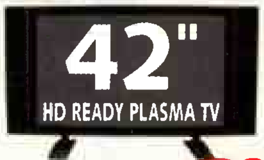

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Network print, scan, fax, copy and a lot more

With a built-in network server, scanner and fax modem, the Samsung SCX-5530FN can do a lot more than just print

Network multifunction laser devices used to only be affordable by big companies, but they are now comfortably within the reach of small businesses. Indeed, it's surprising just what you can get for your money these days, such as the Samsung SCX-5530FN which offers a lot more than the basic printing, copying and faxing options.

At the heart of the SCX-5530FN is a 28 page per minute (ppm) monochrome laser with a now almost essential built-in duplexer for double-sided printing. With a duty cycle of 25,000 pages/month it's ideal for network sharing, so you get an integrated network server as well as USB and parallel interfaces.

A combined toner/drum cartridge is the only consumable required, the Samsung laser shipping with a 4,000-page cartridge to get you started, while replacement 8K cartridges are priced at about £128 ex Vat.

A 250-sheet A4 tray comes as standard with a fold-out multipurpose feeder for transparencies, card and other materials, plus there's an optional 250-sheet second drawer should you need it.

As a printer we found the SCX-5530FN very quick and easy to use and, although only 600dpi, boosted to an effective 1,200dpi by software, it's more than adequate for day-to-day office printing. Plus, there's full support for both PCL6 and Postscript Level 3 printing with drivers for Windows, Mac and Linux provided.

However, it's the other options that really make the SCX-5530FN stand out. Starting with the built-in flatbed colour scanner, complete with automatic document feeder, which not only turns the Samsung into a walk-up copier, but also a fax machine (a fax modem is also built in) and a shared colour scanner. The SCX-5530FN can also convert scans to Tiff, Pdf and other formats and either transmit the scanned documents to remote Windows or FTP file shares, or send them to individuals and groups via email.

It's these last two options that we found the most exciting. For example, using an SCX-5530FN, orders could be scanned in and automatically sent to accounts and dispatch departments for processing. Or you could do away with desktop scanners, with users able to scan directly to their desktops – even directly to an application, if required. Added to which you can plug a USB memory stick into the front of the SCX-5530FN and either print out what it contains or scan documents onto it – great for when you're in a hurry.

We really were very impressed with what the SCX-5530FN had to offer and, although it's a light and easily positioned device, we found it robust and well-designed – an important consideration when used by lots of people. The various options are easy to use, although typing email addresses and other information from the small keypad at the front can be a bit tricky.

Fortunately it's quite easy to configure address books and Pin-protected user settings in advance via the web-based management interface. So much so that scanning a document and either storing it to disk or emailing it to a group of users can be done with just three or four key presses. You also get an impressive bundle of management and user tools as standard.

OK, you can get network laser printers for a lot less. But when you add up the cost of a separate scanner, copier and fax machine, not to mention all the extras, such as the scan-to-email option, you soon discover that you're getting an awful lot more for your money.

Alan Stevens

Details

Price £581.57 (£485 ex Vat)
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Contact Samsung 0870 726 7864 www.samsung.com/uk
Specifications 28ppm, 600dpi laser engine • Single cartridge consumable (4K and 8K page yields) 25,000 page/month duty cycle • 250-sheet A4 paper tray • 50-sheet multi-purpose tray • PCL6 and Postscript Level 3 emulations • 4,800dpi colour flatbed scanner with 50-sheet auto-feeder • Group 3 fax modem • Ethernet print server • Scan to network • Scan to email • Scan/print to/from USB memory stick

Verdict

Pros 28ppm laser printer/copier; flatbed scanner with auto-feeder; scan to network or email; scan to and print from USB stick

Cons Monochrome only; front panel operation can be a bit fiddly

Features	★★★★★
Performance	★★★☆☆
Value for money	★★★★★

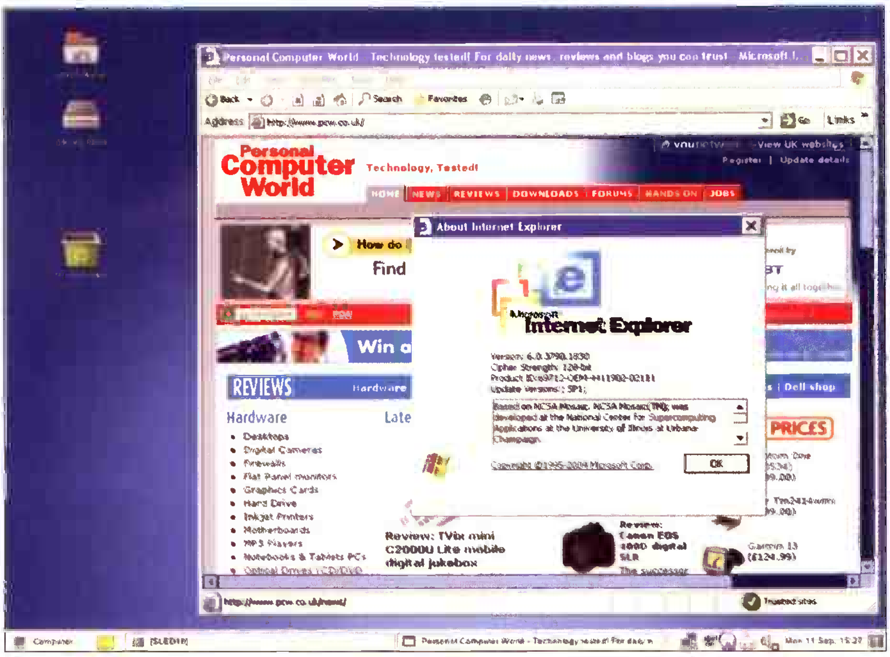
Overall A lot more than the sum of its parts, the SCX-5530FN can both save you money and help your business work smarter

★★★★★

SERVER-BASED COMPUTING

2X Application Server

Shared applications on Windows, Linux and Mac desktops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Review: Canon EOS 400D digital SLR
Trusted sites

The 2X Application Server can be used to tunnel Windows applications out to Linux and Apple Mac desktops

As well as thin-client desktops, Windows Terminal Server is frequently used in conjunction with Citrix Presentation Server to provide ordinary PC users with access to hosted applications. However, Citrix isn't the only vendor to offer this type of add-on, with similar functionality also available using the 2X Application Server.

The 2X package employs the standard Microsoft Remote Desktop Protocol (RDP) rather than Citrix ICA and, although not as configurable as Presentation Server, it is quicker and easier to deploy. Plus it doesn't cost as much, with a free version available for customers with five clients or fewer.

The core software needs to be loaded onto a Windows 2000/2003 server configured and licensed as a Terminal Services/Server host, and is installed like any other application, with a simple Windows console for setup and management.

Using this you can stop and start both the background service and an optional web proxy to tunnel everything over HTTP rather than using standard TCP ports for each of the protocols involved. The web proxy also adds support for a portal, enabling users to access applications from a browser. However, the 2X Application Server client still needs to be installed to run the applications and, in the current release, portal access is only available for Windows clients.

The applications are also installed on the server and published just by browsing to the main executable used to start them. Access can then be limited to specific domain users, computers or IP addresses and a suitable icon selected. But that's about all there is to it.

Web publishing is similarly straightforward. Just a matter of clicking a button to generate the required source code. We used IIS running on our Windows server to host the portal, but other web servers and remote hosts can also be used, plus there are facilities to customise the portal template to suit company style.

Out at the user end the 2X Application Server client needs to be installed to run applications. This is available for Windows 98 or above with the option of downloading from the portal. Clients for Apple Mac and Linux PCs, though, need to be distributed and installed separately.

We had no real problems with any of the clients, although we did have to configure additional compiler libraries on a couple of our Linux PCs – fairly standard practice for Linux applications. However, we were disappointed to find that the Linux client needed to be run from the command line and that we had to type in a plain text password when scripting a session. A GUI version is due in the next release, but wasn't available at the time of testing.

We published a number of applications, including Internet Explorer and tunnelled them to both Windows and Linux clients. It was a bit surreal running Explorer from a Linux desktop but the browser worked as expected, as did the other applications we tried. Note, though, that in each case the application is hosted in a user session on the remote Terminal Server, with limited access to local resources other than printers.

Clearly something of a specialist product, 2X Application Server will appeal to small businesses that are looking to benefit from the lower management costs associated with server-based computing. In particular, it will interest those who want to publish individual applications without the complexity and cost of the Citrix alternative.

Alan Stevens

Details

Price Free for up to five users. From £264.38 (£225 ex VAT) for a 10-user licence

Best price www.pcw.co.uk/bestprices

Contact 2X Software 0845 222 0425 www.2x.com

System requirements Application server requires Windows 2000/2003 server running Terminal Services/Terminal Server • Web server is required for the portal • Clients require Windows 98 or above, Mac O/S X 10.3.9 or above, or Linux

Verdict

Pros Publishing of individual Windows applications; support for Apple Mac, Linux and Windows clients; simple to deploy and manage

Cons Portal publishing only for Windows clients; Linux client run from command line with plain text password

Features	★★★☆☆
Ease of use	★★☆☆☆
Value for money	★★☆☆☆

Overall Worth considering as a Citrix alternative by companies looking to share hosted applications

★★☆☆☆

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Microsoft

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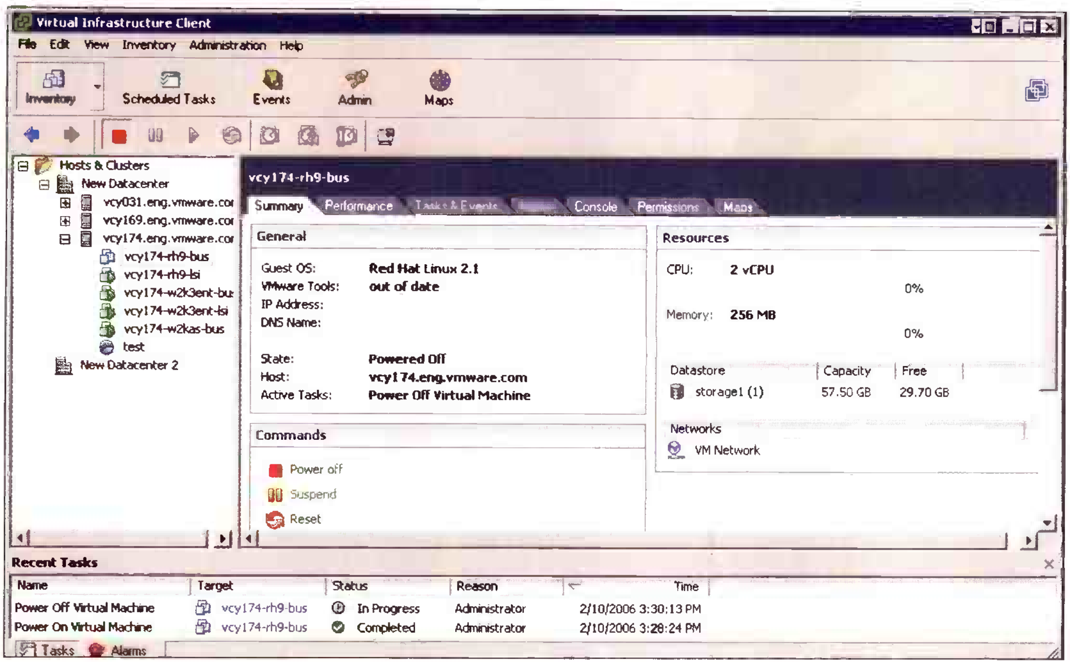
VMWare Infrastructure 3

The power and functionality to virtualise production servers



General

Guest OS: Red Hat Linux 2.1
VMware Tools: out of date
IP Address:
DNS Name:

State: Powered Off
Host: vcy174.eng.vmware.com
Active Tasks: Power Off Virtual Machine

Resources

CPU: 2 vCPU 0%
Memory: 256 MB 0%

Datastore	Capacity	Free
storage1 (1)	57.50 GB	29.70 GB

Networks
VM Network

Recent Tasks

Name	Target	Status	Reason	Time
Power Off Virtual Machine	vcy174-rh9-bus	In Progress	Administrator	2/10/2006 3:30:13 PM
Power On Virtual Machine	vcy174-rh9-bus	Completed	Administrator	2/10/2006 3:28:24 PM

Virtual machines running on multiple ESX Servers are managed centrally using the Windows-based virtual infrastructure client

The market leader when it comes to all things virtual, VMWare has a number of products on offer, including the free VMWare Server we reviewed back in June. However, if you want to consolidate and host production systems, then the revamped VMWare Infrastructure 3 (VI3) solution could be a better choice.

VI3 differs from both the free VMWare Server and most other virtualisation products in that it doesn't need a host operating system. It is based on the tried and tested VMWare ESX Server platform, installed directly onto bare server hardware to deliver enhanced levels of performance, reliability and security.

It's also highly scalable: the latest version supports up to 128 concurrent virtual machines (VMs), hosted on multiple ESX servers, all managed centrally using VMWare's Virtualcenter software.

VMWare servers (virtual and real) can also all share a common file system – the VMWare virtual machine file system (VMFS), enabling dynamic allocation and load balancing across both virtual and physical servers. You can even move whole VMs from one server to another in real time, complete with active users and applications.

Traditionally bought by larger enterprises, the new VI3 implementation of ESX Server falls well within the reach of smaller businesses, with a new Starter Edition selling for just over £500 ex Vat.

It has some limitations, though, such as a maximum of four physical processors and 8GB of memory per server, and no virtual SMP facilities. But you do get the Virtualcenter management and shared VMFS for use with local storage and network-attached storage servers.

Industry-standard servers that use either 32- or 64-bit Intel/AMD processors are required (each server needs at least two processors) with a Windows-like, install routine to step you through the initial setup process. After that, everything is done remotely using Virtualcenter, which needs to be hosted on a Windows server with the main user interface provided by a separate, Windows- or web-based, virtual infrastructure (VI) client.

Using the VI client we were able to create new VMs and convert existing VMs into templates to clone additional copies. We were also able to start, stop, monitor and generally manage VMs from the VI client, allocate VMs to resource pools and delegate management of those resources. VMs can't span more than one physical server, but reallocation of things such as processing power, memory and disk space on the host is possible and can even be automated using the optional Distributed Resource Scheduler.

Other extras include support for up to four-way virtual SMP and the use of the virtual file system on Fibre Channel and iSCSI storage area network. Both are in the more expensive Standard Edition (£1,979 ex Vat for a two-processor licence), which also lifts the ESX Server processor and Ram limits. You can add VMWare High Availability to provide automatic failover in the event of a hardware problem, and VMotion, the module that lets you migrate live VMs from one server to another.

System requirements are greater, and it's not free like VMWare Server, but VI3 provides a more powerful and reliable platform for consolidation of production systems. It's also better supported and offers additional tools to really take advantage of the VM architecture. Overall, VI3 could, paradoxically, work out cheaper. *Alan Stevens*

Details

Price From £620.40 (£528 ex Vat) for the Starter Edition
Best price www.pcw.co.uk/bestprices
Contact VMWare 01276 414 300 www.vmware.com
System requirements ESX Servers require two or more 32-64-bit Intel/AMD processors (single or dual-core), 1GB Ram per server and an Ethernet interface • Local storage can be ATA or SCSI (Serial ATA is not supported) • Virtual file system can be installed on local SCSI or Nas storage, or a Fibre Channel or iSCSI San • Virtualcenter requires a real or virtual Windows 2000 server or above running MSDE (provided)

Verdict

Pros No need for a host operating system; centralised management; shared file system; dynamic resource scheduler; live migration of virtual machines for maintenance and load balancing; virtual SMP support
Cons Sata storage not supported; virtual SMP and San support not available in Starter Edition

Features	★★★★☆
Ease of use	★★★☆☆
Value for money	★★★☆☆

Overall A solid and reliable virtualisation solution for companies looking to consolidate production servers
★★★☆☆

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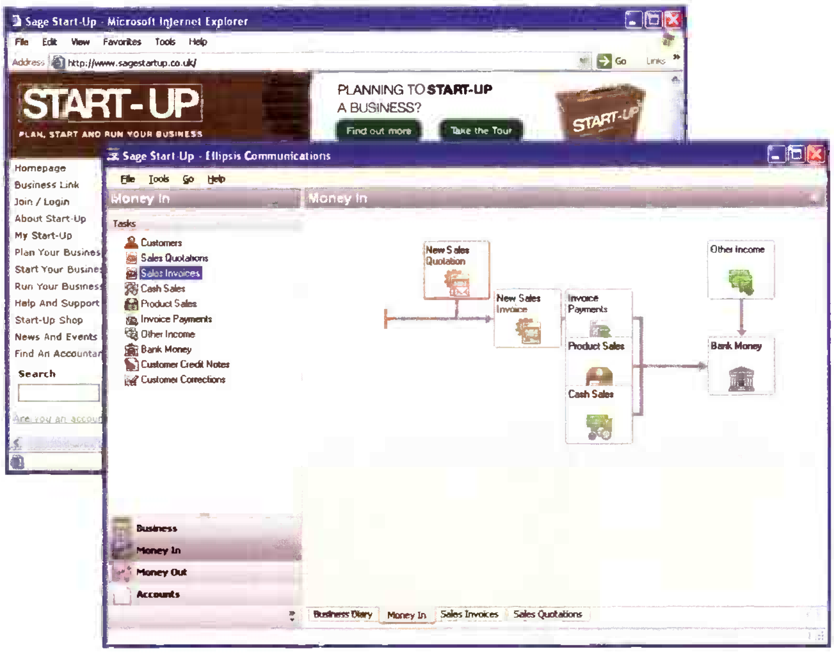
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Sage Start-Up provides access to online advice and planning tools as well as a bundled cashflow management and business diary program

If you're thinking of starting a new business you'll need help, which is what you get with Sage Start-Up, a unique bundle of software, advice and online services to help you plan, start and run a new venture.

Sage, of course, is best known for its accounting software, but if you think that Start-Up is your average small-business accounts package you'll be disappointed. Indeed, the software in the box is only designed to handle day-to-day cashflow management, leaving the rest of the financial donkey work to your accountant. But this is only a small part of what you get.

Sold on a subscription basis, Start-Up membership also provides access to a specialised website (**www.sagestartup.co.uk**) on which you'll find a wealth of information and useful tools. Not least a library of more than 500 documents on subjects such as Vat and employment law, as well as case studies showing other people's experiences and the pitfalls to avoid. You can also download tools to estimate how much it will cost to set up your business and create a professional-looking business plan. Then, once you're up and running, benchmark your performance against others in the same industry.

Of course, the Start-Up software is a major component too, equipping you with a cross between a business diary and a simple cash accounting application. Some initial setup work is required, to define how your business works, enter banking details, add customer records and so on. However, it's all pretty straightforward with plenty of jargon-free documentation to explain the whys and wherefores involved.

The Sage software was very simple to use with graphical menus, for example, to step you through the process of issuing quotations, creating invoices and, finally, banking the money. Tools to handle Vat accounting and year-end procedures are also provided and the data exported to Excel. It's also compatible with the professional Sage software widely used by accountants, so once a year you can just send your records off to be processed. There's even a 'find an accountant' option on the website.

On the downside we did find the software a little simplistic. For instance, we expected to be able to generate invoices from diary entries, but had to do that manually, and there was no facility to email invoices and purchase orders, only to print them. We also encountered a couple of bugs, such as being unable to delete product and service records entered incorrectly.

The bug did, however, enable us to check out the unlimited support service included with the product, when we phoned for help. Naturally, we were put through to an automated system, but after a few key presses we were soon talking to an operator who quickly advised that it was a known problem before giving us a workaround until an update could be issued.

Software updates are included in the subscription and, although nothing to write home about, the Start-Up program does the job required, leaving you to concentrate on running your business.

More importantly we found the other information and advice concentrated the mind and got us thinking about what was needed when starting a new business. It also served to point us in the right direction to get further help and, that alone, makes it well worth the money. *Alan Stevens*

Details

Price £175.08 (£149 ex Vat) for the first year, then £99 ex Vat each following year
Best price www.pcw.co.uk/bestprices
Contact Sage 0800 447 777 www.sage.co.uk
System requirements Windows 2000 or XP PC with 400MHz processor or greater (2GHz recommended) • 128MB Ram (512MB or more recommended) • 150MB free disk space • Internet connectivity • .Net Framework 1.1 (included on disk if not already installed)

Verdict

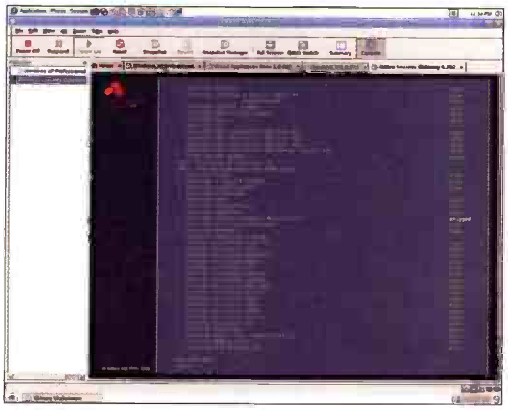
Pros Novel combination of software and web services; easy to use
Cons Financial software a little too simple in places; no links between the diary and the financial tools
Features ★★★☆☆
Ease of use ★★★★☆
Value for money ★★★★☆

Overall A must-have for anyone thinking of starting their own business
★★★★☆

SECURITY APPLIANCE

Astaro Security Gateway

Virtual protection for virtual servers but it's not for beginners



Like most Unified Threat Management (UTM) products, the Astaro Security Gateway offers a mix of firewall, email, web filtering and other security tools. Unlike the others, though, it is available both as a hardware appliance and as software – even as a ready-to-run virtual appliance.

Astaro is the first security vendor to offer its product this way, complete with supporting security-hardened Linux OS, pre-installed as a VMWare virtual machine. We downloaded the VM version and ran it using VMWare Workstation on a Fedora Core host, although you can use the free VMWare Player and VMWare Server products or the VMWare Infrastructure 3 solution reviewed on page 143.

You end up with a virtual machine configured with 256MB of memory, a 30GB hard disk and two Ethernet adapters. Not a powerful platform but sufficient for small business needs and it's easy to add more, with centralised management an optional extra.

With a virtual appliance there is no need for special hardware. We also found the Astaro virtual machine quick to deploy, taking about a minute to boot on our test PC, after which everything is managed via a web interface, identical to that on 'real' Astaro appliances.

Functionality is the same too, with a stateful inspection firewall combined with HTTP, DNS, SMTP, Pop3 and other proxies to support the other options, such as content filtering and anti-spyware scanning. Two independent scanning engines (Kaspersky and Clam) provide virus protection, scanning both email and web downloads, with nine methods of identifying spam also available. The Security Gateway can also act as a virtual private network server.

This is impressive but very little is done for you and we found the appliance version poorly documented.

Details

Price From £264.38 (£225 ex Vat) for 10 users
Best price www.pcw.co.uk/bestprices
Contact Astaro 0118 903 6050 www.astaro.co.uk
System requirements Virtual appliance is available as 740MB download (zip format) which can be used with VMWare Player, Workstation, Server, or ESX Server

Verdict

Pros Virtual appliance has no specific hardware requirements; mix of network, web and email security tools
Cons Complex to set up and manage; lack of documentation

Features	★★★☆☆
Performance	★★☆☆☆
Value for money	★★☆☆☆

Overall Even as a virtual machine the Astaro Security Gateway still needs expert installation and management

★★☆☆☆

NETWORK SWITCH

Dell Powerconnect 3424

Fast switching and good security features

It's easy to forget that as well as PCs and servers, Dell has an extensive range of small-business network switches. Such as the stackable Powerconnect 3424, which can be bought with Power over Ethernet (PoE) support and backup power supply.

It comes as a 1U rackmountable device with 24 auto-sensing UTP ports on the front panel and a pair of Gigabit uplink ports which can also be used to build a fault-tolerant switch stack. Up to six switches can be stacked this way, in addition to which each has two independent SFP (small form factor pluggable) slots for fibre adapters that can be used at the same time as the UTP uplinks.

As with most Layer 2 switches we were able to plug in the Powerconnect 3424 switches and start using them straight away. In addition, however, there's full support for SNMP management plus a built-in command-line interface for local console and Telnet access, and a web GUI.

Using any of these you can configure extensions to the Layer 2 switching engine, including the ability to handle up to 256 VLans and Mac or user-based access controls with authentication via an internal access control list or external Radius server. Quality of Service (QoS) also comes as standard on both models.

Controls to enable/disable and prioritise power delivery on a per port basis are another option on the Powerconnect 3424p model (£539 ex Vat). However, they're hardly necessary as the 3424p can deliver the full 15.4W specified by the 802.3af standard on every port, regardless of the number of devices connected. Plus for an extra £140 ex Vat you can add a second power supply to keep everything working should the built-in supply ever fail.

Details

Price From £292.58 (£249 ex Vat)
Best price www.pcw.co.uk/bestprices
Contact Dell 0870 907 4155 www.dell.com
Specifications Layer 2 Ethernet switches • 24 10/100Mbits/sec UTP ports • 802.3af PoE support on all ports (3424p only) • 2 shared adapter slots for fibre uplinks • 12.8Gbits/sec switching capacity • 8,000 MAC addresses • 256 VLans • Optional redundant power supply

Verdict

Pros Fast switching capability; QoS and security features
Cons PoE version expensive if you don't need power on all ports

Features	★★☆☆☆
Performance	★★★☆☆
Value for money	★★★☆☆

Overall Enterprise-quality managed switches at small-business prices

★★★☆☆

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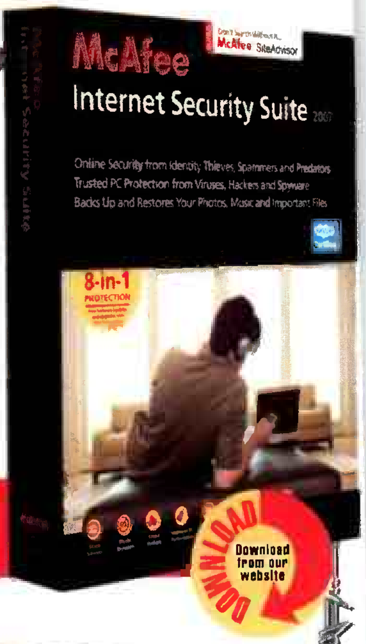
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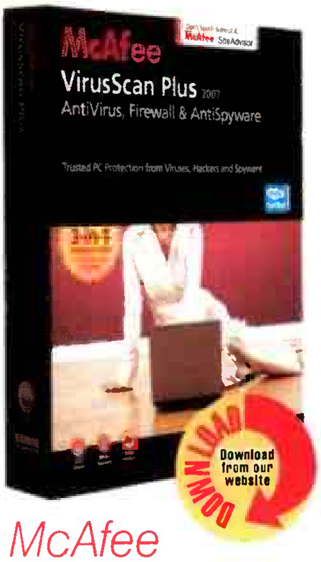
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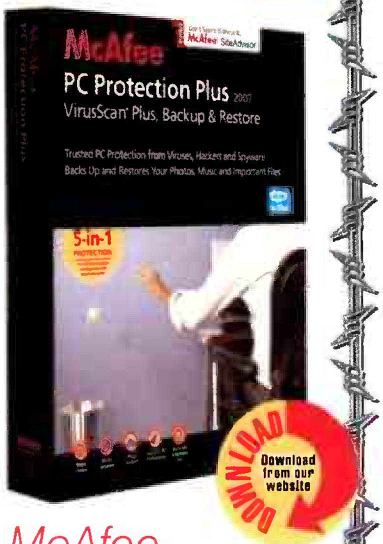
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Our website (**www.pcw.co.uk**, just in case you've been on a desert island for the past few years) is going from strength to strength, particularly for devotees of the Hands on section. As well as most of the Hands on columns going live, we're now starting to put up our Question time content, so you'll have all the answers at your fingertips. To make them easier to find, the articles are grouped using tags – look at the top of each Hands on column in the magazine and you'll see we've printed the specific URL for that section.

For Question time, for example, we use the tag 'faq' – so the URL is **www.pcw.co.uk/tags/faq**. This brings up a new page with all the tagged content aggregated for you. It's a handy way to see all the content quickly, or you can look for a specific article using the search box on the web page. We hope you find it useful – let us know if you have any comments, suggestions or problems by dropping an email to **letters@pcw.co.uk**.

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HARDWARE

Reset the Cmos

Q After three years of successful overclocking, my motherboard recently reset its Cmos settings. My system still boots fine but it reports the processor as a 2.3GHz Pentium 4, when it's actually a 3.06GHz model. I had also previously overclocked it to 3.53GHz, so have lost over 1GHz of speed. What do I need to do to get it running as before, and would increasing the core voltage provide better stability for overclocking?

Russell Marks

A When resetting its Cmos, your motherboard has switched its front-side bus (FSB) from 133MHz to 100MHz as a failsafe setting. Since your processor has a 23x fixed multiplier, your motherboard is now driving it at 2.3GHz. Increasing the FSB to 133MHz will drive your processor at 3.06GHz.

The long-term effects of overclocking vary greatly depending on the components and environment, but it certainly sounds as if your system reset itself as a result of being pushed too far in some respect. Believe it or not, this can still occur after years of trouble-free overclocking.

If a system is unstable when initially overclocked, then an increase in core voltage can certainly improve stability, but yours seemed to work fine for years with the default settings.

As such it sounds as if it may be a temperature issue which has got worse over time, or that your processor is simply no longer stable in an overclocked configuration.

You could try increasing the FSB speed to overclock it again, but beware it may not be as stable as before. You should also consider fitting a more effective heatsink and fan and ensure there's adequate airflow in your case, especially if you're increasing the core voltage.

If three years of overclocking has somehow damaged your processor, though, you may have to accept running it at its normal speed – but it should certainly run at 3.06GHz again with the bus reset to 133MHz.

Partitioning view

Q Do you have any comments on whether partitioning a hard disk affects its life? I've heard some people advocate separate partitions for programs, data and temporary files, including the swap file. The idea was that it made backing up and other tasks easier.

I followed this approach and found it convenient, but recently had a hard disk failure. My support engineer said he is against multiple partitions because they tend to make the disk work harder. Would you recommend partitioning the hard disk to provide separate areas for programs, data and swap files?

Alan O'Brien

'There is an advantage to keeping certain data in different partitions'

A This is exactly the sort of question where it's difficult to find hard evidence pointing one way or the other. There's certainly a convenience and housekeeping advantage to keeping certain types of data in different partitions, but equally doing so could involve greater wear and tear on the disk as it constantly moves back and forth between them.

Interestingly, this is the kind of environment where Native Command Queuing, discussed in this month's Performance column, could prove beneficial.

It's also worth mentioning that Intel's own Matrix Storage Technology exploits dual partitions on two separate disks to deliver one volume with the reliability of Raid 1 for data and another with the performance of Raid 0 for temporary files.

Ultimately, it's a personal choice whether to partition, although many prefer using single partitions, as whatever you're working on has the full available capacity of your hard disk at its disposal rather than the potential ceiling of a smaller partition. One thing is certain, though: if you want to improve the performance of your swap file or Photoshop scratch disk, you'll need to house it on a physically separate hard disk rather than a different partition.

DIGITAL IMAGING

Grass is greener

Q I've been using a Canon G3 for some time now and am generally pleased with the results, but as a long-time Olympus SLR user I was looking forward to using a digital SLR. I was hankering after the 350D when a friend upgraded to the Canon 30D and offered me his 20D at half price.

After taking a few test shots I was a little disappointed to find that my G3 seemed to be much sharper, having better colour and more detail in the shadows. I was told this is because there is a

Canon
EOS 20D
CANON ZOOM LENS EF-S 17-85mm 1:4-5.6 IS USM
DIGITAL
CANON
MADE IN JAPAN

Canon's 20D has greater appeal for the semi-pro lot more in-camera processing in the G3 as it is aimed at people who take snaps, whereas the 20D is designed for semi-pros who like to do more processing themselves on their computer. Taking this on board I set about comparing Raw shots and still found that the G3 produces better images.

The 20D has the standard kit lens, but even so I expected more. Is it me? Am I doing something wrong?
Nick Thatcher

A Raw images are the unprocessed data from the camera. That data needs to be processed and interpreted. Whatever software you're using – be it Canon's Digital Photo Professional, Adobe Camera Raw or whatever – it is doing exactly that.

In order to get the best from your raw shots you'll need to make white balance, saturation, exposure, lens correction and other adjustments, and these will vary depending on the camera, the lens and the conditions under which the images were shot. It's this ability to optimise individual images that provides the advantage when shooting Raw.

When you set your G3 or 20D to shoot Jpegs or Tiffs, the camera preprocesses the images according to the parameter settings. If you want to make a comparison between the two cameras make sure you use the same, or as close as possible, parameter settings. While not as good as more expensive Canon zooms, the EOS 20D's kit lens uses good-quality optics.

In addition, the 20D has a bigger, better sensor, so you should be able to obtain much better quality photos from your 20D than your ageing G3.

The answer is really a query

DATABASES

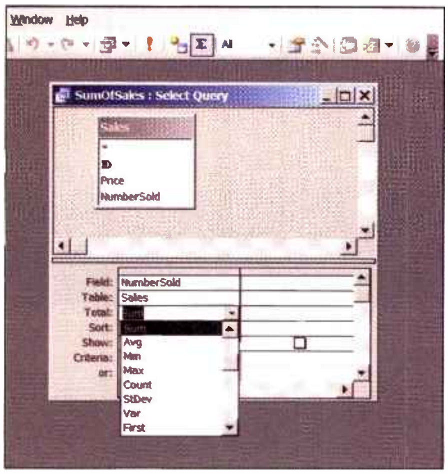
Q I have a column of numbers in Microsoft Access. Can you please tell me how I can get a total?
Roger Lacey

A Use a query. If you are not used to this it sounds weird, but it works fine. The type of query you need is called a GroupBy query. Imagine you have a table such as the one below. And you want to total, say, the NumberSold field. Start building a query and add the table.

Then you press the Totals button (which has the Sigma symbol – a Greek S that looks like an E) and a new row appears in the query builder labelled Criteria. Choose Sum, run the query and you should see the total.

Sales

ID	PRICE	NUMBER SOLD
1	£23.56	6
2	£34.56	45
3	£67.34	87
4	£21.76	93
5	£548.65	56
6	£38.69	3
7	£235.76	244



Field: NumberSold
Table: Sales
Total: Sum
Sort:
Show:
Criteria:
or:

Using the GUI to construct a GroupBy query

The SQL for this is: SELECT Sum(Sales. NumberSold) AS SumOfNumberSold FROM Sales;

GroupBy queries can do more than this. You can calculate the average price and the sum of the number sold.

SELECT Avg(Sales.Price) AS AvgOfPrice, Sum(Sales.NumberSold) AS SumOfNumberSold FROM Sales;

Both queries and the table of data are in the database (DBCDec06.MDB) at **www.pcw.co.uk /2151344** and if you've bought the DVD edition of PCW, on the cover disc.

Outta sites

Q I have recently installed Ubuntu and, after a few hiccups getting to know it, I'm now quite comfortable with my new system. One problem I haven't been able to fix is that some websites display badly, with text not fitting inside the window. The fonts also look different from my Windows system.
Andrew Stanton

A The probable cause here is that you haven't installed the Microsoft 'web' fonts. Many websites expect these, and some poorly designed ones will not display properly if alternative fonts are used. These cannot be distributed directly by Ubuntu, but thankfully the fonts can be legally downloaded and installed easily. Ensure the 'universe' repository is enabled, and find 'msttcorefonts' in Synaptic.

LINUX

Top resolution

Q I have installed Ubuntu Dapper following *PCW's* Hands on columns, but when the CD boots the screen resolution is wrong.

I have a widescreen display, but the highest I can get is 1,024x768 in the administration utility. After installing, the problem remains.
Alexander Robertson

A There is a known problem in Ubuntu, where if the installation program cannot detect your monitor settings for whatever reason, it sets a sensible maximum 1,024x768 resolution. One of the most common criticisms of Ubuntu is the lack of a good utility to change graphics settings.

The quickest way to change the resolutions in these circumstances is to re-run the installation configure script with 'sudo dpkg-reconfigure -phigh xserver-xorg' in a terminal.

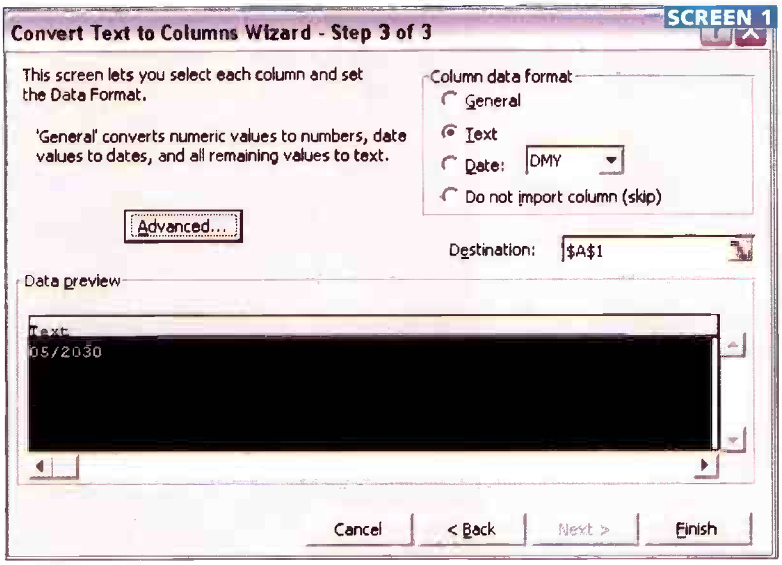
If it cannot detect your settings it will present a list for you to choose. Select the native resolution and log out and back in, and all should be fine.

SPREADSHEETS

A hot date

Q I found useful the DATEDIF function showing Years + Days in a recent Question time. Is there a way to show Years + Months + Days instead?
Michael Makriyiannis

↘



This screen lets you select each column and set the Data Format.

'General' converts numeric values to numbers, date values to dates, and all remaining values to text.

Column data format
○ General
● Text
○ Date: DMY
○ Do not import column (skip)

Destination: A1

Text
05/2030

Using the Text to Columns Wizard

A The optional arguments for the Excel DATEDIF function are y for years, m for months, d for days, yd for days excluding years, ym for months excluding years, and md for days excluding months and years. This formula

```
=DATEDIF(A1,B1,”y”)&” years + ↙
“&DATEDIF(A1,B1,”ym”)&” ↙
months + “&DATEDIF↙
(A1,B1,”md”)&” days”
```

(Key: ↙ code string continues)

assumes that the earlier date is in cell A1 and the later date in B1.

A hard cell

Q I often have to open a Csv file to modify some elements of the data. Excel assumes some reference numbers are dates. For example, 05/2030 becomes May-30, or 05/2199 becomes May-99. This means I have to edit each of these fields and force them to be text by adding apostrophes at the front.
Graham Cable

A If you open a comma-delimited data file in Excel, the Text to Columns Wizard should start, or you can start it on the Data menu. In Step 2, specify that the delimiter is a comma. In Step 3, specify that you want the imported data to be retained as text. Excel will then format the cells appropriately (see screen 1).

Picture this

Q I want to insert a picture into a group of cells, say B3:E13, in an Excel worksheet, and have it sized to fit that area. Ideally, I'd also like a user to be able to click the picture and insert a picture of their choice. Can you help?
Gray Sharpling

A Pictures are on a different layer of the worksheet than the cells. So you are best off with the chosen picture pre-edited to the approximate size and ratio as the chosen range of cells. Click on the worksheet and insert the picture. Right-click on it and drag it to the required position. Fine-tune the picture to cover the desired range of cells. In an adjacent cell, insert an instructional comment telling the user how to pick an alternative picture.

Preferred list

Q Microsoft Word doesn't limit you to a choice of the most recent documents to open. You can also have a list of your preferred documents on any toolbar via Customise, Commands, Built-In Menus, Work. Does Excel offer an equivalent somewhere?
Lynda Mcgrory

A Not an official one but Danie Klann's Add-In works well. Go to, **www.danielklann.com/excel/excel_favourites_add-in.htm** and download the small file, Favourites.zip. This opens to provide an explanatory file, readme.txt, and the Add-In, Favourites.xla. Open Excel, choose Add-Ins from the Tools menu and browse for this file. When loaded, this Add-In offers a Favourites option at the top of the regular File menu and in the shortcut menu displayed when you right-click on a worksheet. Choose, Add Active Workbook to add the current file to the list, or pick from the menu's favourite files (see screen 2). If you choose Organise you can rearrange the order of the file names displayed, add other files, or delete the shortcuts to them.

Present perfect

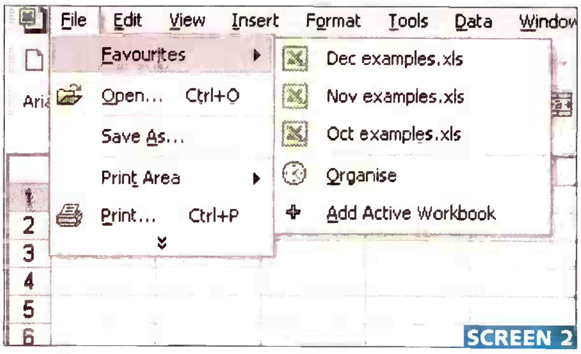
Q I keep a school register using letters in each cell designating a student's attendance: X = Present, L = Late, O = Absent, N = Authorised Absence. I'd like to validate a range of cells to accept only these letters. The only way Excel seems to do it is to have a dropdown box, which is much too slow. If I can see that everyone is present I whiz down the column pressing X and Return. If I try to put a formula in a cell to only accept these letters I get an error message about circular references. What do you suggest?
Bryan Norman

A You could use Validation, List on the Data menu and put your options in a list. You could use Conditional Formatting on the Format menu. Personally, I would probably have a narrow column for every option (with labels running vertically) and pop a '1' in the right column, then Sum the 1s.

WINDOWS

Bird of prey

Q I have a bird program with lots of data on a CD. I am sure I read about a trick that could be used to fool the PC into thinking a CD was in the drive when the data had actually been copied to the hard disk. I have tried copying everything onto my hard disk, including the installation routine, but the program insists on



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my inserting the CD in the drive before it will run.
Dave Smith

A You need to create an image of the CD on disk rather than just copy it. One free program that will do this is Alex Feinman's ISO Recorder, which adds this as a right-click option for CDs (**http://isorecorder.alexfeinman.com/isorecorder.htm**). Having created the ISO image you need to mount it – that is, perform the trick of disguising it as a CD.

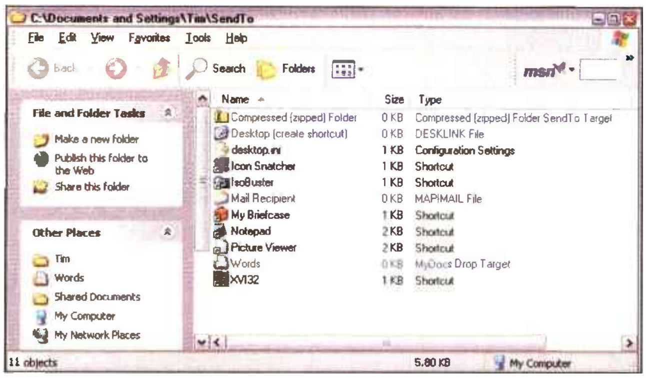
There's a tiny free utility from Microsoft called winxpvirtualcdcontrolpanel that will do this (**http://tinyurl.com/tyxx**).

Desperately seeking Sendto

WINDOWS

Q How can I find and alter the Sendto file in Windows XP Home?
A Nohejl

A It's a folder, not a file, and it's in your profile as Sendto. Start, Run, Sendto – you can then add and delete shortcuts to programs or folders.



Name	Size	Type
Compressed (zipped) Folder	0 KB	Compressed (zipped) Folder SendTo Target
Desktop (create shortcut)	0 KB	DESKLINK File
desktop.ini	1 KB	Configuration Settings
Icon Snatcher	1 KB	Shortcut
IsoBuster	1 KB	Shortcut
Mail Recipient	0 KB	MAPIMAIL File
My Briefcase	1 KB	Shortcut
Notepad	2 KB	Shortcut
Picture Viewer	2 KB	Shortcut
Words	0 KB	MyDocs Drop Target
XVI32	1 KB	Shortcut

You can add and remove shortcuts in the Sendto folder

Capital offence

Q Much as I like Word, it is at its worst when it tries to help but keeps doing something unwanted. In my case, that means automatically changing the first letter of any line into a capital. If I enter text in lower case it is because that is what I want. How can I stop this from happening?
Ian Wright

A Unwanted changes due to someone else's idea of rules have been the plague of writers long before word processors. As Raymond Chandler stated in a letter to his editor, "Would you convey my compliments to the purist who reads your proofs and tell him or her that… when I split an infinitive, damn it, I split it so it will stay split." Word users have two ways of dealing with purist capitalisation.

First, if you press Alt & backspace just after the capitalisation is performed (usually when you type the space after the first word), this will undo the capitalisation.

However, if you would rather it stayed lower case, then you can turn this unhelpful feature off by going to Tools, Autocorrect Options (see screen 3).

Lovely landscape

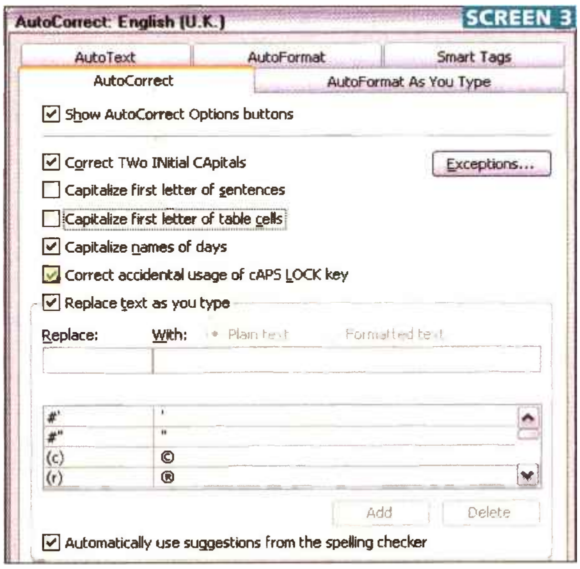
Q Can you help me with a problem I have been trying to solve in Microsoft Word? I want to take an A4 sheet, fold it in half and set it on a table so that the printing looks correct when viewed from each side. That is, if you unfold the sheet the printing on the top half is upside down compared with the bottom half.

I thought all I had to do was set up a table with just one cell in the top half and one in the bottom half and then change the text direction, but you only appear to be able to change printing from horizontal to vertical. Have you any suggestions?
Trevor Mitchell

A You're nearly there. It just takes a further dollop of lateral thinking, in this case literally, as you need to set your page up in landscape format. You can then use a table, or two text boxes. In the left cell or box, change the text direction to run top to bottom, and in the right run the text bottom to top.

Microsoft Office online has a variety of templates for this at **http://office.microsoft.com** for Place Tent or Table Tent.

Take back control of your typing



☑ Show AutoCorrect Options buttons
☑ Correct TWo INitial CApitals
☐ Capitalize first letter of sentences
☐ Capitalize first letter of table cells
☑ Capitalize names of days
☑ Correct accidental usage of cAPS LOCK key
☑ Replace text as you type

Replace	With
#'	'
#"	"
(c)	©
(r)	®

☑ Automatically use suggestions from the spelling checker

A bit of a draft

Q Something very odd has happened to my Word documents. If I edit them in Print Layout view, then all is well, but if I switch to Normal view, everything is in the same font – Times New Roman – and the same size.

Bold and italic still work OK, and the font and size that should be there are still shown in the formatting bar. What has gone wrong with my document?
Chris James

A You seem to have Times set as a draft font. This option is designed to speed up display of heavily formatted text, but is largely irrelevant on modern PCs. Go to Tools, Options, View to turn this off. In some versions of Word, the option only appears when in Normal view.

LET US HELP YOU

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Gordon Laing has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

→ Comments welcome on the Hardware column.
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How to build a Viiv system

Create an Intel Viiv-compliant system with our step-by-step guide

Media PCs branded with Intel's Viiv logo are now on sale, but many people are confused as to how these differ from existing systems running Windows XP Media Center Edition 2005. After all, key Viiv features, such as infra-red remote control, instant on and off, and the ability to record, pause and rewind live TV, are all supported by MCE 2005.

Now that motherboards sporting the Viiv branding are also available, we've put together our own DIY system to see what's really on offer.

Viiv hardware

The heart of any Viiv system is a compatible motherboard and we used the Asus N4L-VM DH which costs about £90 from **www.scan.co.uk**. The N4L is a MicroATX motherboard featuring Intel's 945GM chipset and the required network and audio components. For full benchmarks of this motherboard, see last month's Hardware and Performance columns (**www.pcw.co.uk/tags/hardware** and **www.pcw.co.uk/tags/performance**).

We fitted an Intel Core Duo T2600 processor which runs at 2.16GHz and costs about £340 from **www.dabs.com**; this was one of the fastest models at the time of writing, but slower and cheaper Viiv-compliant versions are also available.

A modern Serial ATA (Sata) hard disk supporting Native Command Queuing is a requirement for Viiv (see box on next page). We used a 300GB Seagate Barracuda 7200.9 model. Viiv doesn't have minimum requirements for memory, but we fitted a pair of high-performance Crucial 1GB Ballistix DDR2 PC2-6400 Dimms.

Preparing for Viiv

As explained in the Viiv requirements box, it's crucial to install the correct operating system and drivers, but first you'll need to modify several settings in the motherboard's Bios.

To support Viiv's instant on and off feature, you will need to enable Quick Resume in the Power Management settings; on older motherboards or Bioses this may still be known by its codename 'Energy Lake'.

While in the power management Bios section, we'd also recommend switching the Standby mode from S1 to S3. This gives you the flexibility of implementing an alternative sleep mode to Quick Resume (see box on next page). The switch from S1 to S3 must be made before installing Windows.

This alternative also requires 'S3 wake-up by USB' to be enabled which, on some motherboards such as the Asus N4L, requires a jumper adjustment – see the manual. Other motherboards may allow you to select S3 wake-up by USB with a Bios setting in the power management section.

A Sata hard disk with Native Command Queuing (NCQ) is a requirement for Viiv, but simply connecting an appropriate model is not sufficient. Modern Sata features, such as NCQ and hot-plugging, will only work if the Sata disk controller also supports them, and that means having a compatible Raid or AHCI (Advanced Host Controller Interface) chipset.

The Asus N4L-VM DH motherboard supports Intel's Viiv, but additional components and configuration steps are required for full compliance

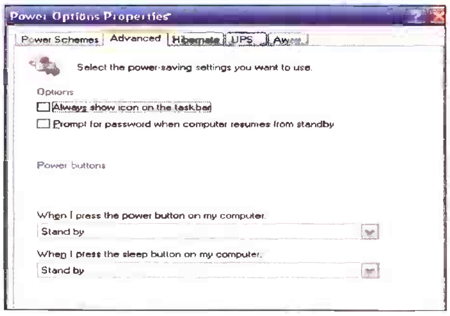
Standby alternative

S3 Standby allows your system to genuinely go to sleep, shut down the fans and consume virtually no power, while still being able to wake up automatically to record shows.

You'll first need to have enabled S3 in the Bios' power management section before installing Windows – see main article. You'll also need to enable your motherboard's USB wake-up from S3 option, which may either be in the Bios or using a physical jumper.

Open the Power Options control panel applet and under the Advanced tab, set the Power buttons options to Standby; if you previously installed the Quick Resume driver, you will need to go to the Away tab and uncheck it.

S3 Standby mode will now be operational, but if you want the MCE remote control to wake your system, you'll need to paste the following bold lines into Notepad and save the file as 'USB.reg':



Select the power-saving settings you want to use.

Options

☐ Always show icon on the taskbar

☐ Prompt for password when computer resumes from standby

Power buttons

When I press the power button on my computer:
Stand by

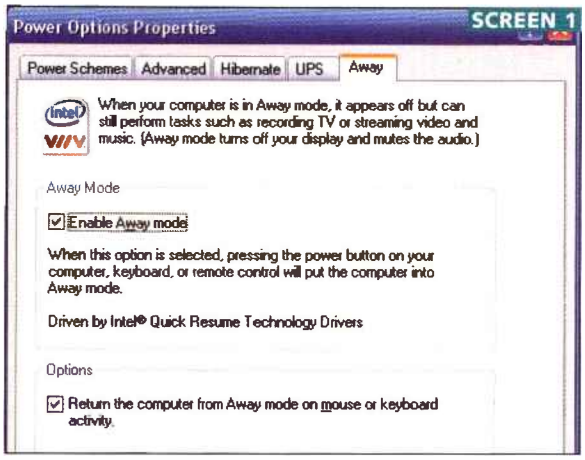
When I press the sleep button on my computer:
Stand by

Properly implementing S3 suspend to Ram in Windows requires additional tweaks

```
Windows Registry Editor Version 5.00
[HKEY_LOCAL_MACHINE\SYSTEM\↙
CurrentControlSet\Services\usb]
"USBBIOSHACKS"=dword:00000000
"USBBIOSx"=dword:00000000
```

(Key: ↙ code string continues)

Now double-click the reg file to install it, then restart your PC.



When your computer is in Away mode, it appears off but can still perform tasks such as recording TV or streaming video and music. (Away mode turns off your display and mutes the audio.)

Away Mode

☑ Enable Away mode

When this option is selected, pressing the power button on your computer, keyboard, or remote control will put the computer into Away mode.

Driven by Intel® Quick Resume Technology Drivers

Options

☑ Return the computer from Away mode on mouse or keyboard activity.

Installing Intel's Quick Resume software for Viiv motherboards adds a new Away tab to Windows Power Options control panel. Checking Away mode enables Viiv's instant on and off feature, but in reality it only mutes the video and audio signals

Viiv requirements

To build a Viiv-compliant system you will need very specific components. This is to ensure a certain level of performance and compatibility, so one Viiv device can be guaranteed to work with another.

Given Viiv's parentage, most of the key components required are, not surprisingly, Intel models. Starting with the processor, Viiv demands dual-core to prevent slowing down when transcoding media formats or streaming content to other devices; you'll need either the Core 2 Extreme, Core 2 Duo, Core Duo or a selected Pentium D.

The processor will then need to be fitted into a motherboard sporting a specific Intel Express chipset; compatible models include the 975X with ICH7-DH, 965X (G or P) with ICH8-DH, and the 945 (GT or GM) with ICH7M-DH.

The motherboard will need additional Intel technologies, including an Intel networking chipset with Intel's Pro Client Lan (82562 or 82573V/L) and Intel HD Audio. The hard disk must also be a recent Serial ATA model supporting Native Command Queuing (NCQ); this requires specific drive controller and driver support.

The operating system must be Windows XP Media Center Edition 2005 running Rollup 2. You must then install drivers for Intel HD Audio, Intel Matrix Storage Technology and Intel Quick Resume Technology, along with Intel's Viiv software, all of which should be included with a Viiv motherboard.

More details on Viiv's component requirements can be found at **www.intel.com/products/viiv/requirements.htm**.

Luckily modern motherboards feature AHCI options for their Sata controllers which you can select in the Bios – usually under the Integrated Peripherals section, although doing so comes with an annoying twist. While Windows can natively support Sata controllers configured to emulate IDE, it treats AHCI the same as Raid, SCSI and other third-party controllers. That is to say, you need to supply a driver at the start of Windows setup, and it needs to come on a floppy disk.

This is annoying to say the least, as most people haven't had a floppy disk drive connected for years. Windows infuriatingly can't accept this driver from a more common source, such as a USB drive. You also can't set the Sata controller to IDE emulation, install Windows, then switch it back to AHCI afterwards. And while it is possible to create your own custom Windows installation CD with the correct drivers in place, it's not a simple process (see our 'Faster, slimmer, better' feature in the April issue of *PCW*, online at **www.pcw.co.uk/2154232**).

So if you want AHCI and NCQ support, whether for Viiv compliance or otherwise, you'll need a floppy drive, and the appropriate drivers copied onto a disk. See this month's Performance column for more on NCQ.

Viiv software

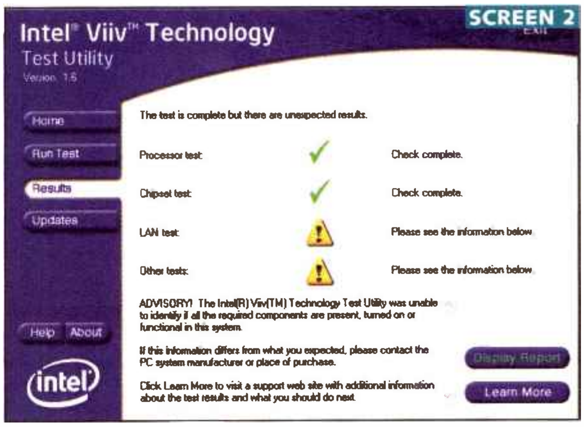
One you've made the required changes to the Bios and connected a floppy drive with the correct AHCI drivers on a disc, you can install Windows XP MCE 2005 as normal. Next, install the drivers for the chipset, graphics, network and audio components, then visit the custom section of Windows Update to download Rollup 2.

Finally, install the Intel Quick Resume and Viiv drivers that came with the Viiv motherboard, and Intel's Matrix Storage Manager, which you may need to download from **www.intel.com/support/chipsets/imsm**.

After restarting your computer, you'll find a new Viiv-branded section under Windows' Power control panel labelled 'Away' (see screen 1). Away mode is behind Intel's Quick Resume Technology, but does nothing more than simply switch the picture and sound off like a mute button.

On the upside, Away mode allows the PC to be ready to stream content to other devices, such as a server, but on the downside it consumes almost the same power as the PC does normally. And once the Quick Resume drivers have been installed, pressing the PC's power button or the on/off button on the MCE remote control will just activate this AV muting facility.

Intel's Viiv Test Utility can check your configuration for full compliance. Here a particular network driver and a non-NCQ disk installation have failed two of the tests



The test is complete but there are unexpected results.

Processor test: ✓ Check complete.

Chipset test: ✓ Check complete.

LAN test: ⚠ Please see the information below

Other tests: ⚠ Please see the information below

ADVISORY! The Intel(R) Viiv(TM) Technology Test Utility was unable to identify if all the required components are present, turned on or functional in this system.

If this information differs from what you expected, please contact the PC system manufacturer or place of purchase.

Click Learn More to visit a support web site with additional information about the test results and what you should do next.

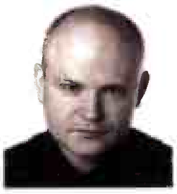
As for the Viiv drivers, all they appear to do is install a DLL file that allows other programs to identify the PC as a Viiv-compliant system. This could then be used to reveal exclusive content for Viiv owners in MCE's Online Spotlight which would be hidden from other MCE owners, but so far there's nothing exclusive to Viiv in the UK.

Either way, at this point you should inspect your handiwork and verify you have a 100 per cent Viiv-compliant system. Intel offers a utility to check at **www.intel.com/support/processors/tools/vtu/index.htm** – this page also provides details on the exact driver versions you'll need to pass the test, as it can be quite fussy (see screen 2).

What's the point?

The first implementation of Viiv is currently little more than a branding exercise. At the time of writing there was no exclusive content for UK Viiv owners, while the Instant on and off feature did nothing more than mute the audio and video signals.

We expect Viiv to become more useful in the future though, especially when it comes to easily setting up streaming media throughout your home. At this point, DIY MCE enthusiasts may wish to build their own Viiv system. **PCW**



Gordon Laing has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

→ Comments welcome on the Performance column.
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The joys of Sata

Serial ATA offers many advantages for the DIY PC builder

Sata has become the dominant hard disk interface, but DIY PC builders may not be getting the most from their hardware. Legacy Bios options, for instance, are often chosen for ease of setup, but limit the features of the latest disks and controllers. In this month's Performance column we'll look at how to exploit Sata's advanced features.

Sata benefits

The most obvious benefit of Sata over parallel ATA (Pata) is the physical interface that allows thinner cabling, thereby improving airflow in the case. Sata also uses just one cable per device. The first Sata specification offered 150Mbytes/sec bandwidth compared with 133Mbytes/sec of the fastest Pata controllers.

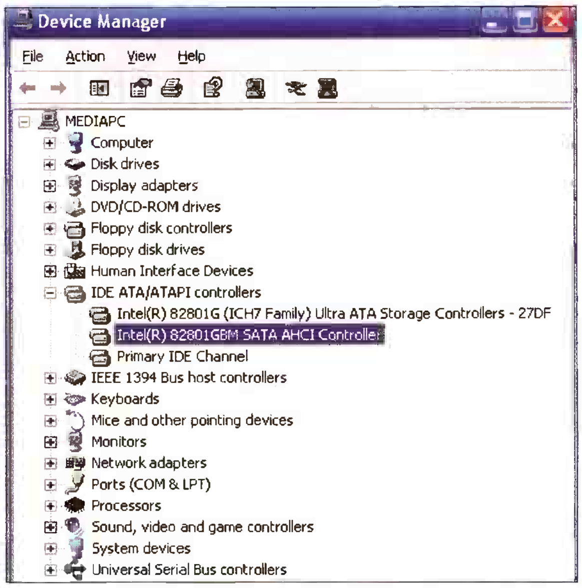
However, the first incarnation of Sata offered little that was new in terms of performance. Although subsequent extensions to the initial specification, known as Sata II, have brought powerful new features, including Native Command Queuing (NCQ).

Sata II brings new features

NCQ finally addresses one of the biggest bottlenecks in ATA hard disk throughput (the SCSI disk interface always had Command Queuing technology). Prior to NCQ, an ATA hard disk would process each data request in turn, even if this meant going from one side of the disk to another, then straight back again.

This is no different from us visiting one shop then returning home, before heading back out again to visit another shop which could be next door to the first. In the same way we sensibly visit several shops on one journey, NCQ can process several requests in advance and gather the data as it goes along.

Before getting too carried away though, it's important to realise NCQ is only exploited when applications request more than one piece of data at a time. This typically only happens in multi-threaded environments or where several applications are accessing data simultaneously.



MEDIAPC
- Computer
- Disk drives
- Display adapters
- DVD/CD-ROM drives
- Floppy disk controllers
- Floppy disk drives
- Human Interface Devices
- IDE ATA/ATAPI controllers
  - Intel(R) 82801G (ICH7 Family) Ultra ATA Storage Controllers - 27DF
  - Intel(R) 82801GBM SATA AHCI Controller
  - Primary IDE Channel
- IEEE 1394 Bus host controllers
- Keyboards
- Mice and other pointing devices
- Monitors
- Network adapters
- Ports (COM & LPT)
- Processors
- Sound, video and game controllers
- System devices
- Universal Serial Bus controllers

To exploit a hard disk's native Sata features, you'll need it connected to a compatible AHCI or Raid controller with the right driver loaded. For primary hard disks, this means a fresh Windows installation and having a floppy disk to hand

As such, you're unlikely to notice the benefits of NCQ in general use, but if your PC were streaming media to other clients while also, say, recording a TV programme, NCQ should allow it to perform better.

Supporting NCQ

To fully support NCQ and other native Sata features your disk controller must be a compatible Raid or Advanced Host Controller Interface (AHCI) model with the relevant driver loaded.

While this presents no problem if you're connecting a second disk to a third-party controller card on an existing system, it's not so simple for your primary disk.

On switching your controller's Sata mode to AHCI or Raid in the Bios, you'll discover Windows doesn't natively support either and requires a driver during the initial setup – and on a floppy disk, no less.

Many DIY builders, frustrated by the need for a floppy drive, go back to their Sata controller Bios settings and choose Disabled or IDE mode. These emulate the older IDE standard, allowing it to install without a hitch.

Unfortunately, these settings won't support native Sata features, and you can't just switch from IDE emulation to AHCI or Raid on existing primary disk installations. For native Sata support on your primary disk, you'll need a fresh Windows installation – and unless you create a custom Windows install CD, you have no choice but to connect a floppy drive. Once Windows is set up, you'll also need to install any supporting software for the disk controller.

Supporting NCQ is easy for additional (non-primary) disks on existing systems though: simply connect them to an appropriate third-party disk controller, set it to Raid or AHCI and install its OS drivers.

Is it on, Tommy?

To put NCQ to the test, we built a system using an Asus N4L-VM DH motherboard with a Core Duo T2600 processor, 2GB of Ram and a 300GB Seagate Barracuda 7200.9; the chipset and disk both support Sata II features.

We first installed Windows XP with the Sata controller configured as IDE, where Sysmark 2004 scored 261. We then reinstalled Windows XP with the controller configured to AHCI and the correct driver loaded; Intel's Matrix Storage Manager utility confirmed NCQ was active. Here Sysmark 2004 scored 263 – a small difference within the test's repeatability error margins. Retesting both configurations with HD Tach also gave virtually the same results.

The benefits of NCQ are not clear in general use, so we'll conduct further tests and report back. **PCW**

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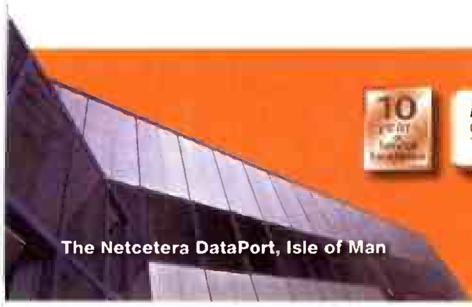
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Tim Nott is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

→ Comments welcome on the Windows column.
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Blind dates

Finding out when a file or folder was last accessed is an exact art

In Christopher Brookmyre's book, *All Fun and Games until Someone Loses an Eye*, a character with hacking skills switches on a PC, then checks the boot log to see when the machine had last been on and for how long. She then checks the directory access records to see which folders had been accessed during the last session. So, is this far-fetched literary licence or fact?

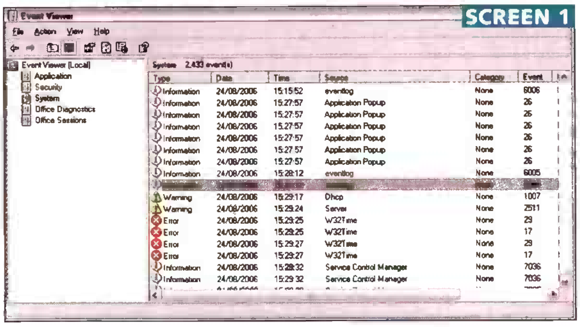
Since the book was published in 2005, we'll assume the PC was running Windows XP. The first part is relatively easy, except that it's not the boot log you should be looking in but the System Event Log.

Run the Event Viewer, which you should find under Administrative Tools in Control Panel or the Start Menu, and click on System in the left pane. Resize the window so you can see the Event column in the right-hand pane (see screen 1).

Look for an entry of 6009 in this column – this shows when the PC was shut down or restarted. A start-up will be logged by a number of events, mostly with the code 7035, 7036 and 26, corresponding to various services and checks. Right-clicking an event and choosing Properties shows a brief explanation, and you can find out more by clicking the link provided in the Event Properties box.

Schrödinger's files?

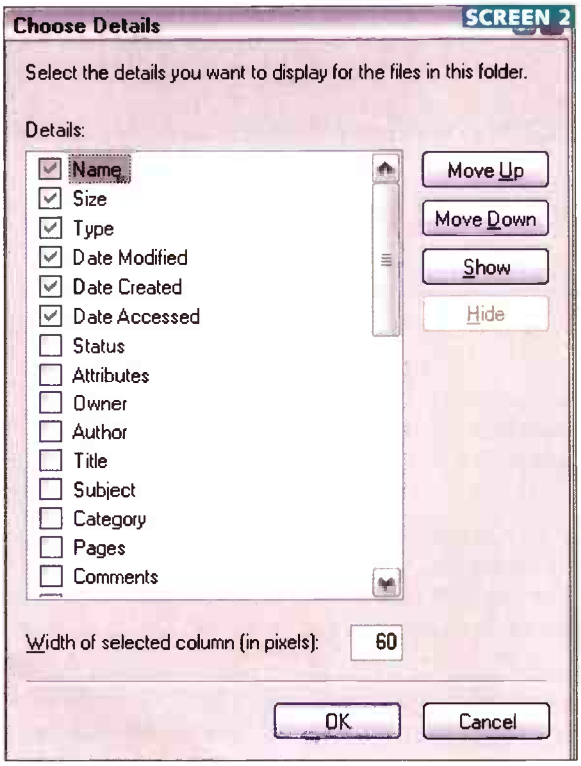
Finding out when a file or folder was last accessed is more difficult. Every file and folder on a Windows PC – and this goes for both NTFS and Fat file systems – has three dates associated with it. The Date Modified is the one you see by default in Explorer or from typing 'dir' at a command prompt. This shows the date and time that the file was last saved. If you open a file and save it – even without modifying it – you will usually find these changes.



SCREEN 1

System 2,433 event(s)

Type	Date	Time	Source	Category	Event
Information	24/08/2006	15:15:52	eventlog	None	6006
Information	24/08/2006	15:27:57	Application Popup	None	26
Information	24/08/2006	15:27:57	Application Popup	None	26
Information	24/08/2006	15:27:57	Application Popup	None	26
Information	24/08/2006	15:27:57	Application Popup	None	26
Information	24/08/2006	15:27:57	Application Popup	None	26
Information	24/08/2006	15:27:57	Application Popup	None	26
Information	24/08/2006	15:28:12	eventlog	None	6005
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Warning	24/08/2006	15:29:17	Dhcp	None	1007
Warning	24/08/2006	15:29:24	Server	None	2511
Error	24/08/2006	15:29:25	W32Time	None	29
Error	24/08/2006	15:29:25	W32Time	None	17
Error	24/08/2006	15:29:27	W32Time	None	29
Error	24/08/2006	15:29:27	W32Time	None	17
Information	24/08/2006	15:29:32	Service Control Manager	None	7036
Information	24/08/2006	15:29:32	Service Control Manager	None	7036



SCREEN 2

Choose Details

Select the details you want to display for the files in this folder.

Details:

- ☑ Name
- ☑ Size
- ☑ Type
- ☑ Date Modified
- ☑ Date Created
- ☑ Date Accessed
- ☐ Status
- ☐ Attributes
- ☐ Owner
- ☐ Author
- ☐ Title
- ☐ Subject
- ☐ Category
- ☐ Pages
- ☐ Comments

Width of selected column (in pixels): 60

Top: Viewing the event log

Bottom: Viewing all three dates in Explorer

The creation date is the date that the file was created on disk in its current location. So if you create a new file by saving it from an application on 1 January, then copy it to another folder on 2 January, then the creation date of the copy will be 2 January but its modified date will remain as 1 January.

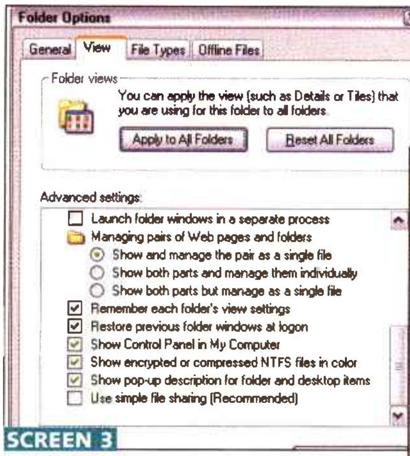
Some files, such as Jpeg images or Microsoft Word documents, will preserve the original creation date under Advanced properties, but this is stored within the file itself rather than in the file system. Moving, rather than copying, a file generally preserves the creation date.

If you're not happy with the concept of something being modified before it was created, then you're going to like the date accessed even less. You can see all three dates for a file if you right-click on it and choose Properties. However, this counts as accessing the file, so the last accessed date changes to the current date and time. By observing the file's properties, you change them – it seems the designers of the system were inspired by quantum physics.

If you are running Windows ME, 2000 or XP, then you can see all three dates in Explorer's details view. In ME or 2000, go to the View menu, then 'Choose columns' (in XP it is View, Choose details – see screen 2). Tick the boxes for Date Created and Date Accessed and you'll see the extra columns for both files and folders.

You can also get at the date accessed from a command prompt. In XP type dir/ta,which will show the last accessed dates – /tc and /tw show the creation and last modified dates. On older versions of Dos, the syntax is slightly different. The /oa and /od switches will list files by accessed and modified dates respectively, but there's a catch. Irrespective of the order chosen, the date you see in both cases is the modified date. To see both dates, use the /v (verbose) switch as well as the sort order switch.

Having said all that, viewing the last accessed date is largely a fruitless exercise. In Windows ME, for example, opening a folder doesn't change the last accessed date. In Windows XP it does – but not always immediately. To make matters worse,



Folder views

You can apply the view (such as Details or Tiles) that you are using for this folder to all folders

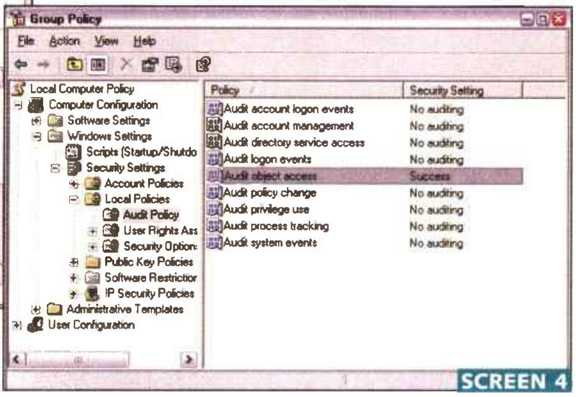
Advanced settings:

- ☐ Launch folder windows in a separate process
- Managing pairs of Web pages and folders
  - ● Show and manage the pair as a single file
  - ○ Show both parts and manage them individually
  - ○ Show both parts but manage as a single file
- ☑ Remember each folder's view settings
- ☑ Restore previous folder windows at logon
- ☑ Show Control Panel in My Computer
- ☑ Show encrypted or compressed NTFS files in color
- ☑ Show pop-up description for folder and desktop items
- ☐ Use simple file sharing (Recommended)

SCREEN 3

Left: Turning off simple file sharing is a first step to setting up Auditing to record access to objects

Below: Turning on auditing



Policy	Security Setting
Audit account logon events	No auditing
Audit account management	No auditing
Audit directory service access	No auditing
Audit logon events	No auditing
Audit object access	Success
Audit policy change	No auditing
Audit privilege use	No auditing
Audit process tracking	No auditing
Audit system events	No auditing

SCREEN 4

so many other things, such as Windows Desktop Search indexing and other services, also change the last accessed date that it's impossible to tell whether a folder was opened by a user or accessed routinely by the operating system.

Bring in the auditors

There is, however, another way to get Brookmyre off the hook in XP, but it's not for the fainthearted. You can set up Auditing to record access to a variety of objects, such as files, folders, printers and Registry keys. First you need to be logged on as administrator status, and if you value your sanity, create a system restore point (see box, right). Next you need to have simple file-sharing disabled. XP Home users can give up now, as this isn't an option, but XP Pro users can do this from Explorer's Tools, Folder Options, View (see screen 3).

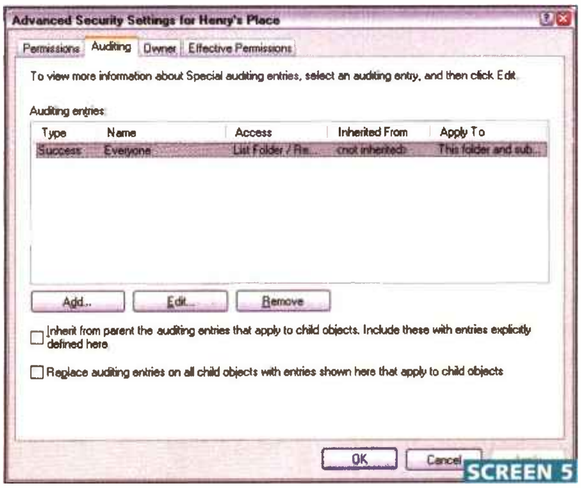
> **'You can set up Auditing to record access to objects, such as files, folders, printers and Registry keys'**

Now you need to set up auditing. Start, Run gpedit.msc to open the Group Policy editor. In the left-hand pane navigate down to Computer Configuration\Windows Settings\Security Settings\Local Policies\Audit Policy. You'll then see, in the right-hand pane, a list of actions that can be audited – by default these will all be set to No Auditing. Double-click on Audit Object Access and check the Success box in the properties box. OK out of the latter (see screen 4).

The next stage is to set up the objects you want audited. So, keeping to the plot, navigate to a folder whose access you want logged. Right-click on it, choose Properties, turn to the Security tab then click the Advanced button. In the Advanced Security Settings dialogue, turn to the Auditing tab. Click the Add... button. To keep things as simple as possible, type "everyone" (without the quotes) in the 'Enter the object name to select' box. Click the Check Names button to ensure you have specified a valid object name, then OK. This will open the Auditing Entry dialogue. Choose what you want audited – 'List folder / Read data' in this case, and select an 'Apply onto' option: if you want to keep the audit log uncluttered just choose 'This folder only' or 'This folder and subfolders'. OK out of all open dialogues (see screen 5).

Now run the Event Viewer, as described earlier, and open the Security branch. You'll see several entries each time the folder you have specified is opened, together with the time, user and other information. If you double-click on an entry you'll get further information, in particular the 'Image File Name' which tells you which program accessed the folder. If you, or another user, has opened the folder, this will show as Explorer.exe.

Choose what you want audited



To view more information about Special auditing entries, select an auditing entry, and then click Edit.

Auditing entries:

Type	Name	Access	Inherited From	Apply To
Success	Everyone	List Folder / Re...	<not inherited>	This folder and sub...

☐ Inherit from parent the auditing entries that apply to child objects. Include these with entries explicitly defined here

☐ Replace auditing entries on all child objects with entries shown here that apply to child objects

SCREEN 5

If some other process has accessed the folder you'll see a different executable, for example, WindowsSearchFilter.exe shows that the Desktop Search indexer has passed that way.

The missing tab

Here's an interesting gotcha. A reader was asked to solve the following problem for a colleague. The latter's screensaver would come into action after 30 seconds of inactivity. To add insult to injury, when he looked at Display Properties, there was no Screensaver tab.

In XP Pro, this can be rectified from the Group Policy editor. If you start, run gpedit.msc, then open the branch User Configuration, Administrative Templates, Control Panel, Display, you will see, in the right-hand pane, a 'Hide Screensaver tab' setting. Double-clicking this and set it to Disabled or 'Not configured' which will get the tab back. There are also other screensaver restrictions you can apply – click the lower tab marked Extended to get an explanation of each. XP Home, however, doesn't have a Group Policy editor, but as you will have guessed the restrictions in both versions are stored in the Registry.

So, under XP Home, having logged on with administrator status and made a Restore Point, go to Hkey_Current_User\Software\Microsoft\Windows \CurrentVersion \Policies\System and look for an entry named NoDispScrSavPage in the right-hand pane. Double-click this and set the value to zero: this will restore the missing tab. **PCW**

Restore point

We always stress the importance of creating a restore point. On a standard XP system it takes five clicks down the Start menu just to launch System Restore.

You could create a more conveniently located shortcut to %SystemRoot%\System32\restore\rstrui.exe, but we rather like Doug Knox's SysRestore Point.exe. Double-click this tiny (20KB) utility and it will simply create a system restore point. The point will be named Automatic Restore Point – this distinguishes it from those that Windows creates, called System Checkpoint. You'll find the utility at **www.dougknox.com**.

Barry Shilliday has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time he prefers to travel the world – and snap it with his camera.

→ Comments welcome on the Linux/Unix column.
Email linux@pcw.co.uk
Please do not send unsolicited file attachments.

Keep the music playing

Update firmware on your iPod with your Linux distribution

Over the past few months we have concentrated on exploring Ubuntu Linux, the distribution that continues to grow in popularity, especially with the use of Linux on the desktop. We've also seen the excellent music management application Amarok and its impressive capabilities with handling iPods and other audio players. Reader Stefan Hoefler writes: "I have switched to Kubuntu and want to take Windows off my machine. I use Amarok exclusively, but how can I update the firmware on my iPod without Windows?" Fortunately it is possible to do this, but it's not as simple as running an update program, since Apple doesn't supply any utilities for Linux.

This month we will look at updating the firmware on an iPod or restoring its factory settings without using Windows or OSX.

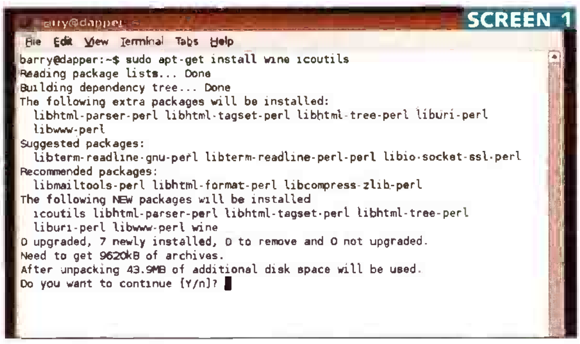
First steps

Let's start by updating the iPod to the latest firmware. Go to **www.apple.com/ipod/download** to get hold of the latest Windows executable. The file in question should be called iPodSetup.exe and will be about 40MB. If you want to use an earlier firmware, run a search with Google to find a copy – the process is identical.

With the firmware downloaded, you will need two extra packages before you can proceed. These are 'wine', the application that lets you run Windows software, and 'icoutils', a utility to extract the firmware from the Windows binary (see screen 1). Install these two packages via Synaptic, or perhaps more quickly, at the command line

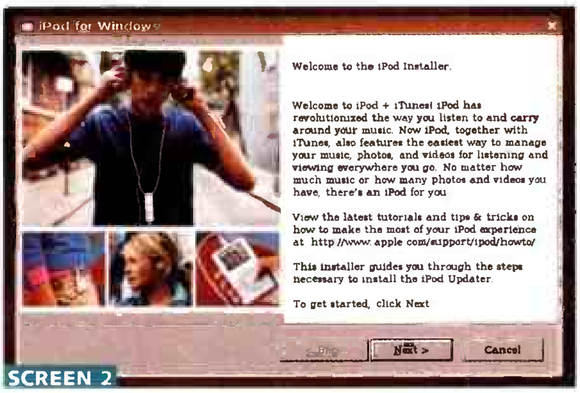
```
$ sudo apt-get install wine ↙
icoutils
```

(Key: ↙ code string continues)



SCREEN 1

```
barry@dapper:~$ sudo apt-get install wine icoutils
Reading package lists... Done
Building dependency tree... Done
The following extra packages will be installed:
  libhtml-parser-perl libhtml-tagset-perl libhtml-tree-perl liburi-perl
  libwww-perl
Suggested packages:
  libterm-readline-gnu-perl libterm-readline-perl-perl libio-socket-ssl-perl
Recommended packages:
  libmailtools-perl libhtml-format-perl libcompress-zlib-perl
The following NEW packages will be installed
  icoutils libhtml-parser-perl libhtml-tagset-perl libhtml-tree-perl
  liburi-perl libwww-perl wine
0 upgraded, 7 newly installed, 0 to remove and 0 not upgraded.
Need to get 9620kB of archives.
After unpacking 43.9MB of additional disk space will be used.
Do you want to continue [Y/n]?
```



SCREEN 2

Welcome to the iPod Installer.

Welcome to iPod + iTunes! iPod has revolutionized the way you listen to and carry around your music. Now iPod, together with iTunes, also features the easiest way to manage your music, photos, and videos for listening and viewing everywhere you go. No matter how much music or how many photos and videos you have, there's an iPod for you

View the latest tutorials and tips & tricks on how to make the most of your iPod experience at http://www.apple.com/support/ipod/howto/

This installer guides you through the steps necessary to install the iPod Updater.

To get started, click Next

Top: Install wine and icoutils quickly from the command line

Bottom: Use wine to install the Windows set up program

The version of wine in the Ubuntu Dapper repositories is rather old, but sufficient for this purpose (see screen 2). Next, run the installer and accept all the defaults to the questions asked:

```
$ wine iPodSetup.exe
```

The installer may take a minute to complete, so don't worry if nothing appears to be happening. Once finished, wine will have created a 'fake' Windows environment under '.wine/drive_c' in your home directory. This reflects a C: drive on a Windows machine, and under 'Program Files' you will find the files the iPodSetup program installed.

Inside the iPod directory there will be another directory stamped with the date of the firmware, and an 'exe' file within (see screen 3). This executable is the file you need, as it contains all the firmware images. Copy this file to somewhere more convenient, such as your home directory. You may wish to rename it to something simpler, 'ipodfw.exe', for example – the original file name in this case is 'iPod Updater 2006-03-23.exe'.

The last step of this stage is to extract the firmware images from the executable file. Create a directory for the images and use 'wrestool', which is part of 'icoutils' installed earlier. The command to do this is rather obtuse, so copy it carefully:

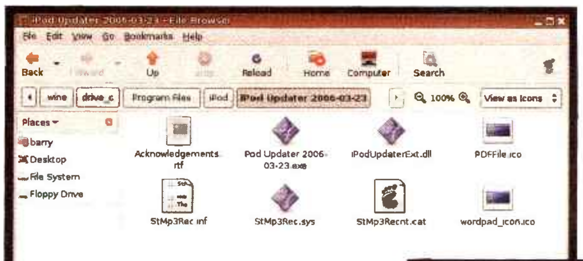
```
$ mkdir ipod_fw
$ wrestool -x —raw -o ~/ipod_↙
fw -t +FIRM ipodfw.exe
```

If successful the command should return no messages, but inside the ipod_fw directory you will find several firmware images, each prefixed with the executable name (ipodfw.exe) and ending 'FIRMWARE-x.y.z'. Refer to **www.ipodwizard.net/wiki/index.php/IPod_Firmware** to confirm which image is suitable for your model of iPod. For example, the iPod Nano series all begin with 14.5.x – and in this firmware set 14.5.1.1. Rename the appropriate file for your model to something simpler if you wish, such as newfirm.bin. That's the hard work over.

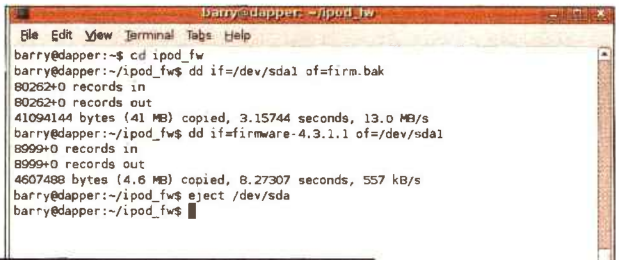
Firmware installation

Now that the firmware image for your iPod is extracted you are ready to install it. Plug the iPod into the computer and wait for Ubuntu to recognise it. Close any applications that might start up as a result and head back to the terminal window.

We now need to know the device name Linux has assigned the iPod. One way is to run 'dmesg' and look towards the end of the output. In screen 4 we can see that the device is /dev/sda. The device name will always begin /dev/sdX and may well be something other than 'sda' if you have Serial ATA hard drives or USB sticks inserted. Alternatively, run the 'mount' command and look for the device mounted under /media/ipod (or something similar). From now on

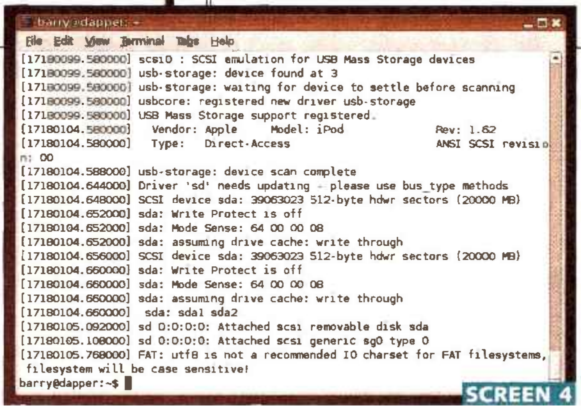


Above: Wine extracts the necessary files in a fake Windows environment



```
barry@dapper:~$ cd ipod_fw
barry@dapper:~/ipod_fw$ dd if=/dev/sda1 of=firm.bak
80262+0 records in
80262+0 records out
41094144 bytes (41 MB) copied, 3.15744 seconds, 13.0 MB/s
barry@dapper:~/ipod_fw$ dd if=firmware-4.3.1.1 of=/dev/sda1
8999+0 records in
8999+0 records out
4607488 bytes (4.6 MB) copied, 8.27307 seconds, 557 kB/s
barry@dapper:~/ipod_fw$ eject /dev/sda
barry@dapper:~/ipod_fw$ 
```

Back up and replace the iPod's firmware



```
[17180099.580000] scsi0 : SCSI emulation for USB Mass Storage devices
[17180099.580000] usb-storage: device found at 3
[17180099.580000] usb-storage: waiting for device to settle before scanning
[17180099.580000] usbcore: registered new driver usb-storage
[17180099.580000] USB Mass Storage support registered.
[17180104.580000]   Vendor: Apple     Model: iPod              Rev: 1.62
[17180104.580000]   Type:   Direct-Access                      ANSI SCSI revisio
n: 00
[17180104.588000] usb-storage: device scan complete
[17180104.644000] Driver 'sd' needs updating - please use bus_type methods
[17180104.648000] SCSI device sda: 39063023 512-byte hdwr sectors (20000 MB)
[17180104.652000] sda: Write Protect is off
[17180104.652000] sda: Mode Sense: 64 00 00 08
[17180104.652000] sda: assuming drive cache: write through
[17180104.656000] SCSI device sda: 39063023 512-byte hdwr sectors (20000 MB)
[17180104.660000] sda: Write Protect is off
[17180104.660000] sda: Mode Sense: 64 00 00 08
[17180104.660000] sda: assuming drive cache: write through
[17180104.660000]  sda: sda1 sda2
[17180105.092000] sd 0:0:0:0: Attached scsi removable disk sda
[17180105.108000] sd 0:0:0:0: Attached scsi generic sg0 type 0
[17180105.768000] FAT: utf8 is not a recommended IO charset for FAT filesystems,
 filesystem will be case sensitive!
barry@dapper:~$ 
```

The 'dmesg' command is an easy way to discover device names

we will assume the device to be /dev/sda, but it is vital that you use the correct device name for any further steps. Run:

```
fdisk -l /dev/sda
```

and you will see that there are two partitions on the iPod: /dev/sda1 and /dev/sda2. The first partition, marked as empty, holds the firmware, and the second the Fat32 filesystem where your music and files are stored.

There is no need to touch the second partition for a firmware update; this process will leave all your music and files intact. We are interested in the first. Before installing the new firmware make a backup of the current one with the 'dd' command:

```
$ cd ipod_fw
$ dd if=/dev/sda1 of=firm.bak
```

> 'This method also allows you to reclaim wasted space, which can be useful on small-capacity iPods'

The command will report back with the same number of records in as out if it was successful. The resulting file is a complete clone of the firmware partition, so can restore the iPod to its previous condition if necessary. After performing the backup, write the new firmware on top of the old:

```
$ dd if=newfirm.bin ↙
of=/dev/sda1
$ eject /dev/sda
```

Again the number of records in and out should be identical. Once done, eject the iPod with the command as shown, and it will detect the new firmware image and restart.

Some iPod models require a mains power connection at this point (USB will not be sufficient), so have this available before installing the new firmware image. See screen 5 for a demonstration of this procedure. Once the iPod has restarted, all is complete.

Although unlikely, if you run into problems with the new firmware, install the backup with dd in the same way:

```
$ dd if=firm.bak of=/dev/sda1
```

Complete restoration

The method above lets you update (or downgrade) the firmware on any Windows-formatted iPod. If you want to remove all data from the iPod and start again from scratch, or convert from a Mac-formatted iPod, some further work is needed.

This method also allows you to reclaim some wasted space, which may be particularly useful on small-capacity iPods. The initial steps are the same. Extract the firmware images via the iPodSetup.exe file and determine the iPod's device name as before.

With the iPod plugged in, run the mount command, and if the iPod is mounted use pumount to unmount it:

```
$ pumount /media/ipod
```

If you are converting from a Mac-formatted iPod or restoring a corrupt drive you must now partition the iPod with fdisk. You must create an 'empty' partition (code 0) for the firmware and another partition of type Fat32 (code b) for files. Use the 'p' command in fdisk to see the partition table at any point. First delete any existing partitions with the 'd' key. Create the first replacement with 'n' (new) followed by 'p' for a Primary partition and '1' for partition one.

Accept the default for the first cylinder, and then enter the size in cylinders or megabytes; 16 to 32MB should be fine. Now repeat the process for the second partition: 'n, p, 2', and accept the default cylinders to use the remaining space on the iPod.

Finally use option 't, 1, 0' and 't, 2, b' to set the types of the two partitions to 'empty' and 'Fat32', respectively. Press 'p' to view the final result, and it should appear as something similar to screen fdisk.png. When everything is correct, write the changes with 'w'. Up to this point no changes are made. Ensure the partition types are set correctly (see screen 6), or the iPod will refuse to boot properly.

Formatting

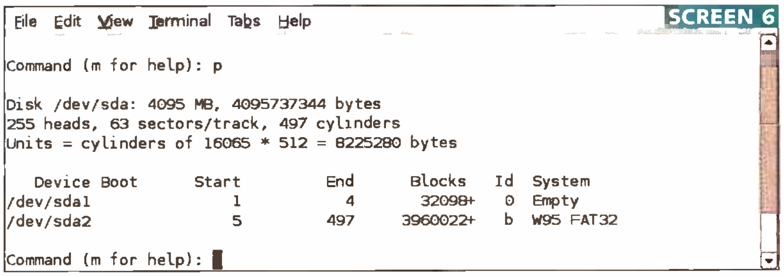
Having repartitioned the iPod, you must now create a Fat32 filesystem on the second partition. The 'mkdosfs' command will do this for you:

```
$ mkdosfs /dev/sda2
```

Now write the appropriate firmware image to the first partition and eject the iPod, as with a firmware update:

```
$ dd if=newfirm.bin
of=/dev/sda1
$ eject /dev/sda
```

The iPod will restart and complete the firmware installation, leaving it completely restored with no data, and ready for use in Amarok. If you've made any errors and the iPod refuses to boot, ensure that the second partition is correctly formatted and that the partition types are set properly. **PCW**



```
Command (m for help): p

Disk /dev/sda: 4095 MB, 4095737344 bytes
255 heads, 63 sectors/track, 497 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1               1           4       32098+   0  Empty
/dev/sda2               5         497     3960022+   b  W95 FAT32

Command (m for help): 
```

Recreate the iPod's two partitions to look something like this

Ken McMahon is a freelance journalist and graphic designer. His involvement with digital cameras began with a Commodore 64. He graduated to Macs and now works mostly with PCs.

→ **Comments welcome on the Digital imaging & video column.**
Email digitalimaging@pcw.co.uk
Please do not send unsolicited file attachments.

Microsoft Live Labs Photosynth

How a new technology could revolutionise the way you view digital images

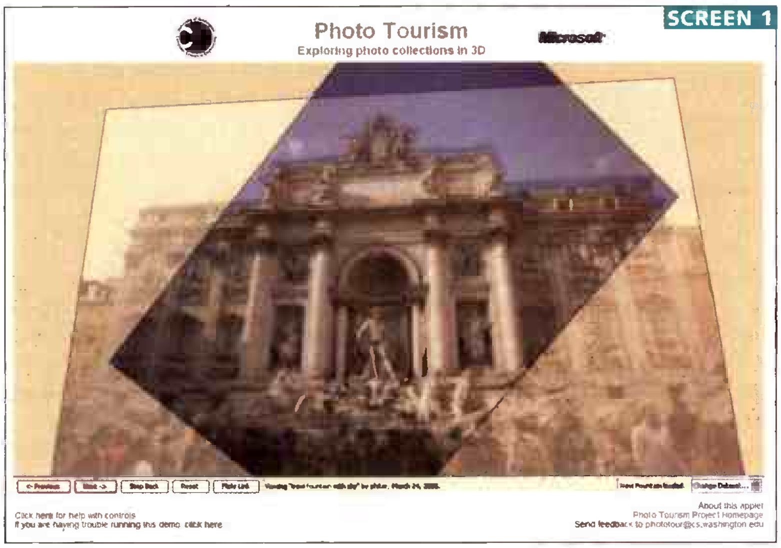


Photo Tourism
Exploring photo collections in 3D
Microsoft
<- Previous
Next ->
Step Back
Reset
Click here for help with controls
If you are having trouble running this demo, click here
About this applet
Photo Tourism Project Homepage
Send feedback to phototour@cs.washington.edu

SCREEN 1

A spatial transition between two cameras providing different views

We're used to hearing about how applications such as Flickr and Google Earth are providing revolutionary new ways of looking at digital images. But a new technology development announced by Microsoft at the ACM Siggraph conference (the annual conference of the Special Interest Group of the Association for Computing Machinery) in August looks like scoring the prize for the most innovative recent development in digital image software.

Photosynth takes a collection of geographically related images and arranges them in a 3D modelled space so you can navigate through them.

It is, appropriately enough, a synthesis of three different software technologies that provides a new kind of environment for browsing photos. Those technologies are image-based modelling, image-based rendering and image browsing. To put it another, perhaps slightly glib way, Microsoft has rolled together technologies from computer gaming, panorama stitching and photo organising to create an entirely new and original way of looking at digital photos.

Photosynth doesn't seek to produce a seamless, technically perfect 360° panoramic vista of a scene in the way that panorama stitching software such as Realviz Stitcher, or Pano Tools does. Instead, it positions individual images within a 3D model that allows you to navigate between them and take a closer look at whatever interests you.

The software engineers behind Photosynth are Noah Snavely and Steven M Seitz of the University of Washington's Graphics and Imaging Laboratory (Grail) and Microsoft's Richard Szeliski. In their paper 'Photo Tourism: Exploring Photo Collections in 3D', they explain that the object is "not to synthesise a photo-realistic view of the world from all viewpoints per se, but to browse a specific collection of photographs in a 3D spatial context."

How does it work?

Like panoramic photography, Photosynth computes the location, orientation and geometry of images in a scene by comparing matching features in pairs of overlapping images. It even uses the same Scale-Invariant Feature Transform (SIFT) algorithm that is used in some panorama stitching software.

Next comes an optimisation process that maps the position of each image relative to its neighbour, starting with a pair of images and incrementally adding more images and re-running the optimisation algorithm.

The final step is to align the model with a geo-referenced image, a satellite map for example, or a digital elevation map such as those used by Google Earth.

In one sense, at least, Photosynth's job is easier than a panorama stitcher's, because it doesn't have to produce an exact seamless match. In panorama stitching, however, a lot of the variables are eliminated by using a known camera and lens combination and by precisely controlling the movement of the camera between shots.

The material Photosynth has to work with will have been shot handheld on anything from a digital SLR with a telephoto lens to a cameraphone. Matching and accurately positioning these images is a vast computational undertaking.

As you'd expect, this is not a process that happens in real time, or anything like it. The optimisation takes the bulk of the time as it involves multiple iterations which slows down with the addition of each new image and as more images share matching points.

In tests using images of a section of the Great Wall of China, shot with the same camera and lens over a short period of time, the render time for a set of 120 photos, of which 82 were registered (that is, the software was able to process them) was several hours. A set of 2,635 'uncontrolled' images obtained from Flickr (of which 597 were registered) took several days.

Now watch the demo

Although there is currently no Photosynth application available, you can view a live demo Java applet of the Washington Grail research group's Photo Tourism applet, on which Photosynth is based at **http://phototour.cs.washington.edu/applet/index.html**.

The demo displays the 3D space as a 'point cloud' with the image frusta overlayed. And if you're wondering what a frustum is, in this case, they are 3D pyramid shapes which indicate the position within the 3D space of cameras, the direction they are pointed in and their angle of view (please don't email me with more precise frustum definitions, I'm taking liberties already for the sake of column inches).

Clicking on any one of the cameras displays the image at that location. Just as interesting, if not more so, than the final view is the journey, which flies you smoothly through the 3D model, passing other cameras on the way. Transitions from one camera to another are very slick, incorporating smooth movement through the 3D space as well as a dissolve.

'Just as interesting than the final view is the journey, which flies you smoothly through the 3D model'

A step back button does just that, depicting a wider field of view from which you can select alternative cameras. The Photosynth application will feature 'geometric browsing tools' which will allow you to move left and right and to view parts of the scene at different scales. There will also be a 'similar' button which will display alternative images of the same scene, for example at different times of the day or year, or even over longer time periods, enabling historical comparisons.

Photosynth's zooming and its ability to display high-resolution detail, will surpass conventional pixel-based viewers. The multi-image composition of scenes makes it possible to drill down to fine detail using new images, rather than enlarging existing ones, until the pixels look like breeze blocks. This process can happen in real time even on narrowband connections due to a technology called Seadragon acquired by Microsoft in February this year.

Never mind the quality, feel the copyright

However it pans out, aside from the technical hurdles, there are other potential obstacles that Photosynth will have to overcome.

Quality is one. Cynics see Photosynth as offering little more than 3D wallpaper comprised of a stack of poor-quality snapshots. This aside, there is the question of commercial rights.

One of the Photosynth trials used a series of shots of Trafalgar Square sourced from Flickr users. While tourists are free to snap away in Trafalgar Square, photography in connection with any business is prohibited without a permit. Similar restrictions apply at many other tourist sites and, although at the time of taking there may have been no intention to make commercial use of such photos, their subsequent appearance on a Photosynth site that, for example, carried advertising would contravene such restrictions.

Commercial Photosynth 'virtual tours' wouldn't have these problems, so it seems more probable that we can look forward to high-quality professionally shot Photosynth tours of every tourist site on the globe. Worthwhile as it is, this somehow seems a less organic, inclusive and exciting prospect than global community-based Photosynth projects.

Here there be Seadragons

Seadragon streams 'multi-gigapixel' images optimised for the display in use over any bandwidth link. What this means in practice is that you will be able to view a scene of, say, a museum, on your mobile phone, PDA or tablet PC, then select and zoom in on a vase, then look at detailed engraving on the handle – all at full resolution and with no delay.

Slideshows provide another way of exploring the 3D photo space (see screen 1). Photosynth will offer two slideshow formats, a spatial option that moves from one image to the next pausing for a few moments at each, and 'Stabilized' slideshows. These lock the camera to the current viewpoint displaying alternate images that share the same location. Stabilized slideshows could be used to view changes over time, showing a garden throughout the seasons, or the ebb and flow of a tidal estuary, for example.

If you want to see Photosynth in action you'll have to be patient. At the time of writing Microsoft announced that it is releasing an ActiveX browser control that will work on pre-processed image collections. In other words you'll be able to look at scenes created by Microsoft, but you won't be able to register new photos to those scenes or produce your own scenes.

Before that can happen Microsoft will have to work on reducing the processing time so that large collections of images can be analysed in seconds or, at the very least minutes, rather than the hours or days it currently takes. It seems pretty confident that it can do this, stating "ultimately, we wish to scale up our reconstruction algorithm to handle millions of photographs".

If that happens, the potential for Photosynth looks to be huge. It's tempting when looking at technology developments such as this to get carried away with the possibilities, but it's clear that the most interesting applications are the large-scale collaborative ones.

It's telling that the developers have chosen Flickr as the source of their test material. The sheer quantity of photos available on Flickr makes it an ideal resource for global image-based applications such as Photosynth.

Flickr photos are tagged, so subject-based searching is straightforward and Flickr's recent introduction of geotagging, which pinpoints the precise geographical location at which a photo was taken and positions it on Yahoo maps, will make its content more accessible to applications like Photosynth.

It will be interesting to see where this goes. Microsoft plans to release the Photosynth application as a free download and the idea of a collaborative 3D 'Photosynth world' built by individuals registering their own photo collections is an attractive one.

Something along the lines of the Google Maps Community layer might be more realistic, though. The prospect of viewing say, a beach in Northern France and moving back in time from the view of holidaymakers enjoying the sunshine to the D-Day landings is hard not to get excited about. **PCW**

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.

→ Comments welcome on the Word processing column.
Email wp@pcw.co.uk
Please do not send unsolicited file attachments.

And writely so

Explore Google's online word processor, Truetype fonts and 'click here' blocks

Over the years this column has been drafted on a number of word processors besides Word, including Star Office, Wordperfect, Ability Write and the near-moribund Lotus Word Pro. But this is the first time I have used a word processor that isn't installed on my PC. Writely – from the people who brought you Google – is a word processor that you use online in your web browser.

The good news is that it's free to use, with a painless sign-up procedure. There are limits to the free beta accounts, such as 500KB for each document and 2MB for embedded images. But there's no limit on the number of documents you can store.

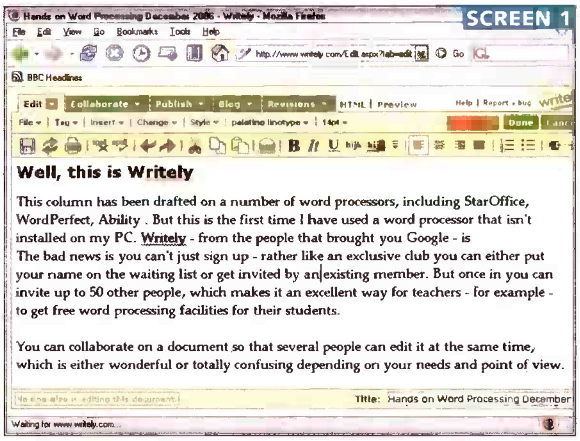
You can collaborate on a document so that several people can edit it at the same time, which is either wonderful or totally confusing, depending on your needs and point of view.

Through an oversight I was stuck with the name 'Untitled' for my first Writely attempt. Then I discovered you can change the title in a box on the status bar. The 'Save as...' lets you save a copy to your own hard disk in Word, Open Office, Pdf and Rtf formats.

Although the facilities don't compete with the established offline heavyweights, you can do most editing and formatting tasks, create tables, and insert images of up to 2MB. There's a Word-style spelling checker that underlines mistakes, including the word Writely, in red. There are styles, a selection of 18 fonts, coloured text, and numbered or bulleted lists (see screen 1).

It's not the only online word processor – others include Zoho Writer and Thinkfree. At the time of writing, both of these were also free, and you could join immediately. Thinkfree is rather more ambitious, and offers a whole Java-powered suite of Microsoft Office-compatible applications. For about the past 10 years we've been hearing about online storage and applications being the coming thing. Now it appears to be happening. I don't think I'd want to use it for mission-critical or high-security documents, but Writely is easy to use and great fun.

SCREEN 1


Hands on Word Processing December 2006 - Writely - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://www.writely.com/Edit.aspx?tab=edit
Go
BBC Headlines
Edit
Collaborate
Publish
Blog
Revisions
HTML | Preview
Help | Report a bug
writely
File
Tag
Insert
Change
Style
palatino linotype
14pt
Done
Cancel
Waiting for www.writely.com...

Well, this is Writely

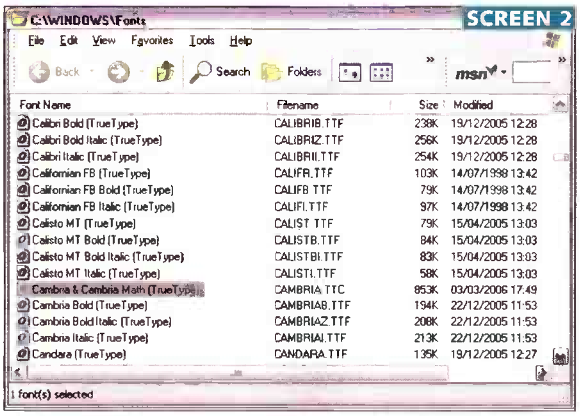
This column has been drafted on a number of word processors, including StarOffice, WordPerfect, Ability . But this is the first time I have used a word processor that isn't installed on my PC. Writely - from the people that brought you Google - is
The bad news is you can't just sign up - rather like an exclusive club you can either put your name on the waiting list or get invited by an existing member. But once in you can invite up to 50 other people, which makes it an excellent way for teachers - for example - to get free word processing facilities for their students.

You can collaborate on a document so that several people can edit it at the same time, which is either wonderful or totally confusing depending on your needs and point of view.

No one else is editing this document.

Title: Hands on Word Processing December

SCREEN 2



Font Name	Filename	Size	Modified
Calibri Bold (TrueType)	CALIBRIB.TTF	238K	19/12/2005 12:28
Calibri Bold Italic (TrueType)	CALIBRIZ.TTF	256K	19/12/2005 12:28
Calibri Italic (TrueType)	CALIBRII.TTF	254K	19/12/2005 12:28
Californian FB (TrueType)	CALIFR.TTF	103K	14/07/1998 13:42
Californian FB Bold (TrueType)	CALIFB.TTF	79K	14/07/1998 13:42
Californian FB Italic (TrueType)	CALIFI.TTF	97K	14/07/1998 13:42
Calisto MT (TrueType)	CALIST.TTF	79K	15/04/2005 13:03
Calisto MT Bold (TrueType)	CALISTB.TTF	84K	15/04/2005 13:03
Calisto MT Bold Italic (TrueType)	CALISTBI.TTF	83K	15/04/2005 13:03
Calisto MT Italic (TrueType)	CALISTI.TTF	58K	15/04/2005 13:03
Cambria & Cambria Math (TrueType)	CAMBRIA.TTC	853K	03/03/2006 17:49
Cambria Bold (TrueType)	CAMBRIAB.TTF	194K	22/12/2005 11:53
Cambria Bold Italic (TrueType)	CAMBRIAZ.TTF	208K	22/12/2005 11:53
Cambria Italic (TrueType)	CAMBRIAI.TTF	213K	22/12/2005 11:53
Candara (TrueType)	CANDARA.TTF	135K	19/12/2005 12:27

1 font(s) selected

Top: Google Writely allows you to do your word processing online

Above: A Truetype collection file helps avoid redundancy

Font collections

Anyone who uses a Windows word processor will be familiar with Truetype (.ttf) fonts. They've been around since Windows 3.1 and provide a means of scaling type to any size and to the best capabilities of the output device, be it screen or printer.

The Truetype technology was developed by Apple, believe it or not, as a rival to Adobe's Type One or Postscript fonts.

A more recent arrival is the Open Type font, which also have the .ttf extension. This technology was a joint effort by Microsoft and Adobe to develop an open-standard successor to both Type One and Truetype, and these fonts are equally at home on Windows, Macintosh and most Unix or Linux systems.

So far, so good, but if you look in your fonts folder, you might discover yet another format with the .ttc extension. So what are these? TTC stands for Truetype Collection and, as the name suggests, these files can contain more than one font (see screen 2). The idea behind this is to avoid redundancy. If two fonts share a number of identical glyphs (the actual shapes seen on screen or in print) then it makes sense to combine them. This is common in Japanese fonts where several fonts may have different kana glyphs, but share identical kanji glyphs.

Nearer home, the Cambria & Cambria Math collection (cambria.ttc) that comes with the Office 2007 Beta share many glyphs. But different spacing, so combining them in one file, saves having to define identical glyphs in separate files. You can find out more at **www.microsoft.com/OpenType/OTSpec/otff.htm**.

Click everywhere

Although we were rather unkind about the ongoing development of Lotus Word Pro, there is one particular aspect of its Smartmaster templates that we like. 'Click Here' blocks can be included in a template that contains instructions for the user, for example, 'Click here and type a title'. When the user clicks and types, the prompt text

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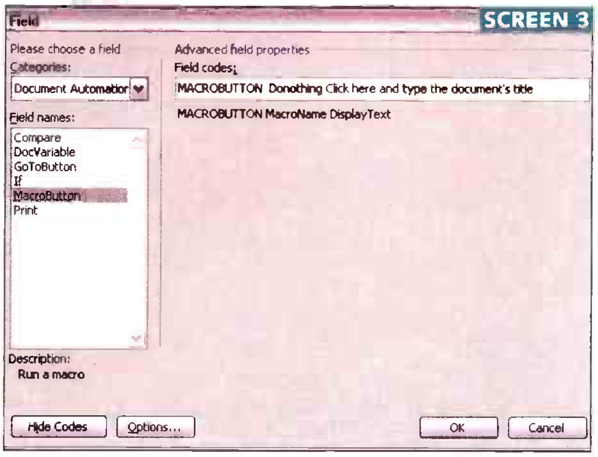
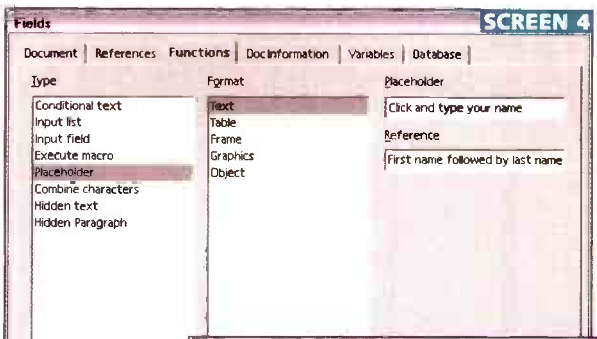


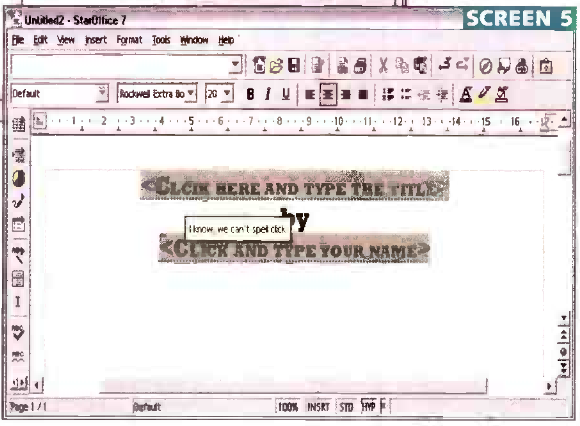
Please choose a field
Categories: Document Automation
Field names: Compare, DocVariable, GoToButton, If, MacroButton, Print
Advanced field properties
Field codes: MACROBUTTON Donothing Click here and type the document's title
MACROBUTTON MacroName DisplayText
Description: Run a macro



Type: Conditional text, Input list, Input field, Execute macro, Placeholder, Combine characters, Hidden text, Hidden Paragraph
Format: Text, Table, Frame, Graphics, Object
Placeholder: Click and type your name
Reference: First name followed by last name

Type text into the Placeholders box in Star Office...

...and you'll get prompt text within chevrons



<Click here and type the title>
by
<Click and type your name>
I know, we can't spell click

is replaced by the typed text, while the formatting of the former is retained. It's a fairly foolproof way of getting user input consistently formatted and in the right place.

A similar feature can be implemented in Word, with a little ingenuity and, since it has been four years since we last aired this tip, here it is again. First you need a template, so either open an existing one, or create a new one. Next you need a macro. If the thought of this fills you with trepidation, don't be put off. The macro doesn't have to do anything other than exist. So, go to Tools, Macro, Macros... and in the 'Macros in:' box select the template in which you want the 'Click here' block. Type a name for the macro, for example Donothing, then click the Create button. The VBA editor will load with the top and tail of the macro in place, plus some remarks about who created it and when. And that's all you need, so you can close the VBA editor without typing a stroke.

To create 'click here' prompts in Word, you need a template

Back in the document template, go to Insert, Field. Choose 'Document Automation' from the Categories box, then select Macrobutton in the Field Names list. You'll see MACROBUTTON appear in the Field Codes box – depending on your version of Word you may first have to click the Field Codes button. Add the macro name, Donothing, followed by a space, followed by the prompt text you want to appear – this can also contain spaces as only the first space is recognised as a code separator (see screen 3).

Click OK, then go to Tools, Option, View and make sure Field Codes is not checked. You should then see the prompt text appear in the template. You can select and format this to suit. Save the template, then create a new document based on the template. Click on the prompt, type in the text and you'll find the prompt will disappear, being replaced by the typed-in text in the same format. In fact, the field self-destructs, which is why you need to experiment on a document based on the template, rather than the template itself.

Another reason we revisit this trick is that reader Chris Cox asked if a similar trick could be performed in Open Office. We've had a look in Star Office, which should be functionally identical, and the answer is that it can – and rather more simply than Word.

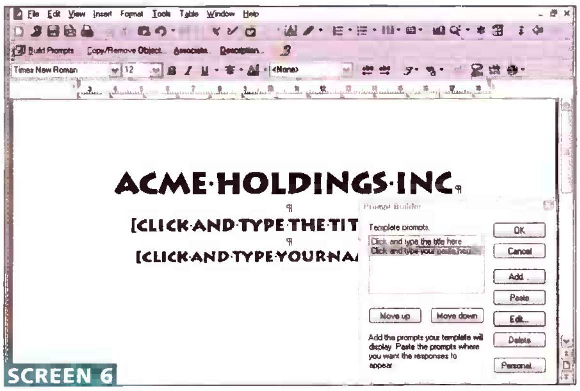
Start a new document and save it as a template. Go to the Insert menu, then Fields, Other. Turn to the Functions tab, select Placeholder as the type, then Text as the Format. Type the prompt text in the Placeholder box. You can also type something in the Reference box – this will appear as a pop-up hint (see screen 4). Click Insert, then Close and you should see the prompt text appear, flanked by chevrons (see screen 5). Save the template, and the job is done.

Creating 'click here' boxes in Wordperfect is simple

While we're on the subject, we may as well collect the set. With Wordperfect X3 the way to create a new template is less than obvious. Go to the File menu, then New from Project. Click the Options button, then choose 'Create WP Template'. If the Template toolbar isn't visible – that's the one with 'Build prompts...' – then switch it on from View, Toolbars.

Click on 'Build prompts...' and up will come the Prompt Builder. Click the Add button and type in the prompt text. You can repeat this for various texts, and you have the option of linking to address book fields. When you have all the prompts you want, click back in the document at the point you want the prompt to appear, highlight the appropriate prompt in the list, and hit the Paste button (see screen 6).

Finally, we haven't forgotten Ability Write users. Here you can use the simple expedient of typing a prompt in the correct position, instructing the user to select the prompt text and replace it with their own. And that solution will work with any word processor. **PCW**



ACME·HOLDINGS·INC.
[CLICK·AND·TYPE·THE·TIT
[CLICK·AND·TYPE·YOUR·NA
Template prompts: Click and type the title here; Click and type your name here
Add the prompts your template will display. Paste the prompts where you want the responses to appear

Hyperlink hint

Further to August's comments on preserving Word hyperlinks, Keith Fletcher passed on a useful tip. If all the files containing hyperlinks and all the files to which they are hyperlinked are moved as a single package at the same time, then all the hyperlinks will continue to work.

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Stephen Wells is a freelance journalist and a regular contributor to computer magazines. He's been writing PCW's Spreadsheets column for over 10 years.

→ Comments welcome on the Spreadsheets column.
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Between the timesheets

Learn to calculate charges for unconventional working hours

Vincent Mehlin writes: "I am using Excel 2000 and wondered if you could help me calculate my timesheet. I work unconventional hours and I want to be able to put the times I started and finished work into a cell, enter my hourly rate and get an answer. I sometimes work past midnight and on Sundays, and I have problems calculating time and converting it to charges."

Numerous timesheet templates are available but they rarely suit everyone's circumstances. You gain a better understanding of Excel if you create your own template. The example given here won't work for everybody, but it demonstrates the typical functions, formulas and formats necessary when you're creating timesheets.

Open a new workbook and type in the labels shown in column A of screen 1. In cell B2 enter the date of the Sunday of the first week to be recorded. In B4 enter

=B2

In C4 enter

=BN4+1

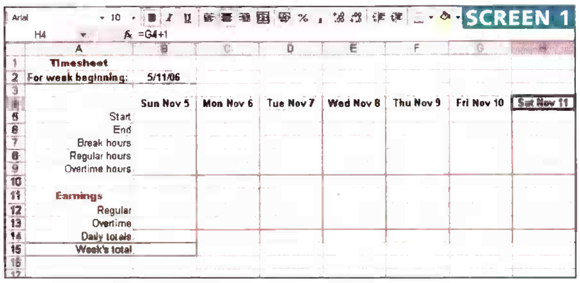
Point to the lower-right corner of cell C4 and drag across to cell H4, which should then read

=G4+1

Highlight the range B4:H4 and give it the Custom format ddd mmm d.

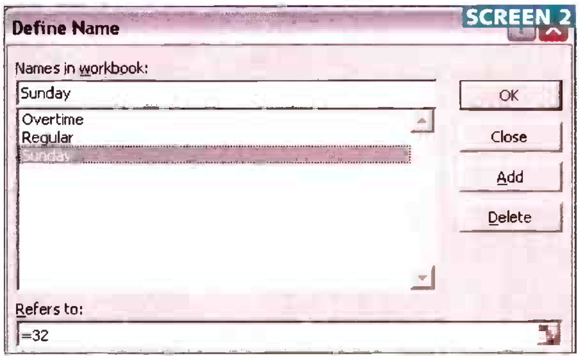
Choose B2. Press Ctrl and highlight the range B5:H7, which selects this cell and range for formatting. On the Format menu choose Cells, Border, Outline. In the Style box choose a thick line. In the colour box choose red. When you click OK this will put a red line around these cells to remind you of those to be filled in each time.

On the Tools menu choose Options, View and uncheck Zero values. A timesheet looks neater if every blank cell doesn't have a 0 in it.



H4 =G4+1

	A	B	C	D	E	F	G	
1	Timesheet							
2	For week beginning:	5/11/06						
3								
4		Sun Nov 5	Mon Nov 6	Tue Nov 7	Wed Nov 8	Thu Nov 9	Fri Nov 10	Sat Nov 11
5	Start							
6	End							
7	Break hours							
8	Regular hours							
9	Overtime hours							
10								
11	Earnings							
12	Regular							
13	Overtime							
14	Daily totals							
15	Week's total							
16								



Define Name

Names in workbook:
Sunday

Overtime
Regular
Sunday

Refers to:
=32

Top: Laying out the timesheet

Bottom: Creating Names for the labour rates

Your hourly rates can remain confidential. They need not appear on the worksheet if given Names. Hold down the Ctrl key and press the F3 function key. This opens the Define Name dialogue box. In the Names in workbook: box enter Regular. If your regular hourly rate is £16.00, enter =16 in the Refers to: box. In the same way, enter your hourly rates for Overtime and Sunday, as in screen 2. Save the workbook to record your progress so far.

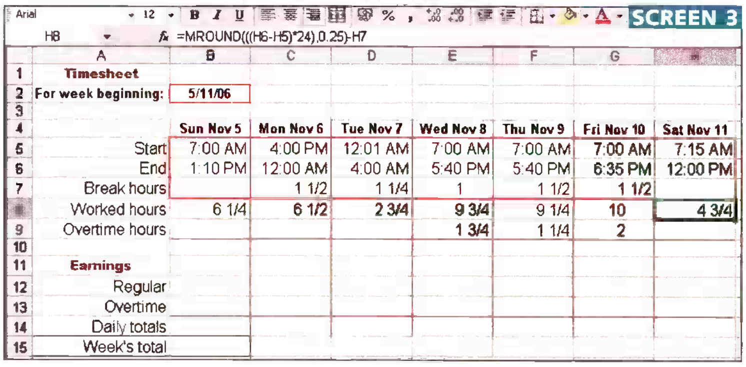
Give the range B5:H6 the Custom format h:mm AM/PM. Using the 24-hour clock, enter some typical work periods. If you work eight hours starting at 4pm on the Monday you would enter 16:00 in cell C5, 24:00 in C6, 0:01 in D5, and 4:00 in D6. This is because you worked four hours on Monday and four hours on Tuesday. Enter other likely work periods in the remaining cells in the range B5:H6.

Times v totals of hours

Spreadsheets record time as fractions of a day. In Excel for Windows the days are counted from Jan 1 1900 and stored as a date number. You can see this number if you press Ctrl and the key to the left of 1 on the top row of the standard keyboard (`). Press this shortcut again to return. Alternatively, choose Options on the Tools menu, View and check the Formulas box.

During most work periods you will take breaks that are not charged to your clients. A record of such rest periods, your overtime hours, and your total hours are measurements of time, not particular historical times. So rather than store them using date numbers, it makes more sense to record them as a number of hours and quarter hours. Highlight the range B7:H9 and on the Format menu choose Cells, Number, Fraction. Enter in these cells some typical breaks. An hour is entered as 1. For an hour and a quarter, enter 1.25, using a full stop and not a colon. Enter an hour and half as 1.5. An hour and three-quarters is 1.75.

The completed timesheet



H8 =MROUND(((H6-H5)*24),0.25)-H7

	A	B	C	D	E	F	G	
1	Timesheet							
2	For week beginning:	5/11/06						
3								
4		Sun Nov 5	Mon Nov 6	Tue Nov 7	Wed Nov 8	Thu Nov 9	Fri Nov 10	Sat Nov 11
5	Start	7:00 AM	4:00 PM	12:01 AM	7:00 AM	7:00 AM	7:00 AM	7:15 AM
6	End	1:10 PM	12:00 AM	4:00 AM	5:40 PM	5:40 PM	6:35 PM	12:00 PM
7	Break hours		1 1/2	1 1/4	1	1 1/2	1 1/2	
8	Worked hours	6 1/4	6 1/2	2 3/4	9 3/4	9 1/4	10	4 3/4
9	Overtime hours				1 3/4	1 1/4	2	
10								
11	Earnings							
12	Regular							
13	Overtime							
14	Daily totals							
15	Week's total							

Excel function key commands

KEY	KEY ALONE	KEY & SHIFT	KEY & CTRL	KEY & ALT	KEY & CTRL & SHIFT	KEY & CTRL & ALT
F1	Help	Context-specific help	N/A	N/A	N/A	N/A
F2	Edit active cell	N/A	N/A	Save as	N/A	N/A
F3	Paste name	Insert function	Define name	N/A	Create names	N/A
F4	Relative/absolute cell reference toggle	N/A	Close workbook	N/A	N/A	N/A
F5	Go to	Find and replace	Restore window	N/A	N/A	N/A
F6	Switch to next pane	Switch to previous pane	Next window	VBE editor toggle (if open)	Previous window	N/A
F7	Spellchecker	N/A	Move workbook window	N/A	N/A	N/A
F8	N/A	Toggle Add mode	Size workbook window	N/A	N/A	N/A
F9	Update changed formulas in all open workbooks	Update changed formulas in active workbook	Minimise workbook window	N/A	Check dependent formulas and recalculate all formulas	Recalculate all formulas in all open workbooks
F10	Cursor focus to Menu bar	Context menu	Maximise/restore workbook window	N/A	N/A	N/A
F11	Create default chart	Insert new worksheet		Open VBE editor	N/A	N/A
F12	Save as	N/A	File open	N/A	Print	N/A

Do you take advantage of the function keys on the top row of the standard keyboard? What they do varies depending upon the software you are using. In Excel they can perform these 36 actions

> **'If you want to charge your time rounded to quarter hours you can use the MROUND function'**

If you want to charge your time rounded to quarter hours you can use the MROUND function. On the Tools menu, under Add-Ins, make sure the AnalysisToolPak is checked. If it isn't there, load it from your Office disc. In cell B8 enter

`=MROUND(((B6 B5)*24),0.25) B7`

Point to the lower-right corner of the cell and drag the formula to H8. The 24 in the formula converts decimal fractions of days into hours. The MROUND function has two arguments: a number and the multiple. Fortunately MROUND will accept a formula as the number

`(B6-B5)*24`

The multiple is 0.25 because you want your results rounded to quarter hours.

Assuming your overtime rate applies after eight hours, calculate your overtime hours by entering

`=IF(C8>8,(C8-8),0)`

in cell C9 and drag this formula to H9. It's not needed in B9 as Sunday is already at an overtime rate. Save the workbook again as this completes the timesheet portion, see screen 3.

It is easy now to calculate your week's earnings. Highlight B12:B15 and click the Currency tool. In cell B12 enter,

`=B8*`

then press the function key F3 to display the available Names and choose Sunday. Click OK and the entry will be

`=B8*Sunday` (see screen 4).

In cell C12 enter

`=(C8-C9)*`

then press F3 and choose Regular. Click OK and the entry will be

`=(C8-C9)*Regular`

Drag this formula across to H12. In C13 enter

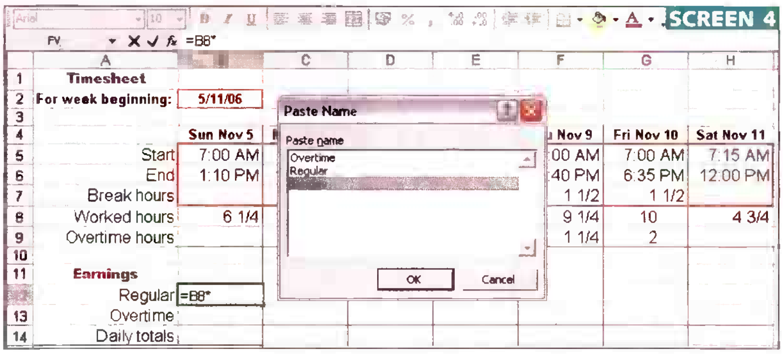
`=C9*Overtime`

and drag this formula across to H13.

Highlight B14:H14 and click the Sum tool. In B15 enter

`=SUM(B14:H14`

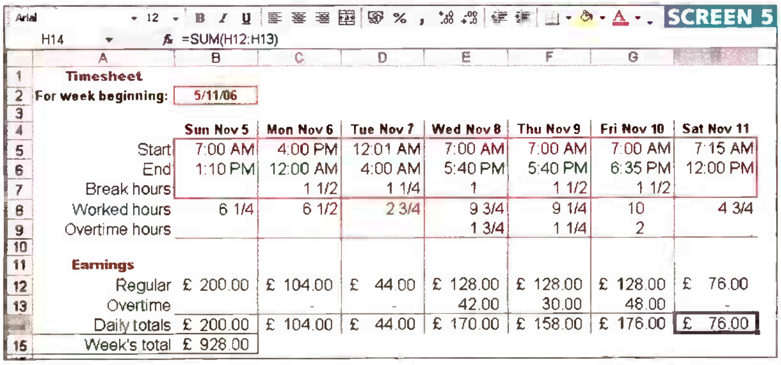
to arrive at your week's total earnings. On the Tools menu choose Options, View, Window options, and uncheck the Gridlines box (see screen 5). This helps convey the appearance of a timesheet rather than a spreadsheet. Save the final result. **PCW**



FV =B8*

	A	B	C	D	E	F	G	H
1	Timesheet							
2	For week beginning:	5/11/06						
3								
4		Sun Nov 5				Nov 9	Fri Nov 10	Sat Nov 11
5	Start	7:00 AM				00 AM	7:00 AM	7:15 AM
6	End	1:10 PM				40 PM	6:35 PM	12:00 PM
7	Break hours					1 1/2	1 1/2	
8	Worked hours	6 1/4				9 1/4	10	4 3/4
9	Overtime hours					1 1/4	2	
10								
11	Earnings							
12	Regular	=B8*						
13	Overtime							
14	Daily totals							

Inserting a Name into a formula



H14 =SUM(H12:H13)

	A	B	C	D	E	F	G	H
1	Timesheet							
2	For week beginning:	5/11/06						
3								
4		Sun Nov 5	Mon Nov 6	Tue Nov 7	Wed Nov 8	Thu Nov 9	Fri Nov 10	Sat Nov 11
5	Start	7:00 AM	4:00 PM	12:01 AM	7:00 AM	7:00 AM	7:00 AM	7:15 AM
6	End	1:10 PM	12:00 AM	4:00 AM	5:40 PM	5:40 PM	6:35 PM	12:00 PM
7	Break hours		1 1/2	1 1/4	1	1 1/2	1 1/2	
8	Worked hours	6 1/4	6 1/2	2 3/4	9 3/4	9 1/4	10	4 3/4
9	Overtime hours				1 3/4	1 1/4	2	
10								
11	Earnings							
12	Regular	£ 200.00	£ 104.00	£ 44.00	£ 128.00	£ 128.00	£ 128.00	£ 76.00
13	Overtime		-	-	42.00	30.00	48.00	-
14	Daily totals	£ 200.00	£ 104.00	£ 44.00	£ 170.00	£ 158.00	£ 176.00	£ 76.00
15	Week's total	£ 928.00						

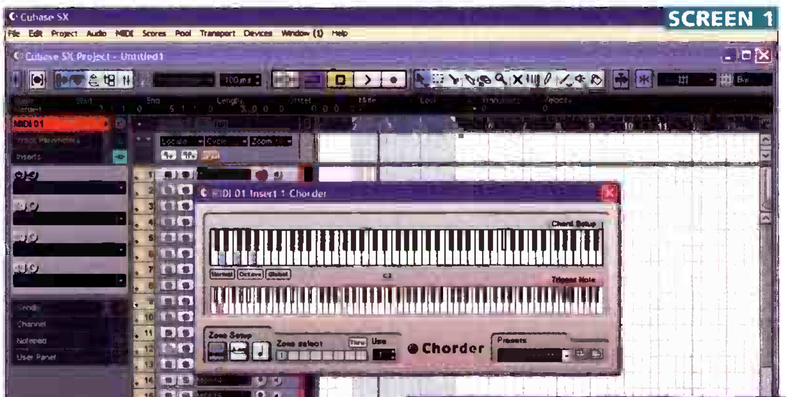
Converting time to money

Niall Magennis has been dabbling in Midi and digital audio since the days of the Atari ST. He writes for a number of music magazines and lives in London in a flat overrun with music equipment.

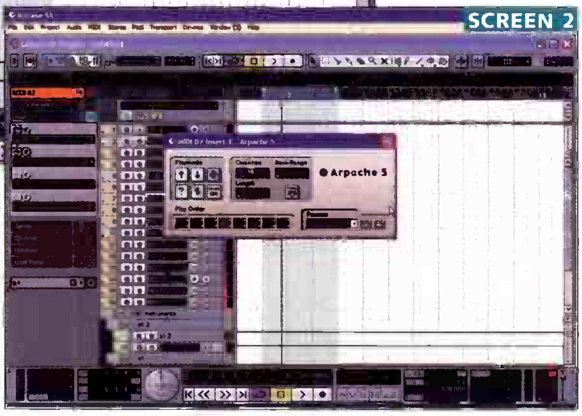
→ Comments welcome on the Sound column. It returns in the February issue. Email sound@pcw.co.uk *Please do not send unsolicited file attachments.*

Midi Effects in Cubase SX

As sequencer manufacturers finally develop plug-ins for Midi data, we talk effects



The Chorder allows you to assign a whole chord to individual keys



You get lots of control over the arpeggios created using Arpache 5

Modern software sequencers are making it increasingly easy to do some outrageous edits on audio tracks, but the problem remains that if you push the envelope too far the results can sound artificial. With Midi recordings, on the other hand, you have a lot more room to manoeuvre. That's because they don't contain any audio data, just information on how an instrument should be played to allow a sequencer to recreate the performance. This enables you to easily edit any element on a Midi recording.

It's a bit surprising then that sequencer manufacturers have taken so long to develop plug-in effects that work on Midi data. Cubase did, of course, feature the Logical Editor (see box on the next page) that allowed you to perform batch commands on Midi data, but that editor was about as user friendly as a bed of nails and many people just ignored it. However, with the first version of Cubase SX, Steinberg finally introduced Midi plug-in effects to Cubase. You can apply these plug-ins in a similar way to audio plug-ins and as they have a standard user interface they are much easier to use than the old Logical Editor. So this month we're going to look at some of the tricks you can perform using these plug-ins.

Setting up a test project

We're going to be using three of the standard Cubase SX Midi effects. The first of these is the Chorder. This allows you to assign a whole chord to individual keys. The second effect we're going to look at is Arpache 5. This plug-in works like the appegiators you used to find on old analogue synths although it offers a lot more control over the arpeggios that you can create. Finally, we're going to put the Step Designer plug-in to use. This is a mini step sequencer that works a bit like the Matrix module in Reason.

First we need to create a project. Load up Cubase SX (you can use version 1.0 or later) and hit Ctrl & N to create a new song. In the New Project box that appears choose '16 Track Midi Sequencer'. Click OK. Choose the folder in which you want to store the Project files, and when the main Arrange window appears click on Track 1.

We'll use a built-in software synth as our sound source. Click on the Devices menu and then select VST Instruments. In the first box in the VST Instruments window select A1 from the Synths sub menu. When the A1 interface appears choose 'Sweep Harmony T' from the presets box at the top of the window. Finally, in the Track Inspector for Track 1 click on the Out box and select A1 as the output for your track.

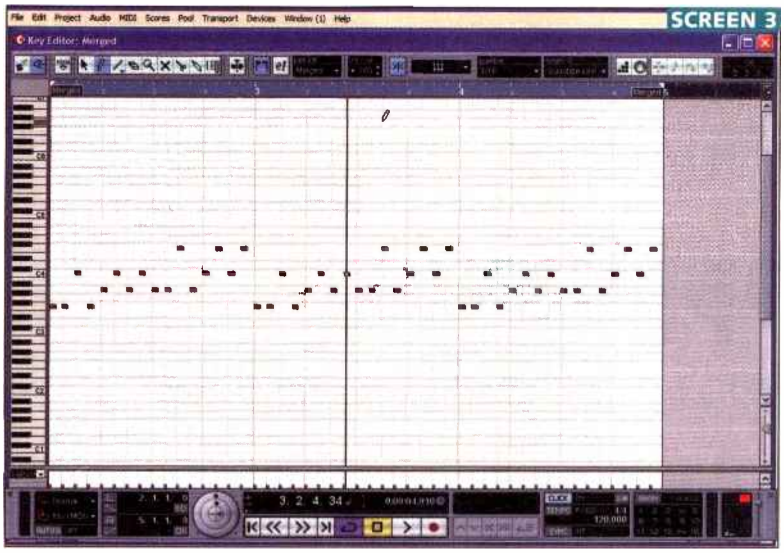
Chorder

Now that we have the track set up we can turn our attention to adding the first plug-in. Click on the Devices Menu and select the first Mixer. When the Mixer opens click on the 'e' button on the channel strip for Track 1 to open the editing window. Click in the first plug-in box and select Chorder from the list of plug-ins that appears.

We can use the Chorder to assign a full chord to an individual key on our keyboard. Click on the Normal button so the bottom keyboard appears. To program the Chorder click on a key on the lower keyboard and then set up the chord by clicking on the keys in the upper keyboard. Program in some chords and try playing them back using single notes on your keyboard to get a feel for how the plug-ins works (see screen 1).

Arpache

Open the VST Instruments window again and assign the A1 synth to the



You can use the 'Merge Midi in Loop' feature to permanently write the output of a Midi plug-in to a track

second slot. When the interface for the A1 synth opens select 'Snappy Bass JH' as the preset. Now click on the track inspector for Track 2 and select the A1 synth as the Midi out.

Press F3 to bring up the mixer window again and click on the 'e' button on the Track 2 channel to call up the editing window. Click on the first plug-in box and choose Arpache 5 from the pop-up menu.

When you hold down a chord an arpeggiator will cycle through the notes in a set pattern rather than playing them together as a chord. The Arpache gives you lots of control over how the notes are played. Make sure the down arrow is selected in the Arpache interface and then hold down a chord on your keyboard to hear what the effect sounds like.

Now it's time to start editing the arpeggio that the Arpache plays. The Quantize value governs the interval at which each note is sounded and the Length value governs how long the note will play for. Click on the length setting and change it to 32 to shorten the length of the notes played. The arpeggio will now take on a staccato feel. If you click on the button with both the up and down arrows, the Arpache will move upwards through the notes and then back down again.

The Arpache allows you to change the order in which the notes are played. When you click on the Order button the Arpache will play the notes according to the values you enter in the Play Order boxes. Number 1 corresponds to the lowest note that you play in your chord. Click on the Order button so that it displays Order On and then program in '1,1,3,1,2,3,2,3' in the Play Order boxes. When you now hold down a chord the arpeggio should sound significantly different (see screen 2).

Storing the Midi output

You may not want to record the output of a Midi plug-in into a track so that it is permanently stored. Let's look at how you would record the output from the Arpache into Track 2.

Return to the main Arrange window and record a single chord over four bars on track 2. Now set the locator markers around these four bars. Click on the Midi menu and select Merge Midi in Loop. Tick the box for Include Inserts to include the output from the Arpache effect and tick the box for Erase Destination to delete the chord that's currently recorded on the track. Click on OK and when you open the track you'll see that the notes from the Arpache arpeggio have replaced the existing chord (see screen 3). Turn off the Arpache effect on that track.

Step Designer

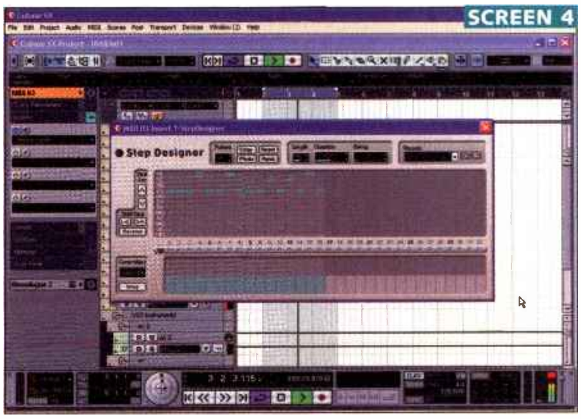
This is essentially a mini step sequencer that you can program patterns of notes into. Open the VST Instrument window and add the Monologue synth into the third box. Click on Track 3 in the main arrange window and set it to use the second monologue synth as the Midi Out. Call up the main mixer and add the Step Designer as an insert effect on Track 3.

Unlike the other plug-ins we've looked at, Step Designer doesn't process incoming Midi notes. Instead, you program it with the notes that you want it to play. To do this click on a box in the grid that takes up most of the Step Designer's interface. If you want to create a longer note you can click on the tie button to tie two notes together on the grid. You can also scroll the grid up and down by clicking on the Note names and dragging upwards or downwards (see screen 4).

Step Designer is an excellent tool for creating the sort of repetitious music patterns that are the staple of dance music styles such as Techno and Hip Hop.

This is the tip of the iceberg of what you can do with the Midi effects built in to Cubase. There are many more plug-ins included and most are under-used, so if you do use them they should help you make your tunes stand out from the crowd. **PCW**

The Step Designer lets you quickly create short patterns of notes



The Logical Editor and Transformer

In older versions of Cubase the Logical editor was often used to create Midi effects. It is extremely powerful, but also about as user-friendly as a Rubik's Cube so it was ignored by most people.

The Editor works by allowing you to create a set of rules that are used to filter certain bits of Midi data and then use another set of rules to manipulate that data. The ins and outs of the editor are too complicated to cover here so if you want to learn how it works you'll have to delve into the Cubase manual. However, even if you don't plan on mastering this device it's still worth a look because it includes a number of presets that you may find useful. For example, you can use it to change all the velocity values in a track to a set value, cut the tempo of a piece in half or just automatically delete short notes that are a result of sloppy playing.

The Logical Editor can also now be used as a plug-in, called the Transformer. The Transformer plies its trade on the output of a track so it doesn't actually change the original recording. However, Cubase also includes the Input Transformer that can be used to filter incoming Midi data and this does affect what is recorded on a track.

Alan Stevens has implemented and supported networks for over 25 years, working for IT vendors, system integrators and customers. He now mostly researches and writes about networking matters.

→ Comments welcome on the Networks column.
Email networks@pcw.co.uk
Please do not send unsolicited file attachments.

A virtual Nas appliance

Learn how to use virtualisation and build a network-attached storage device

Unless you've been living on another planet for the past couple of years, you'll no doubt have heard and read about virtualisation, the technology that lets you run multiple virtual machines (VMs) on the same physical PC or server, each with its own operating system and application software.

What you won't have seen, however, are very many practical examples of things you can do with virtualisation, beyond tinkering with an OS. I want to address this omission and show you how to use virtualisation to quickly build and use a network-attached storage (Nas) appliance.

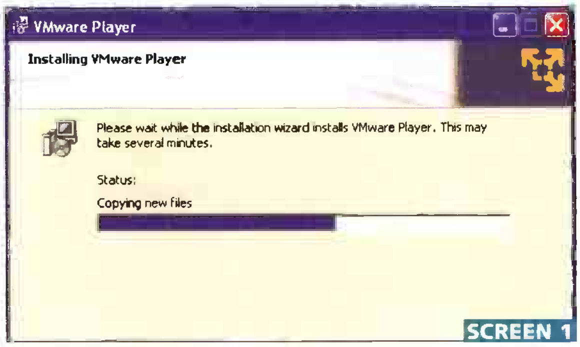
Why a virtual appliance?

Of course the first question you're bound to ask is why you would want to use virtualisation to do this. The answer is because it makes the process a whole lot easier, eliminating many of the issues and concerns associated with more conventional approaches.

For example, the Nas software we'll be using here is written for FreeBSD Unix, but that doesn't matter as virtualisation lets you install and run more or less any operating system on either a Windows or a Linux PC.

Importantly too, virtual appliances come already installed, with the necessary operating system (typically a Linux or, in this instance, Unix variant) plus all the application components required. All you have to do is start up the virtual machine and you're away with, in this example, a built-in web interface to configure the Nas file sharing to suit your network.

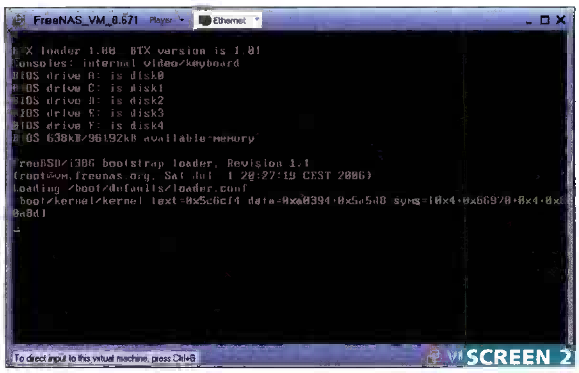
Plus you don't have to worry about compatibility as it's all virtual and everything you need is supplied ready to run. Indeed, this particular Nas appliance comes with a virtual Raid 5 disk array, but the PC involved only needs one physical disk drive. And it doesn't matter whether it's Pata (Parallel ATA), Sata (Serial ATA) or even SCSI.



Installing VMware Player

Please wait while the installation wizard installs VMware Player. This may take several minutes.

Status:
Copying new files



```
BTX loader 1.00  BTX version is 1.01
Consoles: internal video/keyboard
BIOS drive A: is disk0
BIOS drive C: is disk1
BIOS drive D: is disk2
BIOS drive E: is disk3
BIOS drive F: is disk4
BIOS 638kB/96192kB available memory

FreeBSD/i386 bootstrap loader, Revision 1.1
(root@vm.freenas.org, Sat Jul  1 20:27:19 CEST 2006)
Loading /boot/defaults/loader.conf
/boot/kernel/kernel text=0x5c6cf4 data=0xa0394+0x5a5d8 syms=[0x4+0x66970+0x4+0x
0a8d]
\
```

To direct input to this virtual machine, press Ctrl+G

Top: VMWare Player is installed like any other desktop application

Bottom: The guest operating system (FreeBSD Unix in this example) can be seen loading in a Windows on the PC Desktop

Virtually equipped

Not convinced? Well let's just run through this deployment starting with the virtualisation software itself, which can be obtained in a variety of formats from a number of sources. Most let you create and customise virtual machines of your own, but I've opted for the VMWare Player. This lacks virtual machine building tools but enables you to run already created VMs without having to know too much about what's involved.

Another benefit is that it's from the market leader in virtualisation, VMWare, so there are lots of pre-built virtual appliances you can download to run on it. Added to which, it's available for free – which is always an important consideration.

Download the player

VMWare Player is available for both Windows and most Linux distros, but if you're running Windows, you'll need Windows 2000 or, better still, XP.

A fast processor will also make life easier (500MHz or better is recommended) plus you'll need plenty of memory. The minimum you can get away with is 256MB, on top of which you should have enough to host any guest operating systems. Similarly you'll need plenty of disk space as virtual machines can be several gigabytes in size. However, they can also be quite small, as is the case with the Nas appliance we'll be using here.

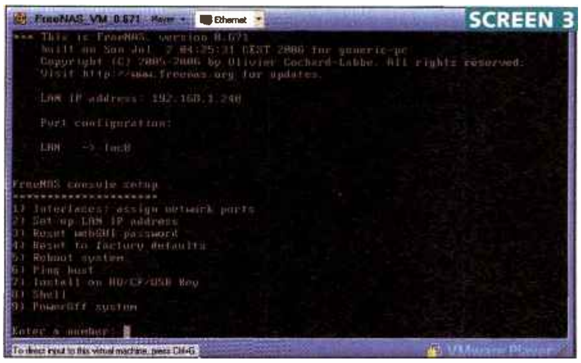
To get hold of the VMWare Player simply go to the VMWare website (**www.vmware.com**) and find the download page for the platform you'll be using. I've used VMWare Player V1.02, a 28.4MB download, which can be installed like any other Windows application (see screen 1), although may take several minutes. Plus you'll have to reboot once it's finished.

The virtual appliance

The next step is to download the virtual appliance. The product I've used here is called FreeNAS and, as the name implies, it can be downloaded for free from **www.freenas.org**.

You'll find the software available in two formats; either as a complete install disk with which you can set up a FreeNAS appliance from scratch or as a VMWare virtual appliance. Either way you'll end up with exactly the same appliance functionality, but by opting for the VM implementation most of the hard work is done for you and there are no compatibility worries.

I used version 0.671 for this workshop, downloaded as a 19.2MB compressed file, which I then unzipped into a folder on my PC hard disk (C:\FreeNAS_VM).


FreeNAS_VM_0.671 - Player
Ethernet
SCREEN 3
To direct input to this virtual machine, press Ctrl-G
VMware Player

```
*** This is FreeNAS, version 0.671
    built on Sun Jul  2 04:25:31 CEST 2006 for generic-pc
    Copyright (C) 2005-2006 by Olivier Cochard-Labbe. All rights reserved.
    Visit http://www.freenas.org for updates.

    LAN IP address: 192.168.1.248

    Port configuration:

    LAN    -> lnc0

FreeNAS console setup
**********************
1) Interfaces: assign network ports
2) Set up LAN IP address
3) Reset webGUI password
4) Reset to factory defaults
5) Reboot system
6) Ping host
7) Install on HD/CF/USB Key
8) Shell
9) PowerOff system

Enter a number:
```

Here the FreeBSD virtual machine has finished loading and the FreeNAS appliance is now running

Running the appliance

You don't have to install a virtual appliance; just run it, which means first starting the VMWare Player. This will prompt you to browse for a virtual machine configuration file, so here I directed it to the C:\FreeNAS_VM folder and clicked on the FreeBSD file unzipped earlier.

The VMWare Player will inform you that the virtual machine has been changed or copied since it was last on and that a new unique identifier (UUID) should be generated for it. That done, the virtual machine and its guest operating system can be seen loading in a window on the PC Desktop (see screen 2), just as though loading onto a 'real' PC.

And that's really all there is to it. Once it's loaded you'll have another virtual machine running on your PC. This will share the host's (ie physical) network interface, but will be bridged to a different IP address, which you can ping just like any other network device. You can also enter commands from the console window, although there's very little you can do on this appliance other than change its IP address, reset the web password or power it down. Everything else is done via a built-in web interface. To access that you need to start a browser and enter the IP address of the appliance as displayed in the VMWare Player window.

Configuring the appliance

Just as with a real appliance, you have to log on to FreeNAS to manage it. The default user name is 'admin' and the password is 'freenas', after which you'll see a fairly basic menu-driven interface, shown in screen 4.

The menus here let you tweak a host of features to get the FreeNAS appliance to share files using a variety of protocols on different networks. However, for Windows you're only interested in CIFS – the Common Internet File System, also known as Server Message Block, or SMB.

CIFS support is provided by Samba, and enabled by default so all you have to do is tell the appliance the name of the workgroup or domain to use. As in screen 5, I've clicked on CIFS in the menu tree to get to the appropriate screen and changed the workgroup name to Editorial – the name of a workgroup on my Lan.

Notice that I've left the NetBiosName entry as 'freenas', which is what the appliance will be called when browsing from Windows Explorer, but I've chosen Local User in the authentication dropdown.

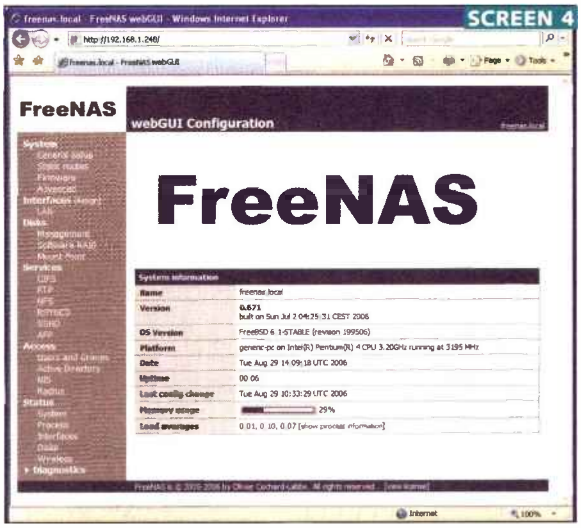
I could have left this last entry as Anonymous, for anyone on the network to access the appliance, but by specifying Local User, only those on the built-in user list are allowed in.

I also had to select Users and Groups and from that menu create a group to add valid users for them to see and use the CIFS shares. By default just one share is configured (called raid5), but you can easily define others if you want. And to access the shares, you just open the My Computer folder and select My Network Places as normal. An entry marked raid5 on FreeNAS server (Freenas) should then be listed.

Putting it to work

Loading and running a virtual appliance this way is easy. Rather than buy a custom Nas appliance, a virtual implementation can be downloaded and set to work on a redundant Windows or Linux PC in a process that should take about an hour. Performance will be dictated by the PC and if you've lots of files to store, a disk upgrade may be in order. But it requires hardly any technical expertise. Plus it's a good first step to understanding what virtualisation has to offer. **PCW**

Once up and running, the FreeNAS appliance is configured from a web browser


freenas.local - FreeNAS webGUI - Windows Internet Explorer
SCREEN 4
http://192.168.1.248/
freenas.local - FreeNAS webGUI
Page
Tools
FreeNAS
webGUI Configuration
freenas.local
System
General setup
Static routes
Firmware
Advanced
Interfaces (assign)
LAN
Disks
Management
Software RAID
Mount Point
Services
CIFS
FTP
NFS
RSYNCD
SSHD
AFP
Access
Users and Groups
Active Directory
NIS
Radius
Status
System
Process
Interfaces
Disks
Wireless
Diagnostics
FreeNAS
Internet
100%

System information

Name	freenas.local
Version	0.671 built on Sun Jul 2 04:25:31 CEST 2006
OS Version	FreeBSD 6.1-STABLE (revision 199506)
Platform	generic-pc on Intel(R) Pentium(R) 4 CPU 3.20GHz running at 3195 MHz
Date	Tue Aug 29 14:09:18 UTC 2006
Uptime	00:06
Last config change	Tue Aug 29 10:33:29 UTC 2006
Memory usage	29%
Load averages	0.01, 0.10, 0.07 [show process information]

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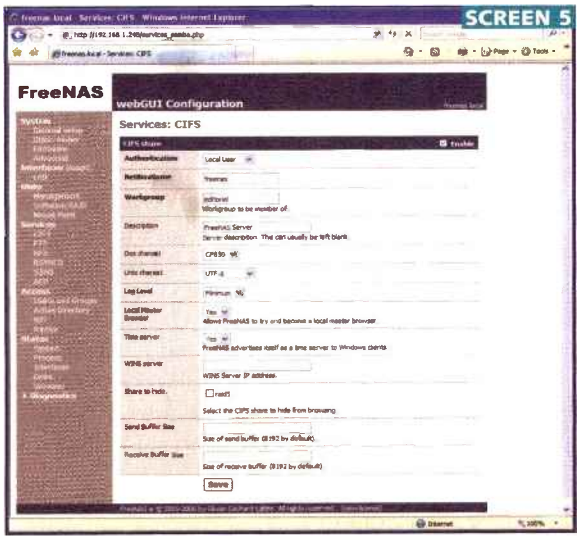
freenas.local - Services: CIFS - Windows Internet Explorer
SCREEN 5
http://192.168.1.248/services_samba.php
freenas.local - Services: CIFS
Page
Tools
FreeNAS
webGUI Configuration
freenas.local
System
General setup
Static routes
Firmware
Advanced
Interfaces (assign)
LAN
Disks
Management
Software RAID
Mount Point
Services
CIFS
FTP
NFS
RSYNCD
SSHD
AFP
Access
Users and Groups
Active Directory
NIS
Radius
Status
System
Process
Interfaces
Disks
Wireless
Diagnostics
Save
Internet
100%

Services: CIFS

CIFS share ☑ Enable

Authentication: Local User
NetBiosName: freenas
Workgroup: editorial
Workgroup to be member of
Description: FreeNAS Server
Server description. This can usually be left blank
Dos charset: CP850
Unix charset: UTF-8
Log Level: Minimum
Local Master Browser: Yes
Allows FreeNAS to try and become a local master browser
Time server: Yes
FreeNAS advertises itself as a time server to Windows clients
WINS server:
WINS Server IP address.
Share to hide: ☐ raid5
Select the CIFS share to hide from browsing
Send Buffer Size:
Size of send buffer (8192 by default)
Receive Buffer Size:
Size of receive buffer (8192 by default)

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Windows' file sharing with CIFS is enabled by default but a little bit of tweaking will be required

More appliances

There are many other virtual appliances you might like to try. Most are written for use with VMWare, making the VMWare Technical Network website (**www.vmware.com/vmtn**) a good place to start. The FreeNAS appliance can also be downloaded from here along with hundreds of others to, for example, create virtual firewalls, content-filtering appliances and a lot more besides.

Another good site is **www.virtualappliances.net**, which has appliances for the Xen virtualisation platform as well as VMWare.

Most virtual appliances will be based on open-source software that can be downloaded and run free of charge, but check the licence terms carefully. Plus you need to be aware that the people who build the virtual appliances aren't necessarily the original developers or sellers of the software. The level of support you can expect will vary enormously and may be limited to the implementation as a whole rather than the components on which it's based. Plus many are effectively beta software, which means they're likely to be incomplete, and prone to the odd bug here and there.

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.

→ Comments welcome on the Databases column.
Email database@pcw.co.uk
Please do not send unsolicited file attachments.

Inside tables and queries

Make-table and Union queries explained, plus an update on Update queries

As part of our occasional series for those starting out with databases, this month we'll take a look at make-table queries. The clue is in the name: run one of these and it will generate a table on disk. Is that so odd? Yes. To understand why it is weird, we need to look at how a normal query works.

We store data in tables and these tables are stored on disk. Since there are other kinds of tables we refer to these as 'base' tables. Queries extract data from the base tables and display it to us in a different kind of table, an 'answer' table.

A query is not a set of data, it is simply an SQL statement:

```
SELECT Customer.FName, ↙
Customer.LName
FROM Customer
WHERE Customer.FName="Penguin";
```

(Key: ↙ code string continues)

When you run the query it goes to the relevant base table(s), extracts the required data and displays it to you. However, when it puts the answer up on screen, the data is displayed to you looking like a table. It has rows, it has columns – but it's an answer table.

The difference is that it only exists in memory and isn't usually written to disk. When you close the query, the answer table vanishes. If you re-run the query, of course the answer table reappears but it may now contain a different set of data. Why? Because in the interim, someone else may have altered the data in the base table. When a query is run it looks at the data in the base table as it exists at that time and displays it to you. This is excellent because you see the most up-to-date data and that is what most of us want, most of the time.

However, there are times when you want to see the data at a specific point in time (as normal) but you also want to keep that snapshot of the data for some time in the future. Enter the make-table query. When you run it the data is extracted from the base table as normal but it is then written to disk, thus forming a new base table.

A make-table query consists of a 'normal' query (such as the SQL statement) but it has an additional component which is the name of the base table (in this case, NewBase) that it should produce when it is run.

```
SELECT Customer.FName, ↙
Customer.LName INTO NewBase
FROM Customer
WHERE Customer.FName="Penguin";
```

Using the GUI in Access, you simply create the SELECT query that you want in the normal way. Then you pop-down the Query part of the menu system and choose the 'Make-table query...' option.

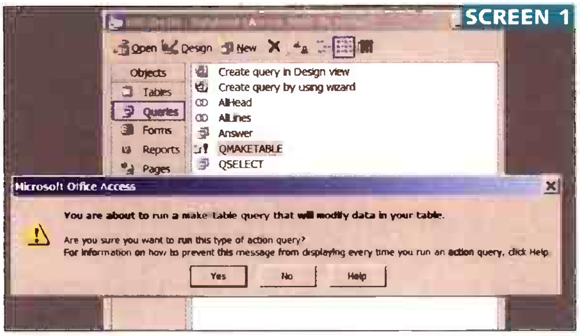
A dialogue opens up and asks for the name of the table to make and that's it. If you click on the data sheet view button it will effectively run the query but not create the base table. However, if you click on the 'Run' button (the one with the red exclamation mark), Access will put up various warning dialogues and, if you tell it to do so, it will go ahead and do it (see screens 1 and 2).

Make-table queries are very useful for taking snapshots of the data at a point in time. Remember that the data will be overwritten the next time the query runs so, if you need to keep the data, modify the make-table query or rename the base table you have created.

All Ahead Full

There's a variety of queries around and each one has a range of practical uses. Simon Coombes emailed with a problem for which the UNION query

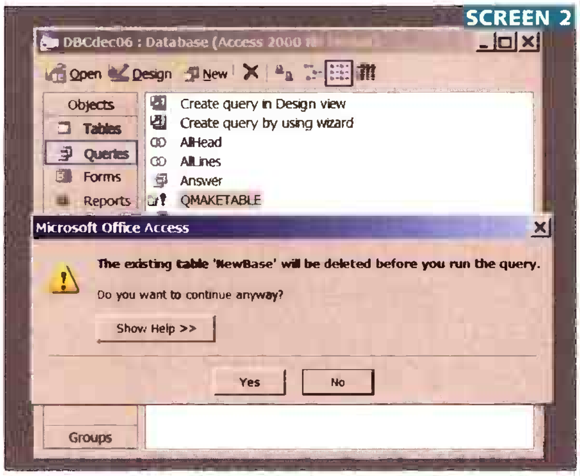
SCREEN 1



You are about to run a make-table query that will modify data in your table.

Are you sure you want to run this type of action query?
For information on how to prevent this message from displaying every time you run an action query, click Help

SCREEN 2



The existing table 'NewBase' will be deleted before you run the query.

Do you want to continue anyway?

Running a Make-Table query causes Access to issue several warnings before it will run

FIG 1

Union query

RECEIPTNO	TIME	DATE	ACC NO
1	11:12:00	1/1/06	32
2	12:03:00	1/1/06	34
3	12:07:00	1/1/06	32
4	12:13:00	1/1/06	45
5	13:07:00	1/1/06	43
6	14:03:00	1/1/06	43

FIG 2

Line table

RECEIPTNO	LINE	QUANTITY
1	1	3
1	4	6
1	6	4
2	1	8
2	4	6
2	7	4
3	5	23

(mentioned briefly last month) could have been designed. He runs a chandlery shop and collects data from his tills. The tills operate independently, so while each produces a 'unique' number for each sale (the ReceiptNo) there is nothing to stop different tills from issuing the same number. Each till produces a table like figure 1.

There are three tills, so there are three Head Tables. Since each sale can include one or several products (or lines), there is a second table associated with each till (the Line table) that stores that information (see figure 2).

So the sale with receipt number 1 had three different product lines associated with it, products 1, 4 and 6.

Simon is aware that he can't simply combine the tables because the receipt numbers are unique to each till. However, if he can find a way to use the till number and the ReceiptNo together, he could make beautiful reports. So what he would like to see is a table something like figure 3.

FIG 3

Head table

TILLNO	RECEIPTNO	TIME	DATE	ACCNO
1	1	11:12:00	1/1/06	32
1	2	12:03:00	1/1/06	34
...	....	.....	.....	....
2	1	11:12:00	1/1/06	23
2	2	11:12:00	1/1/06	12
...	...	.....	....	...
3	1	09:12:00	1/1/06	34
3	2	10:23:00	1/1/06	56

This table combines the three Head tables and has an extra column (TillNo). The TillNo and the ReceiptNo together form a perfect primary key. If we can do the same with the Lines tables, we can generate a pair of tables that are perfect for reporting.

Let's look at the Head data first. In theory, we could use a query like this:

```
SELECT 1 AS TillNo, Head1.*
FROM Head1
```

which will generate an answer table that has all the fields found in Head1 as well as a column called TillNo in which the value is always 1. We could then write a variation for each of the other tables, for example:

```
SELECT 2 AS TillNo, Head2.*
FROM Head2
```

That would give us three queries, each of which adds the appropriate till number to the data. By doing this we would have to add the results of those three queries together to give us a complete list of the Head data. Boring. To save time, we can write what is called a UNION query that runs these three queries and adds them together; all in one go.

If you've bought the DVD edition of *PCW*, you'll find the sample database, DBCDec06.mdb on the cover disc. It's also at **www.pcw.co.uk/2151344** and **www.penguinsoft.co.uk**). A query in the sample database called AllHead reads like this:

```
SELECT 1 AS TillNo, Head1.*
FROM Head1
UNION
SELECT 2 AS TillNo, Head2.*
FROM Head2
UNION
SELECT 3 AS TillNo, Head3.*
FROM Head3;
```

We create another called AllLines:

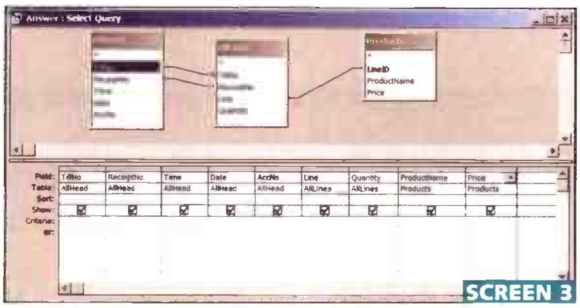
```
SELECT 1 AS TillNo, Lines1.*
FROM Lines1
UNION
SELECT 2 AS TillNo, Lines2.*
FROM Lines2
UNION
SELECT 3 AS TillNo, Lines3.*
FROM Lines3;
```

That gives us all the Head data in one answer table and all the Lines data in another.

I said above that the UNION query could have been designed for solving Simon's problem. For the UNION operator to work, it requires tables with an identical structure in terms of numbers of fields, and ideally the fields that are to be united should contain values that are drawn from the same range. Simon's three Head and three Lines tables fit the bill exactly.

For reporting purposes, we need another query, Answer (see screen 3) which marries those two answer tables into one. (I've added another table called Products, just so that we have some readable product names).

```
SELECT AllHead.TillNo, ↙
AllHead.ReceiptNo, ↙
AllHead.Time, AllHead.Date, ↙
AllHead.AccNo, AllLines.Line, ↙
AllLines.Quantity, ↙
Products.ProductName, ↙
Products.Price
FROM
(AllHead INNER JOIN AllLines
ON (AllHead.ReceiptNo↙
=AllLines.ReceiptNo) AND ↙
(AllHead.TillNo=AllLines.↙
TillNo)) INNER JOIN
Products ON ↙
AllLines.Line=Products.LineID;
```



Field:	TillNo	ReceiptNo	Time	Date	AccNo	Line	Quantity	ProductName	Price
Table:	AllHead	AllHead	AllHead	AllHead	AllHead	AllLines	AllLines	Products	Products
Sort:									
Show:	☑	☑	☑	☑	☑	☑	☑	☑	☑
Criteria:									
or:									

SCREEN 3

The Access query builder version of the query called 'Answer'

The beauty of this system is that it is simple to use. As long as the six base tables contain the original data, all you have to do is to open the query called Answer. It will call the intermediary queries (AllHead and AllLines) and show you the data you need.

UPDATE update

Our back-to-basics series looked at UPDATE queries in July but I recently received a short, sweet and perfect example of how useful they can be.

Alice Horton has inherited a large table of contacts in which the phone numbers are stored without leading zeros, even though the PhoneNo field is a text field. She'd like to store the numbers correctly but doesn't relish the prospect of adding all those zeros manually.

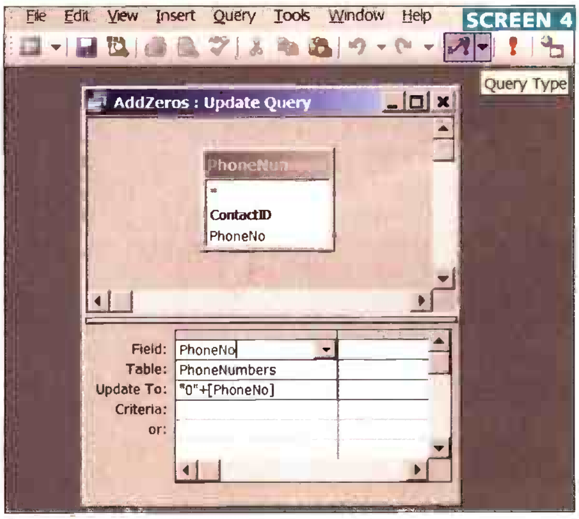
An UPDATE query provides the solution (see screen 4). As always, perform the updating on a copy of the table first, just to check that everything works as planned. Open the query grid, add the table and then click the Query Type button and select Update Query. Add the PhoneNo field, and in the Update To: line type:

```
"0"+[PhoneNo]
```

The SQL is:

```
UPDATE PhoneNumbers SET ↙
PhoneNumbers.PhoneNo = ↙
"0"+[PhoneNo];
```

You won't see the changes if you click the View button; you have to run the query using the Run button – another good reason working with a copy is good practice. **PCW**



Field: PhoneNo
Table: PhoneNumbers
Update To: "0"+[PhoneNo]
Criteria:
or:

SCREEN 4

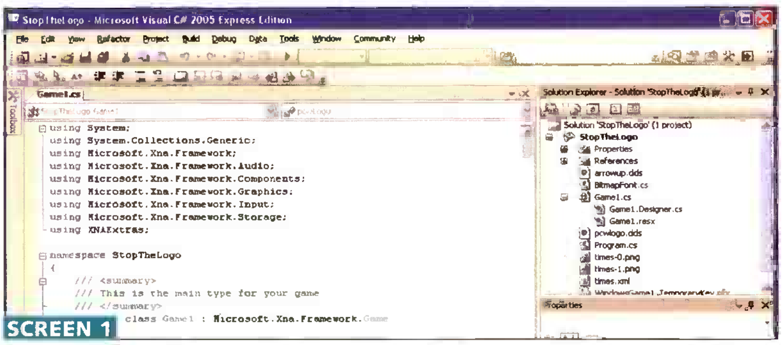
An UPDATE query to add zeros where you want them

Tim Anderson is an IT journalist and software developer, and began writing for PCW in 1993. Since his first Commodore Pet, he has acquired expertise in Rad programming, Windows and the Internet.

→ Comments welcome on the Visual programming column.
Email visual@pcw.co.uk
Please do not send unsolicited file attachments.

Create a game with XNA

Try your hand at game development with Microsoft's new free tool


StopTheLogo - Microsoft Visual C# 2005 Express Edition
File Edit View Refactor Project Build Debug Data Tools Window Community Help
Game1.cs
Toolbox
Solution Explorer - Solution 'StopTheLogo'
Solution 'StopTheLogo' (1 project)
StopTheLogo
Properties
References
arrowup.dds
BitmapFont.cs
Game1.cs
Game1.Designer.cs
Game1.resx
pcwlogo.dds
Program.cs
times-0.png
times-1.png
times.xml
Properties

```
using System;
using System.Collections.Generic;
using Microsoft.Xna.Framework;
using Microsoft.Xna.Framework.Audio;
using Microsoft.Xna.Framework.Components;
using Microsoft.Xna.Framework.Graphics;
using Microsoft.Xna.Framework.Input;
using Microsoft.Xna.Framework.Storage;
using XNAExtras;

namespace StopTheLogo
{
    /// <summary>
    /// This is the main type for your game
    /// </summary>
        class Game1 : Microsoft.Xna.Framework.Game
```

SCREEN 1

Game Studio Express presents you with code to type, rather than the visual editors you might have expected

Microsoft has kick-started hobbyist game development with its free XNA Game Studio Express. XNA is a .Net Framework class library focused on game development. It is a wrapper for DirectX – the multimedia API which is implemented on both Windows and the Xbox 360.

Using XNA, you can target both Windows and the Xbox 360 easily, though deploying to an Xbox is tricky. There is also a high-end XNA Studio product aimed at game development studios, but Express enables the rest of us to play as well. Despite the multilanguage support in .Net, the only supported language for XNA is C#.

Given that .Net applications tend to be slower than their native code equivalents, XNA may seem a strange choice for game development. On the other hand, .Net applications do compile to native code at runtime, so excellent performance should be possible. The trade-off is that XNA is great for productivity. It also gives you a legal and supported way to try out your code on the Xbox 360 console, something previously impossible for hobbyist developers.

Garage Games, which makes the Torque Game Engine and other tools for game developers (see **www.garagegames.com**), is porting many of its libraries to XNA. It also claims to have ported its successful Xbox Live Arcade title, Marble Blast Ultra, to XNA without ill effect, demonstrating that performance is at least good enough.

Modern game development is often compared with making a movie, with all the expense and complexity that suggests. Clearly something like Half-Life or Grand Theft Auto is beyond the grasp of any individual, let alone a part-timer. Fortunately, the mood of the industry is changing. The most successful aspect of the Xbox 360's chequered launch has not been the big-budget titles, but low-budget, highly playable offerings on the Xbox Live Arcade. Some of these are puzzle games that are not particularly complex to code. Another sign of the times is that Nintendo's family-friendly DS handheld has been more successful than Sony's more powerful Playstation Portable. Creative, fun ideas count for more than the ultimate in pixel-pushing power, so there is no reason to hold back from having a go.

It is easy to target Windows with XNA, but how do you run your game on an Xbox 360? This is impossible with the beta release, since Microsoft says it will not risk beta code on its console. In the final release, you will be able to sign up for a Game Studio Express subscription at what Microsoft describes as a "nominal cost". Then you can create projects that target the Xbox 360 and download them to a network-attached console for testing. This requires an Xbox 360 with a hard drive. You will be able to use remote debugging in the same way as for Windows Mobile devices.

Sharing binary executables with other Xbox 360 owners is prohibited. To share your game you have to distribute the source code to other XNA Game Studio Express users. That is far from ideal, especially if you want to make money from your game, but the situation may change in future. The other option is to upgrade to XNA Game Studio Professional, to be released next year, which will allow you to submit titles to Microsoft to be certified for commercial release.

XNA Game Studio Express is the easiest DirectX framework yet, but it is not a drag-and-drop visual game development tool. It is code-oriented, and you are going to need graphical and mathematical skills to make the most of it (see screen 1).

Given the target market, some will find that disappointing, but there is nothing to stop third parties such as Garage Games from providing tools that use the underlying framework.

Getting started

XNA Game Studio Express is an add-in for Visual C# Express. It will not install into the non-Express versions of Visual Studio, though you can have the two products side by side. Once installed you can use XNA from the full Visual Studio. It is also advisable to install the latest DirectX SDK, which ensures your DirectX runtime is up to date and adds some important utilities, such as the Texture Tool.

XNA adds three project templates to the Express IDE – Windows Game, Windows Game Library and the Spacewar Starter Kit, which is a complete game, albeit fairly complex. A better approach to learning XNA is to start a new Windows Game project, which creates a skeleton game. If you run the game immediately, it displays a blank window. The Game1.cs file defines a class that inherits from Microsoft.XNA.Framework.Game, and here is where you start writing code.

You will notice two TODO comments. One is in the Update method, which gets called at frequent intervals while the game is running. This is where you process the logic of your game. The second is in the Draw method, which is where you paint the screen. Your game will run in a loop, with Update and Draw running alternately. Other key methods are OnStarting, where you write initialisation code, and LoadResources for loading multimedia resources from files into program variables.

The best way to learn XNA is by coding a game. What follows is the simplest game imaginable. A *PCW* logo flies back and forth across a window. You must hit the spacebar when it is at the central small arrow. The score depends on how close you get to the arrow. The game is based on the tutorial in the documentation – Your First XNA Game – with additional steps as described below.

Creating a sprite

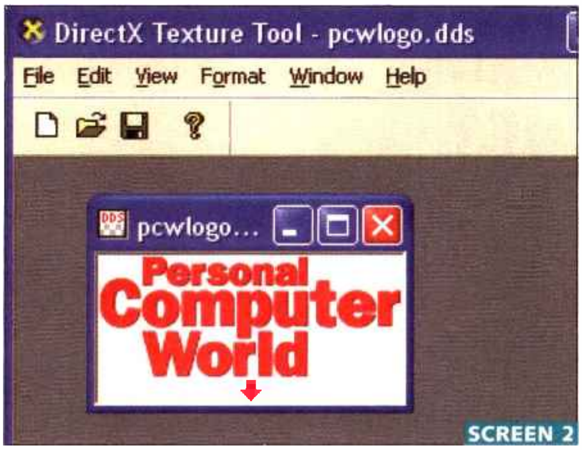
One of the first things you need to do with many games is to control sprites. The starting point for a sprite is an image – in this case the *PCW* logo – modified to add a small arrow. To use this in XNA, it needs to be loaded into a Texture2D object, as such:

```
pcwLogo = Texture2D.↙
FromFile(graphics.↙
GraphicsDevice, "pcwlogo.bmp");
```

(Key: ↙ code string continues)

By default this creates a rectangular image, whereas you probably want an image with a transparent background. This is where the DirectX SDK utilities come in handy. Create the image as a png file with transparency set as you want. Then run the DirectX Texture Tool (see screen 2). Create a new Texture file with the same size as the image, and then choose File/Open onto this surface to place the png onto the Texture. Save the file as pcwLogo.dds and add it to the project, setting the Build Action property to Content, and setting Copy to Output Directory to Copy Always. Load the logo like this:

```
pcwLogo = Texture2D.↙
FromFile(graphics.↙
GraphicsDevice, "pcwlogo.dds");
```



The Texture Tool from the DirectX SDK can help create transparency effects

Sprites are drawn on the DirectX surface using the SpriteBatch class, in the Draw method of the Game class. As the name suggests, the SpriteBatch class lets you specify the position of multiple sprites, and then draw in a batch for best performance. You call SpriteBatch.Begin to initiate sprite drawing, SpriteBatch.Draw to position each sprite, and SpriteBatch.End to have the batch drawn. You need to make a small change to the tutorial code to get transparency:

```
spriteBatch.Begin(SpriteBlend↙
Mode.AlphaBlend);
```

The code to get the sprite moving right and left is shown in the tutorial, with vertical movement set to zero.

Reading the keyboard

When the user hits space, the game stops the logo and reads the position. This test goes in the Update method of the Game class. Reading the keyboard is easy:

```
KeyboardState kbs = ↙
Keyboard.GetState();
if (kbs.IsKeyDown(Keys.Space) ↙
& !wasDown) {…}
```

There is a small issue with the keyboard handling. In a Windows application, you would probably handle a keyboard event such as KeyPress, which fires once only when the user hits the key. Here, by contrast, you are polling the keyboard state, so you need to maintain your record of the keyboard state in order to detect changes. This is the purpose of the wasDown variable shown above.

An XNA limitation is the lack of any built-in support for writing text to the DirectX surface. Fortunately, Microsoft's Gary Kacmarcik has plugged the gap by offering some sample code via his blog (**http://blogs.msdn.com/garykac/default.aspx**). His BitmapFont class creates a graphic for each character. This is included in the game in order to write a prompt to the screen, and to report the score. It depends on several files for each font you want to use. For Times, there are two .png files and one XML file which must be deployed with the application. You must add these to the project, using the same Build Action and Copy to Output Directory properties as for DirectX Texture files.

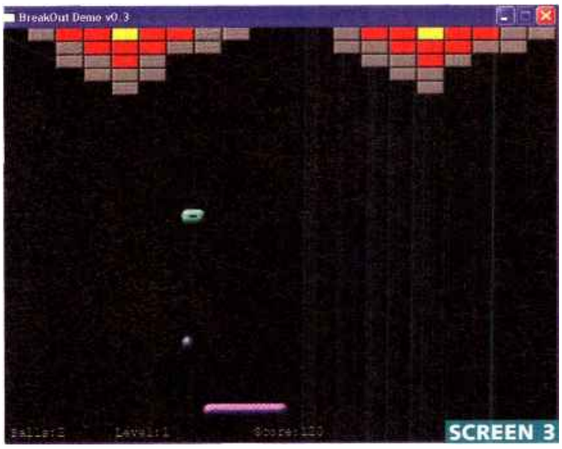
The game is deployed via the Visual C# Express Publish wizard. This will handle the dependencies, provided you have set the Build Action properties as described above. The publish wizard creates a setup.exe which will install the game. Currently, XNA only officially supports Windows XP SP2, though Vista is to be added as soon as it is fully released.

The XNA revolution

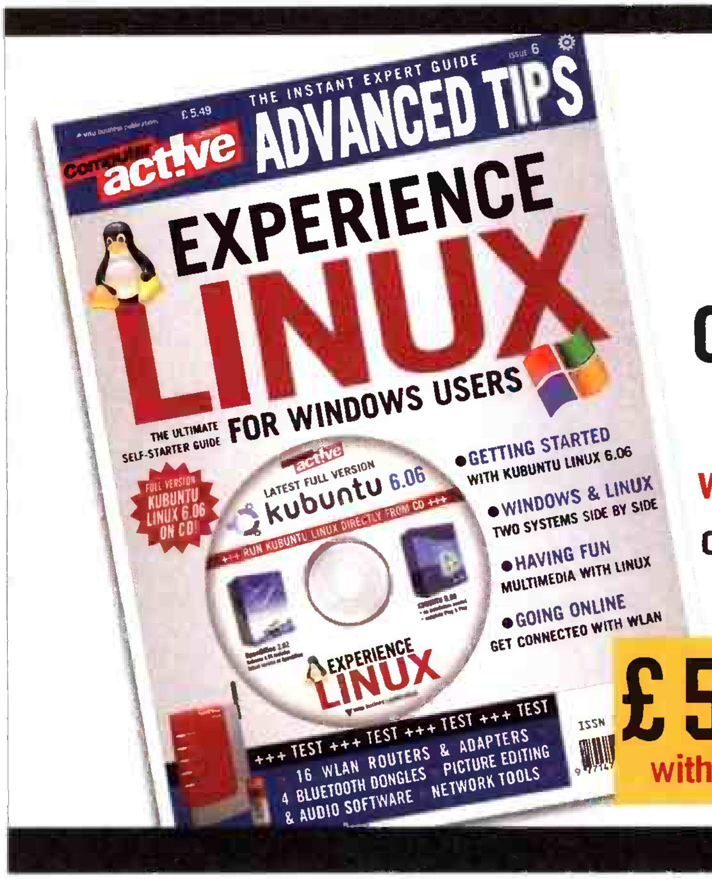
XNA really needs to be bundled with some user-friendly multimedia editors to make it more attractive for beginners, and features such as writing text should be built in.

The revolutionary part is the possibility of targeting a next-generation console as well as Windows, and its attractive price of £0.

A community is already building up around XNA, which means plenty of tips and help will be available, so it is well worth a look if you have a few gaming ideas or, for that matter, any application that works better on top of DirectX rather than the staid old windowing API (see screen 3). **PCW**



This BreakOut clone by Eric Grossinger is among the early releases to emerge from the XNA community, just days after the beta became available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How to buy the best products tested by our Labs

BUYER'S GUIDE

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DVD drives
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TV tuners
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Digital cameras
Routers
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PERSONAL COMPUTER WORLD
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OLYMPUS

78 PRODUCTS REVIEWED TO MAKE YOUR BUYING DECISION EASIER

HOW TO BUY: PCs

Many of the choices you are faced with when buying a PC are covered in the following pages. You need to think about the graphics card, memory, onboard sound or separate soundcard, size and type of hard disk, CD burner or DVD burner and so on.

Once your budget is set, the starting point is the CPU (central processing unit), because it is the brains of your PC.

Intel and AMD offer a bewildering number of processors. The differences between the CPUs are in technical details that don't necessarily mean much to end users. Pricing is also competitive, with AMD PCs generally cheaper than comparable Intel models.

Budget PCs come with Intel's Celeron or AMD's Sempron CPUs. These are aimed at undemanding users. If your needs are for word processing tasks and surfing the internet with some low-end gaming or image editing, a PC running either of these processors is fine. You won't need a huge hard disk – 80GB will be plenty – coupled with between 256MB and 512MB of Ram and a low-end graphics card, or even onboard graphics for the truly undemanding. You'll be fine with onboard sound, and can expect to pay up to about £500, depending on your monitor.

In the mainstream desktop market it's Pentium 4 and Pentium D versus AMD's Athlon XP and Athlon 64. The chief difference is that older Pentium 4 and Athlon XP models are 32bit CPUs, while some newer Pentium 4s, the Pentium D and Athlon 64 are 64-bit models. To take full advantage of this, you need a 64-bit operating system and applications.

More memory can be supported by 64-bit systems – 32-bit Windows or Linux systems are limited to 4GB of Ram, whereas a 64-bit Windows or Linux system can support 128GB. Data is also moved in larger chunks, allowing a theoretical speed advantage.

AMD and Intel offer high-end processors with the Pentium Extreme Edition and Athlon FX ranges, both aimed at the hardcore gaming market. They also have dual-core CPUs. These processors, in effect, act as two CPUs in one and offer superior performance.

If you're choosing a PC running the above CPUs, other considerations come down to your needs. If you store lots of music, video or photos, go for a big hard disk – 200GB or above. Memory will help speed up applications, so aim for 1GB or above and don't drop below 512MB. The latest games demand the latest graphics cards, but for most people, cards that were new six to 12 months ago will be powerful enough. And look at the CPU's cache memory, which helps eliminate data bottlenecks.

Most PCs are Windows XP, and the Home Edition is fine. If it's for a small business, or you need features such as remote access, buy XP Professional. Few PCs are sold running Linux, and we recommend that only the technically confident buy a Linux-only system. Linux can always be installed later. Finally, don't overlook the monitor, especially if you're using the PC for gaming or imaging. Buy the best you can afford.

1

Scan 3XS C2D-OC
£1,499 ★★★★★
Reviewed November 06
3xs.scan.co.uk

Terrific performance and plenty of upgrade potential.

2

Chillblast Fusion 3800 AM2 OC Edition PC
£1,099.99 ★★★☆☆
Reviewed November 06
www.evesham.com

A fast, overclocked, yet affordable system.

3

Apple iMac 24in
£1,349 ★★★★☆
Reviewed December 06
www.apple.com/uk

An impressively designed system that is equally suitable for home entertainment and professional use.

GRAPHICS CARDS

SUB £200

1

Gainward Bliss 6800GS GLH
£176.19 ★★★★★
Reviewed July 06
www.overclockers.co.uk
A terrific graphics card for those who like to dabble with overclocking.

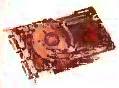
2

3D Fuzion Geforce 7600GS
£75.20 ★★★★☆
Reviewed November 06
www.novatech.co.uk
A good value card for those on a tight budget.

3

Sapphire Radeon X1600 XT Ultimate
£110 ★★★★☆
Reviewed September 06
www.sapphiretech.com
Not totally fan free, but still one of the quietest cards around, and performs well.

£200-£349

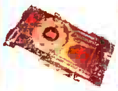
1

Gecube Radeon X850XT Uniwise
£269.97 ★★★★★
Reviewed May 05
www.gecube.com
A single-slot design using Gecube's own cooling system, and it offers good performance.

2

Gainward Bliss 7800GT GLH
£244.89 ★★★★☆
Reviewed July 06
www.overclockers.co.uk
A little expensive, but this card has plenty of overclocking potential.

3

Powercolor Radeon X850XT Platinum Edition
£320 ★★★★★
Reviewed July 05
www.powercolor.com
Based on ATI's fastest Radeon processor, this card will run the latest games with ease.

4

Gecube X850XT Platinum Edition Uniwise
£307 ★★★★☆
Reviewed January 06
www.gecube.com
High-end performance and quiet cooling for AGP motherboards.

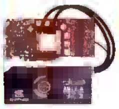
£350+

1

MSI NX7950GX2
£408.85 ★★★★☆
Reviewed September 06
www.msicomputer.com
A dual-core card that paves the way for DIY quad-SLI.

2

HIS Radeon X850XT Platinum Edition IceQII
£370 ★★★★★
Reviewed June 05
www.hisdigital.com
Making use of the IceQII efficient cooling system, this is a quiet and super-fast card.

3

Sapphire Toxic X1900XTX 512MB
£421.83 ★★★★☆
Reviewed August 06
www.sapphiretech.com
This is a water-cooled, overclocked and blazingly fast graphics card.

HOW TO BUY

Most graphics cards are based on either the Nvidia Geforce or ATI Radeon family of chips. Each has their strengths and both offer state-of-the-art image acceleration and comparable features.

Performance improves as you move up a range. Top chips offer more features and draw more pixels or textures in a single pass than cut-down, lower-cost options. All current graphics processors are fine for office work, but hardcore gamers favour Nvidia's Geforce 6800 or new 7800 series and ATI's latest X1900 XTX card.

Ensure the card you buy can display favoured resolutions with at least a 75Hz monitor refresh rate to avoid eye strain from flicker (if using a CRT monitor).

There are usually three clock speeds quoted (in megahertz). Core clock is the internal speed of the graphics processor. Memory speed (or memory clock) is the speed of data transfer between the graphics card's onboard memory and the graphics processor. Ramdac speed is the capability of the digital-to-analogue converter that provides the graphics output from the card.

Graphics cards use their own dedicated video memory to store data, images and textures. The more you have, the better the performance. A card with 64MB is fine for office tasks, but we recommend at least 128MB or 256MB for the latest games and video applications.

About £40 will buy you a Geforce FX 5200 or Radeon 9200 card with 128MB of Ram, which is good for 2D action/strategy games, image editing and less demanding 3D games.

To play 3D action games smoothly, look at £100-£150 cards. Serious gamers should consider the Geforce FX 6800 GT at £280-plus, Radeon 850 XT at £320-plus, or 7800 GTX at £350-plus.

Depending on the motherboard, you'll need an AGP or PCI Express graphics card. PCI Express is the newest interface standard, offering up to double the bandwidth of an AGP 8-speed slot for even faster and more complex graphics. Both ATI and Nvidia offer PCI Express versions of most of their cards. Nvidia also has its SLI (Scalable Link Interface) technology that lets you use two PCI Express graphics cards in SLI-enabled motherboards for ultimate performance. ATI's rival technology Crossfire is an alternative.

Look for support for both analogue (VGA) and digital (DVI) displays, and S-video and composite video outputs for use with TVs. Some 'all-in-one' cards have a built-in TV tuner and video-capture options, so you can save money rather than buying separate cards.

NOTEBOOKS

1

Hi-Grade D6000_1602
£997.58 ★★★★☆
Reviewed December 2006
www.higrade.com
Intel's Core 2 Duo processor powers this portable and great-value media center notebook.

2

Dell Latitude D420
£1,350 ★★★★☆
Reviewed December 2006
www.dell.co.uk
A good business notebook, complete with an HSDPA high-speed internet module.

3

Evesham Voyager C720DC
£1,499 ★★★★☆
Reviewed November 06
www.evesham.com
A super-fast notebook with Intel's new mobile Core 2 Duo processor.

4

Evesham Quest Nemesis
£1,599 ★★★★☆
Reviewed September 06
www.evesham.co.uk
A great notebook for 3D gaming, but battery life isn't exceptional.

5

Acer Aspire 5652
£1,149 ★★★★☆
Reviewed November 06
www.acer.co.uk
A fast notebook with high-speed mobile internet.

HOW TO BUY

Notebooks have caught on like wildfire with consumers thanks to plummeting prices and massive marketing campaigns. However, there are so many options that it's easy to get confused.

Decide what you want your notebook for. If it's for occasional use, running some office applications, accessing the internet and email, then almost any low-cost notebook will do the job. If it's for gaming or running video-editing software, you will be looking for a notebook with a large 15in/17in screen – possibly widescreen – a high-end Nvidia or ATI graphics chip, 1GB of memory and an 80GB (or bigger) hard disk.

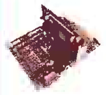
In the low-cost arena, Intel has its Mobile Celeron chip and AMD has Sempron. In the mid-range/high-end space, there are Intel's Mobile Pentium 4 or Pentium 4 chips, while AMD offers Mobile Athlon 64 and Athlon 64. Expect to find these in desktop replacement systems and those used by gamers.

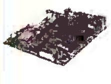
For the best in performance with power-saving technology, go for Intel's Core Duo or AMD's Turion 64 processors.

Any notebook you get should have in-built Bluetooth and Wifi connectivity, a 30-40GB hard disk drive, 512MB of Ram, 14-15in screen, USB2 or Firewire ports, DVD/CD-RW combo drive and three to four hours' battery life.

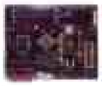
MOTHERBOARDS

SUB £100

1 
ECS PF88
£64.63 ★★★★☆
Reviewed August 05
www.ecs.com.tw
The PF88 is feature-packed and compatible with both Intel and AMD processors.

2 
Aopen i915GMm-HFS
£79 ★★★★☆
Reviewed July 05
www.aopen.com
The HFS makes the ideal platform for building a quiet, power-efficient Intel PC.

3
Asus A8N-SLI Deluxe
£98 ★★★★☆
Reviewed April 05
www.asus.com
A good, all-round AMD SLI board, packed with plenty of features.

4 
ECS 915-A
£61.81 ★★★★☆
Reviewed June 05
www.ecs.com.tw
All the features you'd expect from a modern Intel-based motherboard and outstanding value for money.

5
Asus K8N-E Deluxe
£59 ★★★★☆
Reviewed November 04
www.asus.com
A tidy AMD board with lots of room around the major components and a wide range of features.

6
Epox 8HDA3+
£79.92 ★★★☆☆
Reviewed July 04
www.epox.com
An AMD board that stands out from the crowd thanks to its dual Lan and external Sata support.

7
MSI 945P Platinum
£99 ★★★☆☆
Reviewed November 05
www.msi.com.tw
An Intel board that features DTS Connect, so you can output true DTS surround-sound audio.

£100+

1
Gigabyte GA-965P-DQ6
£164.44 ★★★★☆
Reviewed October 06
www.giga-byte.com
A decent Core 2 Duo motherboard that's loaded with overclocking features.

2
Asus M2N32-SLI Deluxe Wireless Edition
£136.59 ★★★★☆
Reviewed www.pcw.co.uk/2156925
www.asus.com.tw
This is one of the new motherboards to support the AMD AM2 socket.

3
ECS PF22 Extreme
£123 ★★★★☆
Reviewed February 06
www.ecs.com.tw
A good range of features including dual graphics support courtesy of ATI's Crossfire technology.

HOW TO BUY

The motherboard dictates the type of processor you can use, how well the components communicate, the features on offer and future upgrade potential. About £70-£100 gets you the latest technologies.

We recommend an Intel P4 or Athlon 64 for a good all-round system. The Athlon 64 can address one terabyte of Ram (1,000GB).

The new generation of processors change the way data is transferred. Athlon 64s integrate the memory controller into the CPU die.

Divided into northbridge and southbridge, the chipset handles the communication between all the components and dictates the features on offer.

Today's motherboards mainly use DDR or DDR2 Ram.

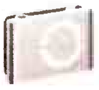
Fit dual in-line memory modules (Dimms) in pairs if the chipset supports dual-channel operation.

The latest boards support both older IDE and new, faster serial ATA (Sata) hard disks. Check the number of connectors available for both.

Some chipsets provide Raid support so data can be spread across two drives. SCSI controllers are found on more expensive boards, or can be added with expansion cards.

Also important is the number of USB2 and Firewire sockets for external add-ons. Look out, too, for onboard Ethernet networking, a built-in 56K modem and onboard sound.

DIGITAL MUSIC PLAYERS

1 
Apple iPod Shuffle
£55 ★★★★★
Reviewed December 2006
www.apple.com/uk
The mini-marvel from Apple gets even smaller.

2
Sandisk Sansa e260
£149 ★★★★★
Reviewed September 06
www.sandisk.co.uk
User-friendly and feature-rich, this mp3 player is capable of being a Nano-killer.

3
Netac A200
£69.99 ★★★★★
Reviewed www.pcw.co.uk/2162508
www.netac.co.uk
Broadcast your tunes directly to an FM radio with this compact portable media player.

4
Apple Ipod
£219 ★★★★★
Reviewed January 06
www.apple.com/uk
All the usual Ipod features but now with the ability to play video.

5
Creative Zen Nano Plus
£99 ★★★★★
Reviewed December 05
http://europe.creative.com
1GB flash player that houses a radio, voice recorder and mp3 encoding from a line-in source.

HOW TO BUY

There are two main categories of mp3 players: Flash memory-based players, which range in size from 256MB to 1GB; and mini hard drive-based models, which run from 4GB to 60GB. Prices for a 256MB player start as low as £20 rising to around £300 for a 60GB player. In terms of songs, the difference is the ability to hold 40 on one and 15,000 on the other.

If you need a portable record store, then go for a 4GB-6GB player – up to the range of 20GB, 40GB and 60GB models. Ensure whatever you buy supports playback in different formats. The ability to listen to FM radio and record voice is also a bonus. Most importantly, check out the battery life.

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Black Midi Tower
Case W/O PSU
Mft Code: SLK3000B
YOYO Code: 4409
£36.22 INC VAT

Centurion 534
ATX Mid Case
Mft Code: RC-534-SKN1-GP
YOYO Code: 4707
£37.07 INC VAT

Nvidia Socket AM2
ATX Motherboard
Mft Code: KN9S
YOYO Code: 5147
£59.06 INC VAT

Socket 775 PCI-E
SATA Motherboard
Mft Code: IL8
YOYO Code: 4471
£59.72 INC VAT

USB2.0 + 80X 1GB OCZSDDU80-1GB
SD Dual Digital Card
£24.97 INC VAT
YoYo Code: 4845

250GB SATA 2
7200RPM HDD
Mft Code: HDT722525DLA
YOYO Code: 2311
£52.71 INC VAT

160GB SATA 2 8MB
7200RPM HDD
Mft Code: ST3160812AS
YOYO Code: 4074
£42.58 INC VAT

Core 2 Duo E6300
Socket 775 CPU
Mft Code: BX805576300
YOYO Code: 8031
£131.45 INC VAT

AM2 Athlon 64
3800 Orleans CPU
Mft Code: ADA3800CNBOX
YOYO Code: 4477
£77.44 INC VAT

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Thr-Sat: 9.30am-7.00pm
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7300GT Silent DVI PCI-E Graphics Card
Mft Code: EN7300GT SILENT/HTD/256
YOYO Code: 8067
£61.94 INC VAT

Radeon X1600 AGP DVI Graphics Card
Mft Code: 11076-02-20
YOYO Code: 4772
£90.80 INC VAT

VS 1GB PC2-4200 DDR2 533 Memory
Mft Code: VS1GB533D2
YOYO Code: 9410
£75.91 INC VAT

512MB DDR2 667 (PC5400) Memory
Mft Code: OCZ2667512V
YOYO Code: 5299
£40.84 INC VAT

V L System M-PLAY Mini VFD Display+Remote
£14.39 INC VAT
YoYo Code: 4167

550W P4 Super Silent Power supply
Mft Code: n4ce550W
YOYO Code: 9841
£16.10 INC VAT

520W Powersupply with 120mm Fan
Mft Code: OCZ520120
YOYO Code: 4359
£53.91 INC VAT

Aero Flower Cooper Cooler
Mft Code: CNPS9500 LEO
YOYO Code: 2251
£32.05 INC VAT

Freezer 64 Pro CPU Cooler
Mft Code: Freezer 64 Pro
YOYO Code: 4039
£11.82 INC VAT

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HARD DRIVES

INTERNAL

1 **Seagate Barracuda ST3750640AS**
£352.44 ★★★★☆
Reviewed August 06
www.seagate.com

An internal hard drive that provides you with a whopping 750GB capacity.

2 **Western Digital Raptor X**
£243.17 ★★★★☆
Reviewed June 06
www.wdc.com

Two 75GB platters combine to create one of the fastest non-SCSI hard drives.

3 **Seagate Barracuda 7200.8 (ST3400832A) 400GB**
£186.96 ★★★★☆
Reviewed July 05
www.seagate.com

This massive 400GB drive offers impressive capacity and an 8ms seek time.

4 **Hitachi Deskstar 7K250 (250GB Sata150)**
£88 ★★★★★
Reviewed May 04
www.hitachi.co.uk

Those needing a large Sata150 drive will find this a great bargain.

5 **Samsung Spinpoint P120S**
£80.11 ★★★★☆
Reviewed February 06
www.samsung.co.uk

This isn't the fastest drive on the market, but it is extremely cool and quiet.

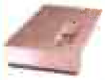
EXTERNAL

1 **Maxtor Onetouch II Firewire 800 300GB**
£179 ★★★★★
Reviewed November 05
www.maxtor.com

A good-quality 300GB USB and Firewire hard drive that comes with backup software.

2 **Western Digital My Book Essential Edition**
£149 ★★★★☆
Reviewed June 06
www.wdc.com

This is a stylish external hard disk drive, but it lacks a network option.

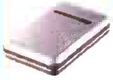


3 **Lacie Safe Mobile Hard Drive 80GB**
£149 ★★★☆☆
Reviewed December 05
www.lacie.co.uk

Featuring a fingerprint reader for security, this 80GB external hard drive would suit business users.

4 **Buffalo Linkstation 120GB**
£240 ★★★★☆
Reviewed October 04
www.buffalotech.com

If you want easy-to-use external network storage, this is a great choice.



5 **Buffalo Ministation HD-PHS40U2/UC**
£70 ★★★☆☆
Reviewed April 06
www.buffalo-technology.com

This 40GB portable hard drive includes shock protection to minimise the risk of data loss.

HOW TO BUY

If you're building a high-performance system, buy the fastest drive you can afford; if you just want lots of capacity then slower drives offer better value.

The transfer rates in today's Ultra ATA drives are 100Mbytes/sec (133Mbytes/sec for Maxtor drives), while serial ATA (Sata) drives are rated at 150Mbytes/sec. Check the seek times, spindle speed, buffer size and the areal density of the platters (disks).

The larger the buffer (cache), the more recently written or stored data is held in the drive's memory, resulting in less time seeking the data on the disk.

Areal density is the amount of data stored on a given area of a drive's platter. The more data per square centimetre (gigabytes per platter), the less disk movement is required to bring it under the heads.

Faster Sata drives are more expensive than parallel ATA. Sata uses two pairs of high-frequency cables, working at low voltage.

SCSI drives are technically no different to ATA drives, but support up to 16 devices on a single channel and you can have multiple channels in a PC.

Most motherboards support Raid (Redundant Array of Independent Disks), which connects multiple drives, to improve performance or provide fault tolerance.

DVD DRIVES

1 **NEC ND-4551A**
£35 ★★★★★
Reviewed May 06
www.nec.co.uk

An excellent DVD drive supporting every format and Labelflash technology.

2 **Pioneer DVR-110 Supermulti**
£40 ★★★★★
Reviewed March 06
www.pioneer.co.uk

Supports all major formats, including DVD-Ram. Good value for money.

3 **Toshiba SD-R6472**
£83.42 ★★★★☆
Reviewed September 05
www.span.com

A slimline dual-layer DVD writer that performs well and is perfect for small form factor PCs.

4 **Philips DVDR16LSK**
£59.99 ★★★★☆
Reviewed October 05
www.philips.co.uk

An excellent Lightscribe-capable dual-layer DVD burner that's very keenly priced.

5 **LG 12X Super Multi DVD**
£116.99 ★★★★☆
Reviewed January 05
www.lge.co.uk

Good-value external USB2/Firewire rewriter with all-format media support.

HOW TO BUY

DVD burners can be divided into internal and external drives. Internal drives are cheaper, but require a level of knowledge so you can install them yourself. External drives can be hooked up simply via USB2 or Firewire.

Make sure your drive supports DVD+R, DVD+RW, DVD-R and DVD-RW discs. Newer double and dual-layer drives can write to new discs which can store 8.5GB. This is useful for backing up your DVD movie collection.

The dual-layer drives cost little more than single-layer drives, so are a good investment. The same cannot be said for the cost of dual-layer discs. A branded, dual-layer 8.5GB disc will cost around £3.75.

PRINTERS

PHOTO PRINTERS

1

Epson Picturemate 100
£100 ★★★★★
Reviewed January 06
www.epson.co.uk

This is a high-quality photo printer that is both cheap and easy to use.

2

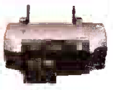
Canon Pixma IP5000
£129 ★★★★★
Reviewed June 05
www.canon.co.uk

If it's pixel-perfect printing you're after, look no further than the IP5000 – a real bargain.

3

HP Photosmart 8450
£170 ★★★★★
Reviewed April 05
www.hp.com/uk

HP's Photosmart 8450 is a bulky printer, but it's capable of producing stunning photo prints.

4 

Epson Stylus Photo R340
£149 ★★★★☆
Reviewed February 06
www.epson.co.uk

Excellent-quality prints and the ability to function without a PC.

MULTIFUNCTION DEVICES

1

Canon Pixma MP800R
£329 ★★★★★
Reviewed July 06
www.canon.co.uk

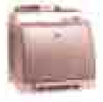
A capable MFD with built-in wireless networking that's easy to set up and use.

2

Dell Photo All In One 944
£121 ★★★☆☆
Reviewed April 06
www.dell.co.uk

A bulky, but good-quality MFD that would suit both home and small office use.

LASER PRINTERS

1 

HP Color Laserjet 2605dn
£299 ★★★★★
Reviewed September 06
www.hp.com/uk

An affordable colour laser that would benefit any small business.

2

Lexmark C500n
£239 ★★★★☆
Reviewed September 06
www.lexmark.co.uk

A good budget colour laser, but it comes with low starter cartridges.

3

Brother MFC-8860DN
£527.58 ★★★★☆
Reviewed November 06
www.brother.co.uk

Fax, copy, print and colour scanning combined in a laser multifunction device.

4

OKI C3300n
£374 ★★★☆☆
Reviewed www.pcw.co.uk/2162830
www.oki.co.uk

A fast alternative to a laser printer for small workgroups and home users.

HOW TO BUY

If you don't need colour, consider a monchrome laser or LED printer. The latter tend to be cheaper.

If you print hundreds of pages a week, a laser is cheaper and more reliable for high-volume printing. If you print a few pages a month, buy a cheap colour inkjet.

Look for the manufacturer's quoted 'duty cycle' – how many pages a month the machine can handle.

Quoted printer speeds often refer to the speed the printer pushes a blank sheet of paper through the mechanism; for documents they refer to lower quality settings. PCW's tests use real documents and photos, giving a better idea of print speed.

For serious inkjet photo printing, consider higher-end models that use six, seven or eight colour cartridges.

Some 'convertible printers' use four separate black cartridges for longer-life mono printing and you can replace three of them with cyan, magenta and yellow cartridges for colour printing.

Laser models often have a large number of paper-handling options. They're usually modular so you can add features as required.

The quality and usability of the driver software is vital. Check PCW's reviews and online forums (**www.pcw.co.uk/forums**) and read the manufacturer's technical support site for any known problems.

TV TUNERS

1

Terratec Cinergy Hybrid T USB XS
£89 ★★★★☆
Reviewed June 06
http://en.terratec.net

A dual-format USB TV tuner complete with remote control and portable aerial.

2

Nebula DigiTV
£99.95 ★★★★★
Reviewed August 05
www.nebula-electronics.com

This external USB2 tuner has a built-in web server to let you share TV over your network.

3

Twinhan Magic Box
£69.99 ★★★★☆
Reviewed August 05
www.twinhan.com

A stylish external USB2 tuner with good software and an attractive price.

4

Terratec Cinergy 400 TV
£89.99 ★★★★☆
Reviewed March 05
http://en.terratec.net

A PC Card-based analogue tuner with good software, it's a great buy for laptop users.

5

Kworld Dual TV Tuner DVB-T 220
£49.99 ★★★☆☆
Reviewed October 06
www.kworld.com.tw

This device provides one analogue and one digital tuner at a decent price.

HOW TO BUY

Internal TV tuners require a PCI slot. External options connect via USB and are easier to set up. Hi-speed USB2 is often needed and devices typically require Windows ME, 2000 or XP.

A Freeview digital tuner offers the best channel choice, picture and sound, but may need an outdoor aerial (check **www.freeview.co.uk**).

Digital tuners record to disk for maximum quality; analogue signals need to be digitally encoded – look for mpeg2 hardware for real-time video and audio encoding.

Most analogue systems let you capture video from a VCR or camcorder. Look for composite or S-video connectors and stereo phono inputs.

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Pundit P1-PH1 Intel Socket 775 Barebone
ASUS
Mft Code: P1-PH1
YOYO Code: 4098
£106.23 INC VAT

AM2 NVIDIA PCI-E SATA Barebone
Shuttle
Mft Code: mPC 51PV
YOYO Code: 80111
£180.25 INC VAT

19" TFT 2ms Monitor
ViewSonic
Mft Code: VX922
YOYO Code: 2223
£222.83 INC VAT

19" DVI 8MS TFT Monitor
MIRAI
Mft Code: DML-519W100
YOYO Code: 4723
£140.81 INC VAT

Photosmart 7450 Q3409A Colour Printer
£42.56 INC VAT
YoYo Code: 80316

54Mbps Wireless ADSL Modem Router
NETGEAR
Mft Code: DG834G
YOYO Code: 437
£62.33 INC VAT

54Mbps Wireless Adsl Router+PCMCIA Wireless Card
LINKSYS
Mft Code: WGKPC354G
YOYO Code: 80209
£52.39 INC VAT

SB X-Fi Xtreme Music Soundcard
CREATIVE
Mft Code: 70SB04600201
YOYO Code: 2066
£86.16 INC VAT

5.1 X530 Speakers
Logitech
Mft Code: 970114-0120
YOYO Code: 9485
£47.55 INC VAT

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MONITORS

20IN

1

Sony MFM-HT205
£649 ★★★★☆
Reviewed June 06
www.sony.co.uk
An elegant widescreen multimedia monitor with superb image quality and a built-in TV tuner.

2

Belinea 10 20 30W
£319.99 ★★★☆☆
Reviewed July 06
www.belinea.co.uk
A high-quality MVA panel with great specifications, but lacks a DVI port.

19IN

1

Hanns.G HW191
£150 ★★★★☆
Reviewed November 06
www.hannsg.com
A superb value-for-money monitor.

2

Iiyama Prolite E1900WS-B1
£175 ★★★½☆
Reviewed October 06
www.iiyama.co.uk
A budget monitor with decent brightness, contrast and response times.

17IN+

1

LG Flatron L1732P
£239 ★★★★☆
Reviewed February 06
www.lge.co.uk
Fast response times make this 17in panel a good choice for gamers.

HOW TO BUY

Monitor resolution is the number of picture elements (pixels) displayed on a screen. In any TFT or LCD monitor, each pixel is composed of three sub-pixels coloured red, green and blue. The number of pixels equals the 'native' resolution; a 1,024x768 TFT will have exactly that number of pixels horizontally and vertically. Users wanting 1,600x1,200 will probably need an expensive 20in model – most 19in panels are currently limited to 1,280x1,024.

Modern TFTs can be viewed from a wide range of angles vertically and horizontally, but anything over +/- 45° makes no difference in normal use. Response time is the time taken for a pixel to reach maximum brightness. Some newer monitors now have response times as low as 4ms, but 12-25ms is typical.

The ISO 13406-2 standard specifies minimum requirements for display contrast, viewing angle, brightness, reflections, flicker, contrast and defective pixels. ISO 13406-2 has stringent standards for defective pixels. Only Class I TFTs are guaranteed no defective pixels – most consumer models are Class II. Some manufacturers offer dead pixel guarantees with Class II TFTs – check the policy before you buy.

DIGITAL CAMERAS

DIGI SLR

1

Canon Eos 400D
£649 (body only) ★★★★☆
Reviewed December 2006
www.canon.co.uk
A quality digital SLR complete with a 10megapixel sensor and dust removal system.

PROSUMER

1

Fujifilm Finepix S9500 Zoom
£469.99 ★★★★☆
Reviewed February 06
www.fujifilm.co.uk
A serious contender to entry-level digital SLRs with a 10x zoom and 9megapixel CCD.

COMPACT

1

Nikon Coolpix S6
£349 ★★★★☆
Reviewed www.pcw.co.uk/2157327
www.nikon.co.uk
A decent compact camera with Wifi and a host of useful features.

2

Fujifilm Finepix Z3
£249.99 ★★★★☆
Reviewed December 2006
www.fujifilm.co.uk
A stylish digital compact, with excellent build quality.

3

Samsung NV10
£279 ★★★★☆
Reviewed December 2006
www.samsung.co.uk
A novel digital camera with some unusual features.

HOW TO BUY

In general, the higher the megapixel count of a digital camera's sensor – and the bigger the sensor's physical size – the more detailed the images. A small sensor and high megapixel count won't always produce better image quality. Four to five megapixels is good for 8x10in or larger prints. The quoted 'effective' pixels number is the camera's true megapixel resolution.

Forget digital zoom and concentrate on the optical zoom, which zooms in on the subject and produces a better-quality image. Digital zooms simply crop into the centre of the picture. Look at the selection of automatic or preset picture modes for standard shots, portraits, night shots and landscapes, plus macro modes for close-up photography.

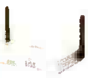
Movie modes are not as good as a basic camcorder, but are fine for short movie clips to play on your PC. Most offer 15fps (frames per second), but some are 30fps, which means the video will be smoother. Experienced photographers will want manual controls for aperture and shutter priority, white balance and focusing. Good cameras should also provide quick and easy access to image quality, resolution and format settings.

ROUTERS

WIRELESS/MODEM

1

Netgear 108 ADSL router
£159 ★★★★☆
Reviewed April 05
www.netgear.co.uk
If you need a Super-G router with built-in ADSL modem, this offering from Netgear is great value.

2

Ozenda 11g ADSL Router
£70 ★★★★★
Reviewed November 04
www.ozenda.com
Ozenda has come up trumps – wireless ADSL doesn't get any easier than this.

WIRELESS

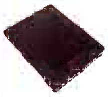
1

Linksys WAG54G (wireless)
£76 ★★★★★
Reviewed August 05
www.linksys.com
This 802.11g wireless model offers advanced features for home and professional users.

2

D-Link DSL-G624M
£110 ★★★★☆
Reviewed March 06
www.d-link.co.uk
Combines Mimo technology with Super G to give faster speeds and extended coverage.

VOIP

1

Intertex IX66+ ADSL Airsip GW (wireless VoIP)
£269.08 ★★★★★
Reviewed March 05
www.intertex.se
For a small business needing multi-user VoIP telephony, the Intertex IX66+ is hard to beat.

HOW TO BUY

The router is at the heart of any home network. Costing less than £100, they are an inexpensive way to exploit the advantages of being able to share information between the computing devices in your home. A router is a simple networking device to which you connect your PCs and notebooks using a network cable. They often include built-in firewalls and other security measures, making them ideal for protecting your PCs from intruders. The router connects to your broadband modem, as long as your modem uses an RJ45 Ethernet connection – most routers don't support USB modems. Special broadband routers, also called ADSL gateways, come with built-in ADSL modems. If your broadband is provided via a cable company's set-top box, you should buy a standard router without a built-in modem. Once hooked up, your devices can share broadband as well as swap data. Wireless (Wifi) routers are increasingly popular in the home market, allowing devices to remotely connect to the internet and each other without the need for cables – but wireless routers usually have network (Ethernet) ports to let you connect non-wireless devices.

PRODUCT INDEX

Below is a list of every product reviewed by PCW over the past three months, to help you find the full reviews quickly and easily in your back issues.

Key: ★ Editor's Choice ★ Recommended ★ Great Value All scores are out of five

	COMPANY	PRODUCT	ISSUE	SCORE
★	3D Fuzion	Geforce 7600GS (graphics card)	Nov 06	4
	Aastra	9112i (IP telephone)	Sept 06	2
	ACDSee	8 Photo Manager	Oct 06	4
	Acer	Acer Aspire 5652 (notebook)	Nov 06	4
	Acer	Aspire AS9802 (notebook)	Sept 06	3
★	Actinic	Actinic Business 8	Nov 06	4
★	Adobe	Photoshop Elements 4.0	Oct 06	5
★	AIS	AIS DVB Viewer Pro 3.5.0	Nov 06	5
	AJP	D900K (notebook)	Sept 06	3
	Akasa	AK-HC-01-WH	Oct 06	4
	ALK	ALK Copilot Live 6 (navigation)	Nov 06	4
	Ambros	Shuttle SD36G5 PC System	Oct 06	4
★	Apple	Nike + iPod Sport Kit	Nov 06	4
★	Ascaron	Darkstar One (game)	Nov 06	4
	ATL	IP300S (IP telephone)	Sept 06	2
★	Brother	Brother MFC-8860DN	Nov 06	4
★	Buffalo Technology	Buffalo Linkstation Pro	Nov 06	4
★	Business Objects	Crystal Xcelsius	Sept 06	5
★	Business Solve	Hotdesk Manager	Sept 06	
	Check Point	Check Point VPN-1 UTM Edge	Nov 06	3
★	Chillblast	Fusion Hardcore Crossfire	Oct 06	5
	Chillblast	Hardcore 6600 PC	Nov 06	3
	Colour Confidence	Colorvision Printfix Pro	Oct 06	4
	Corel	Photo Album 6	Oct 06	4
	Cube	Pegasus ST6 (desktop PC)	Oct 06	4
	Dell	3007WFP (HDCP monitor)	Nov 06	4
	Dell	XPS M2010 (notebook)	Nov 06	4
	Diskeeper	10 Professional Premier Edition	Oct 06	4
★	Eidos	Hitman Blood Money	Sept 06	4
	Elmeg	290 (IP telephone)	Sept 06	3
	EMC	Retrospect 7.5 (backup)	Oct 06	4
★	Enermax	Enermax Aurora (peripheral)	Nov 06	5
	Enermax	Vanguard (removable storage)	Oct 06	4
	Enermax	Warp PC case fans (component)	Oct 06	3
★	Evesham	Quest Nemesis (computer)	Sept 06	4
★	Evesham	Solar Plus (Conroe PC)	Nov 06	4
★	Evesham	Visto (desktop PC)	Oct 06	5
★	Evesham	Voyager C720DC (notebook)	Nov 06	4
	Extrasys	Hosted Desktop (applications)	Oct 06	3
	Firefly Studios	Civcity Rome (game)	Nov 06	3
★	Flock	Flock (web browser)	Oct 06	4
	Focus HI	Call of Juarez (game)	Nov 06	3
★	FSP	FSP Booster X3 (component)	Nov 06	4
★	Fujifilm	Finepix F30 (digital camera)	Nov 06	4
★	Fujitsu-Siemens	Scenicview P24-1W (TFT)	Sept 06	4
	Funcom	Dreamfall: The Longest Journey	Sept 06	3
	Gendan	Engine Check 1.4	Sept 06	4
	Gigabyte	GA-965P-DQ6 (motherboard)	Oct 06	4
★	Google	Picasa 2 (photo software)	Oct 06	4
★	Grandstream	Budgetone 101 (IP telephone)	Sept 06	4
	Gordano	Messaging Suite v12 (email)	Oct 06	3
	Grandstream	GXP-2000 (IP telephone)	Sept 06	4
	Grandstream	GXV-3000 (IP video phone)	Sept 06	3
★	Hanns.G	HW191 (TFT monitor)	Nov 06	4
	Hannspree	Hannsvaas (TFT monitor)	Oct 06	3
★	HP	Color Laserjet 2605dn (printer)	Sept 06	5
	HP	Compaq nx9420 (notebook)	Sept 06	4
	HP	Pavilion Media Centre TV m7475	Oct 06	4
★	Hi-Grade	Ultinote D6000 (notebook)	Sept 06	4
	Iiyama	Prolite E1900WS-B1 (monitor)	Oct 06	4
	IPdialog	Siptone III (IP telephone)	Sept 06	3
	Ipswitch	WS_FTP Professional 2007	Nov 06	4
	JDPSoft	Digital Vault (encryption)	Sept 06	3
	Kiss	DP-600 (media player)	Sept 06	3
	KWorld	Dual TV Tuner DVB-T 220 (tuner)	Oct 06	3
	Lexmark	C500n (colour laser printer)	Sept 06	4
	Lexmark	X3480 (multifunction device)	Oct 06	3
	Magnetictime	Magnetictime (utility)	Oct 06	3
★	Matrox	Triple Head 2Go (adapter)	Oct 06	4
	Maxfield	G-Flash Metal (media player)	Oct 06	2
★	Mediaman	Multimedia Player HVX-3500	Oct 06	4
	Mesh	Elite E6600 PCW (Conroe PC)	Nov 06	3
	Mesh	Matrix2 AM2 5000 PCW (PC)	Oct 06	4
	Mesh	Matrix Quad FX (PC)	Nov 06	4
	Microsoft	Digital Image Suite 2006	Oct 06	3
	Midway	Rise and Fall: Civ. at War	Oct 06	2
	Minispeakers	K8000 (speakers)	Oct 06	4
	Mio	C210 (satellite navigation)	Oct 06	2
	Mio	C710 (satellite navigation)	Nov 06	5
	MSI	NX7950GX2 (quad-SLI graphics)	Sept 06	4
	NEC	TCM160 (notebook computer)	Oct 06	3
	Nero	Photoshow Deluxe 4	Sept 06	3
★	Netgear	Powerline XE104 (switch)	Nov 06	4
	Nortel	BCM 50 (telephony)	Sept 06	4
	Novell	Novell Suse Linux Enterprise 10	Nov 06	4
	Nuance	Dragon Naturally Speaking 9	Nov 06	4
★	Optoma	EP747 (projector)	Sept 06	4
★	Opera	Opera 9 (web browser)	Oct 06	4
	Panasonic	Panasonic Toughbook CF-74	Nov 06	3
	PC Nextday	Zoostorm 5-7402 Edge PC	Nov 06	4
★	PC Nextday	Zoostorm 5-7502 Advanced PC	Oct 06	5
	PC Nextday	Zoostorm 7-7401 (desktop PC)	Sept 06	4
	Pillar Solutions	Winternals Recovery Mgr. 3.0	Oct 06	4
	Pinnacle	Mobile Media Converter	Nov 06	3
	Pentax	Optio T10 (digital camera)	Sept 06	4
	Pioneer	BDR-101A (removable storage)	Sept 06	4
	Polycom	Communicator C100S	Sept 06	3
	Port Designs	Coolfan	Sept 06	3
★	Rock	Xtreme CTX T2500 (notebook)	Sept 06	5
	Ridings	Ridings Slimplug (accessory)	Nov 06	3
	Samsung	SM205BW (HDCP monitor)	Nov 06	4
★	Samsung	SM215TW (HDCP monitor)	Nov 06	5
★	Samsung	Syncmaster 940BW (TFT)	Sept 06	4
	Samsung	Syncmaster 940NW (TFT)	Oct 06	4
	Samsung	YP-U2 Music Player	Sept 06	3
★	Sandisk	Sansa e260 (media player)	Sept 06	5
★	Sanyo	Xacti VPC-C6E (camcorder)	Oct 06	4
	Sanyo	Xacti VPC-HD1E (camcorder)	Sept 06	4
	Sapphire	Radeon X1600 XT Ultimate	Sept 06	4
	Scan	3XS C2D-OC (Conroe PC)	Nov 06	5
	Seiko Instruments	Smart Label Printer 450	Sept 06	4
	Serif	Album Plus 4 (photo software)	Oct 06	3
	Sharp	XV-Z3000 (projector)	Nov 06	4
	Shuttle	Mini X 100HA (small PC)	Nov 06	2
	Sky	Sky+ Remote Control	Oct 06	4
	Smart PC Solutions	PC Professional (utility)	Nov 06	2
	Smoothwall	Corporate Guardian 5	Nov 06	3
	Sonic Gear	i-Steroid (speakers)	Oct 06	4
	Sony	Location Free (TV streaming)	Sept 06	3
	Sony	MFM-HT205 (HDCP monitor)	Nov 06	5
	Sony	PCS-TL30 (video-conferencing)	Nov 06	3
	Sony	Vaio TX3HP (notebook)	Oct 06	4
	Sony	Vaio VGN-AR11M (notebook)	Sept 06	3
★	Storcase	Data Express for Backup	Oct 06	5
	Storvision	MiniVCR SV-1000	Sept 06	4
★	THQ	Titan Quest (game)	Oct 06	4
	Tiscali	Netphone (VoIP service)	Sept 06	3
	Tom Tom	Go 510 (satellite navigation)	Oct 06	4
	Ubisoft	Pirates of the Caribbean: Legend of Jack Sparrow (game)	Oct 06	3
	Ubuntu	6.06 LTS (Linux distribution)	Oct 06	4
★	Valve	Half-Life 2: Episode One	Sept 06	4
	Viewsonic	VG2021m (TFT monitor)	Nov 06	4
	Viewsonic	VP2330wb (HDCP monitor)	Nov 06	4
	Viewsonic	VP2330wb (TFT monitor)	Sept 06	4
★	Wired2Fire	Pyro 64 FX (desktop computer)	Oct 06	4
★	Zybert Computing	Z1 Gem (network server)	Sept 06	5

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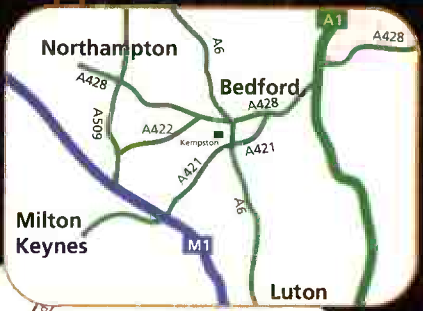

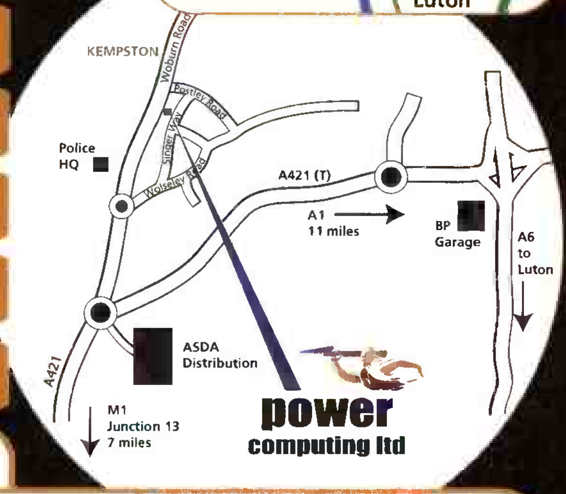

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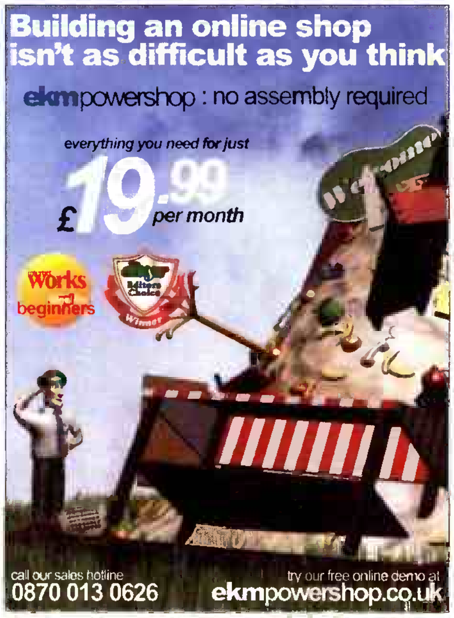
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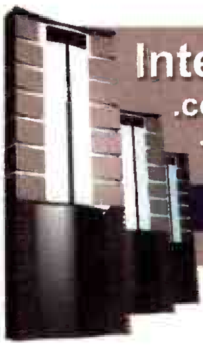

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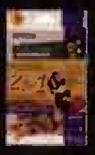

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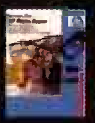

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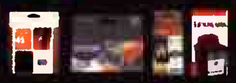

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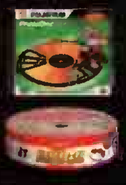

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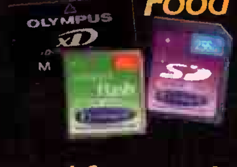

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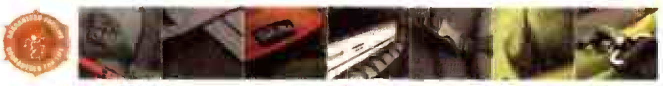

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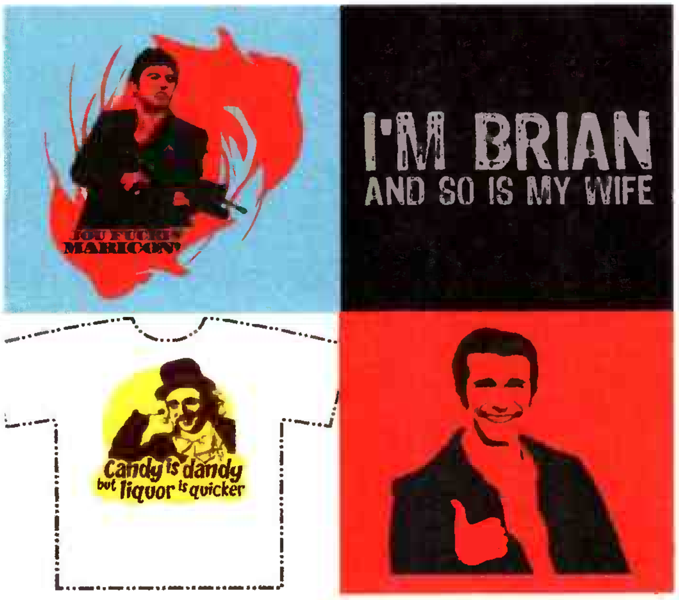
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Device compatibility

Blackberry, Nokia N series and 6600 models, Fujitsu Siemens LOOX 420, LOOX 720, T- Mobile MDA compact, MDA II, MDA III, Vodafone VPA II, VPA III, VPA compact, O2 Xda II, Xda III, Qtek 2020, HP iPAQ hx2110, iPAQ hx2410, iPAQ rx3715, iPAQ hx2750, iPAQ hx4700, iPAQ hx5150, iPAQ hx6340, Acer n30, Acer n50, Dell Axim X50, X30, Palm Zire 72 - silver, Tungsten T2, Tungsten T3, Tungsten T5, Treo 650, LifeDrive.
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Operating System

Palm OS 5.2.1, 5.2.8, 5.4.5, Windows Mobile 2003 4.20.1081 (Build 13100), 4.20.0 (Build 14053), 4.21.1088 (Build 14235.2.0.0), Windows Mobile 2003 SE 4.21.1088 (Build 14132), Windows 2000/XP, Symbian and RIM

All you need to know about this month's software

DECEMBER 2006

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BitDefender Internet Security 10
Paragon Partition Manager 8
Norton AntiVirus 2007
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MAME 0.108
Cascade DTP 4.0.023
FlashGot 0.5.96.060
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MozBackup 1.4.5
SmartFTP 2.0.997
Jetico Personal Firewall

SHAREWARE INCLUDING

AudioConvertor Studio 5.1
PFrank 1.73
RAM Idle 1.5

HTMLPad 2006 7.2.0.68
Rapid PHP 7.2.0.68
Registry First Aid 5.0.2
CuteFTP Home 8.02
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NetBSD 3.1 RC3
Gentoo Linux 2006.1
Slax 5.1.8

RESOURCES

Over 100 programs on offer to try out

USING THE COVER DISC

The PCW cover disc uses a web-browser-style interface. To get full functionality, you'll need to use Microsoft Internet Explorer (version 5.5 or later). Unfortunately, Netscape doesn't properly support this software. However, we have also provided links to the featured programs so you can still copy them to your hard disk or install them manually (the standard download dialogue box will appear). 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 open the terms.htm file 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 December 2006, cover disc ABT, First floor, 13 Clifftown Road, Southend-on-Sea, Essex, SS1 1AB quoting reference: 'PCW Vol 30 No 12'.

PROBLEMS INSTALLING/ RUNNING THE SOFTWARE

Check the support page on the disc or check the manufacturer's site.

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Call 08700 885 995 (9.30am to 5pm Mon, Tues, Thurs & Fri; open until 8pm on Wed and 10am to 2pm Sat). Or go to www.vnusupport.co.uk or email us at pcw@vnusupport.co.uk.

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SIX PAGES OF DISC INFO INCLUDING

- PRODUCT DESCRIPTIONS
- WORKSHOPS
- UPGRADE OFFERS
- KEY FEATURES
- CONTACT DETAILS
- NEED TO KNOW

FULL VERSION
2005
McAfee
spamkiller
McAfee

McAfee Spamkiller 2005

De-clutter your inbox with this powerful junk mail filter

Are you drowning in a deluge of junk email? Spam, scams, viruses and other unsolicited nuisances comprise up to 92 per cent of emails, so protecting your inbox is essential. McAfee Spamkiller is an ideal tool for the job.

The first plus point you'll notice with Spamkiller is that it doesn't interfere with your email client. There are no extra buttons or toolbars in Outlook or Outlook Express (or any other email client, and it works with most, as well as Hotmail), perhaps slowing down the program or making it unstable. You just collect messages exactly as you did before, no change at all, while Spamkiller sits in the background filtering out the junk.

The spam-blocking process here goes beyond the usual statistical Bayesian techniques. Spamkiller includes some of these, but also blocks the specific addresses of known spammers, and includes filters that look for keywords in the senders address, subject line, message header and body text. McAfee is treating this in much the same way as its antivirus software, and so Spamkiller checks online for new filters every day to ensure you're kept up to date.

This system should deliver a high degree of accuracy out of the box, but every junk mail filter will make mistakes occasionally. Spamkiller can minimise the chance of flagging a legitimate email as spam accidentally, by creating a white list from your address book and always letting their messages through. And if you find it misses some junk emails, then you can always design a few custom filters of your own, ensuring you always have the maximum possible spam protection.

INFORMATION

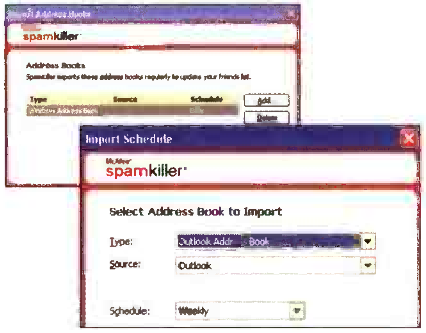
System requirements Windows 98/Me/2000/XP, 35MB hard disk space, Internet Explorer 5.5 or later, POP3/MAPI/MSN/Hotmail account

Contact http://uk.mcafee.com

Registration Follow instructions during installation

Need to know Not a limitation, but Internet Explorer must have cookies, scripting and ActiveX enabled for Spamkiller to work (see Readme.txt)

Get the most out of Spamkiller with these three tweaks



Address Books

Spamkiller imports these address books regularly to update your friends list.

Type	Source	Schedule

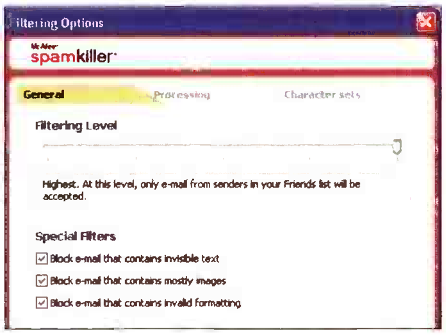
Select Address Book to Import

Type: Outlook Address Book

Source: Outlook

Schedule: Weekly

1 You can use Spamkiller with its default settings, but take the time to customise some of them and you're likely to get better results. Right-click the McAfee system tray icon, and click Spamkiller > Settings > Address Books. If your main email address book isn't listed, click Add and select it. Spamkiller won't block emails from anyone on this list.



Filtering Level

Highest. At this level, only e-mail from senders in your Friends list will be accepted.

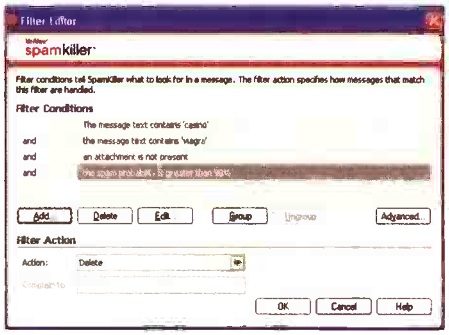
Special Filters

☑ Block e-mail that contains invisible text

☑ Block e-mail that contains mostly images

☑ Block e-mail that contains invalid formatting

2 Click the Filtering options button. Here you can set the filtering level, perhaps increasing it to accept messages only from senders in your Friends list. Click the Character sets tab to block all emails in a particular character set, such as Korean or Japanese. Handy if you're sure you'll never get a legitimate email from those countries.



Filter conditions tell SpamKiller what to look for in a message. The filter action specifies how messages that match this filter are handled.

Filter Conditions

The message text contains 'casino'

and the message text contains 'viagra'

and an attachment is not present

and the spam probability is greater than 90%

Filter Action

Action: Delete

Complain to

3 If Spamkiller doesn't block all the spam you receive, click Personal filters to create rules of your own. Click Add > Add, choose the part of the message to examine (message header, body text, subject line, more), and the condition to apply (message header contains "casino", say). Add more conditions, an Action (Accept, Delete) and click OK.

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FULL VERSION
PagePlus8
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Desktop Publishing

Serif PagePlus 8

Create business cards, newsletters, calendars, websites and more

It has been 16 years since PagePlus first revolutionised DTP with easy-to-use, low-price feature sets. Constant development since has sealed its place as one of Serif's flagship products, and version 8.0 is packed with reasons why it should be your DTP application of choice.

This starts with the design wizards. Choose a project type from options, including business cards, calendars, greetings cards, newsletters, even websites, and you'll see a range of pre-designed templates. Personalise the document by typing in the appropriate details, such as the sender and recipient's name for a birthday card, then choose a colour scheme and you're done.

You can also customise these designs fully or create your own documents from scratch, and there are plenty of tools available to help. Image-enhancement tools (including a red-eye remover) and a photo optimiser get the most colourful, vivid results from your images. Powerful drawing options, transparency effects and gradient fills let you add style to your documents, while versatile text layout, composition and flow tools give your words the maximum impact.

Perhaps the best part of PagePlus 8 is the way it's so much easier to work with multipage documents. This includes templates (define styles for different sections of the document) and a multipage view (work with many pages in view at once). Then use the Studio Page Manager to add, copy and delete, or drag and drop pages within your document to rearrange their sequence, and you've got an ideal tool for working with the most complex publishing projects.

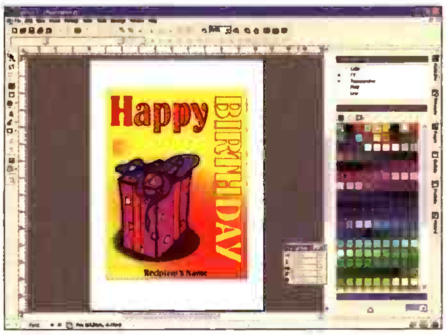
INFORMATION

System requirements Windows 98 or later, 160MB disk space

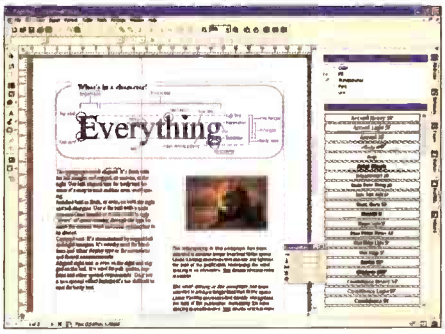
Contact www.serif.com

Registration Follow the Registration Wizard when launching the program (or click Help > Registration Wizard)

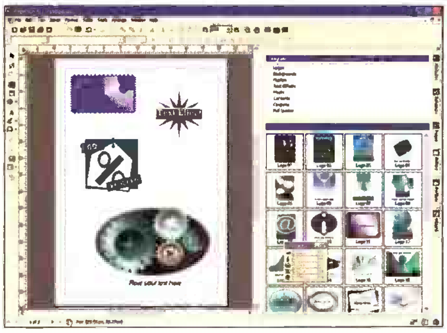
PagePlus 8 delivers stylish documents, no artistic experience required



1 You might be colour blind, completely unable to draw and have no design ability whatsoever, but that doesn't matter: PagePlus 8 can still help you produce some great-looking publishing projects. Choose a Page Wizard from the opening screen, then pick a template, customise it with your details and you're ready to go.



2 Another way to get started is by opening one of Serif's sample documents (you'll find them in the Program Files\Serif\PP80\Samples folder), using the pre-designed layouts and replacing the default content with your own. There are only two samples to choose from initially, but be patient, the CD you're sent on registration contains another 300+.



3 Alternatively, use the 'Start from scratch' option and choose a paper size. Now click the right-hand Gallery tab and you'll find all kinds of designs, including logos, flashes and backgrounds you can use to create personalised stationery and more. Drag and drop any design you like onto the page, then right-click it for various tweaks.

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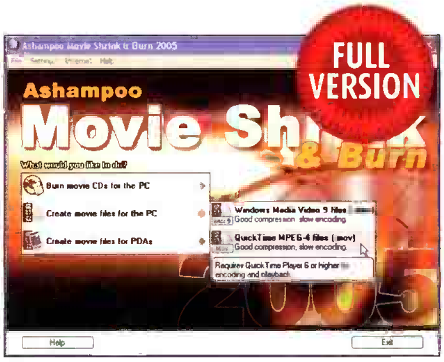
Ashampoo Movie Shrink & Burn


FULL VERSION
Ashampoo Movie Shrink & Burn 2005
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Movie Shrink & Burn
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Create movie files for PDAs
Windows Media Video 9 files
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QuickTime MPEG-4 files (.mov)
Good compression, slow encoding
Requires QuickTime Player 6 or higher for encoding and playback
2005
Help
Exit

INFORMATION

System requirements 128MB Ram, Windows 98/Me/2000/XP, 5MB disk space

Contact www.ashampoo.com

Registration Check "Get fullversion key" during installation, or click Help > Buy / Register > Obtain a free full version key

Converting your videos to Windows Media Video 9 format can reduce their size dramatically, while maintaining good image quality

Creating home movies is easy and affordable these days, thanks to tough competition in the digital video camera market. But sharing them is another matter. Re-encoding a video so it's small enough to email or download can be a hit-and-miss affair, involving guesswork about resolution, bit rate and encoding scheme. Get one of these factors wrong and the finished file might be too big or small, forcing you to start the laborious process again.

Ashampoo Movie Shrink & Burn 2005 takes the guesswork out of the process, ensuring you get the best results in the minimum of time. Tell the program which video file you want to convert (common formats such as .avi, .wmv, .mov, .mpg, and .asf are supported), give it a target size, click Start and leave the encoding engine to do its work. Once complete you can have either a Windows Media Video 9 (.wmv) or QuickTime Mpeg-4 (.mov) file, almost exactly of the size you specified, ready to email or put on your website.

Time-saving extras include the ability to split files into chunks, which is useful when a video is too big to email in one go. The program can also burn your converted video files to CD once it's finished, without requiring other mastering software. And there's the option to create movies specifically for playback in PDAs, where file size and video resolution are crucial.

UPGRADE OFFER

UPGRADE TO MOVIE SHRINK & BURN 2

The latest incarnation of Movie Shrink & Burn creates movie CDs in DivX, VCD or SVCD formats that work with most DVD players. And it can also convert your movies to many more file types, including Mpeg-4 and DivX .avi, .Mpeg-1, Mpeg-2 and .vob. It's considerably more versatile, then, and yet instead of the £29.99 list price, Ashampoo is only asking you to pay an exceedingly reasonable £7.49. Click Help > Buy / Register > Upgrade to Ashampoo Movie Shrink & Burn 2 to find out more.

NovaPDF Lite 2.5

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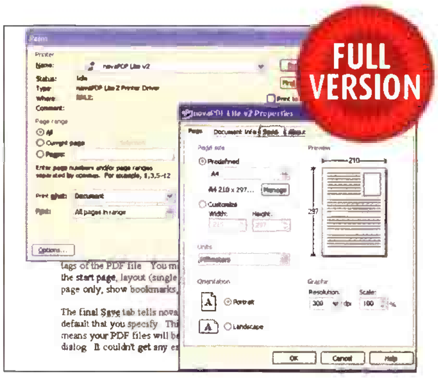
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Help

INFORMATION

System requirements 128MB Ram, Windows 2000/XP, 2MB disk space

Contact www.novapdf.com

Registration Get your serial code from www.novapdf.com/free-registration.php?src=15

NovaPDF allows quality Pdf output from Microsoft Word, Excel, Outlook and just about every other Windows application

If your favourite Windows application doesn't output data in Pdf format, you could email the authors to complain, or start a petition. But it might be easier to install NovaPDF Lite instead.

The tool works by installing a virtual printer driver on your PC. Select Print in any Windows application, point at the NovaPDF driver and, in a few seconds, your document will be saved as a standard Pdf file. If you want more control over the results, NovaPDF makes configuration options available from the Printer preferences dialogue.

On the Page tab, it's possible to choose a preset page size or configure a custom page. The document resolution can be set to values from 72-2,400dpi and the output to between 1-400 per cent of the original document size.

The Document info tab is where you can set the Title, Subject, Author and Keywords tags of the Pdf file. You may also choose various Acrobat viewer options, including the start page, layout and mode (show page only, show bookmarks, display full screen, more).

The final Save tab tells NovaPDF Printer Lite to either prompt for a file name, or use a default that you specify. This can include the date or time to ensure it's unique, and means your Pdf files will be produced without you seeing the Save as dialogue. It couldn't get any easier.

UPGRADE OFFER

SAVE 25% ON NOVAPDF PROFESSIONAL 4

Try the Professional version of NovaPDF and you'll find support for 40-bit and 128-bit encryption, plus restrictions to limit whether your Pdf files can be printed, copied, modified or annotated. Pdf bookmarks can be automatically generated based on headings in the source document. There's support for embedding TrueType and OpenType fonts, and Zip and Jpeg compression will keep files at their minimum size. NovaPDF Professional 4 retails at $39.95, but for a limited time you can upgrade for $29.95 (£16). Visit **www.novapdf.com/free-registration.php?src=15** to order.

FULL VERSION
Privacy Guardian
Protect your privacy at home and online!

PC Tools Privacy Guardian 4

Maintain PC privacy by deleting tracks

After installing a firewall, antivirus tool and spyware detector, you might think your PC privacy and security is assured. But you'd be wrong. The reality is that Windows, web browsers and most other applications all maintain details of things you're doing, such as files you open or view and websites you've visited. You may not even notice, but it means that anyone with access to your PC can find out exactly what you've been doing on it in the minimum of time.

Privacy Guardian resolves these problems by clearing away many of the tracks left on your PC. The Browser Settings section can selectively delete any or all of Internet Explorer's auto-complete form data, cookies, downloaded program files, cache files, history or address bar URLs. And it directly supports clearing your tracks in Firefox, Mozilla, Netscape and the Opera browser, too.

The other section included here is entitled Windows settings, although that's a little misleading. It wipes the history lists that Windows maintains (recent files, Search history, Run history and so on), but also deletes information in less obvious areas (such as the temporary files folder, the Recycle bin and the clipboard). And it optionally deletes the Recent files list in all Microsoft Office applications.

Any or all of these tracks may be deleted at the click of a Privacy Guardian button. Or if that's too much hassle, tell the program to erase them when Windows starts, or at regular intervals ranging from 30 minutes to two days. A bonus Shredder tool for securely deleting confidential files rounds off a very useful privacy tool.

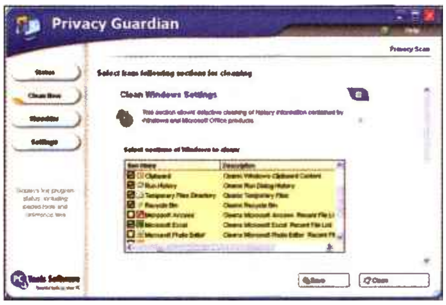
INFORMATION

System requirements Windows 98/Me/2000/XP, 6MB disk space

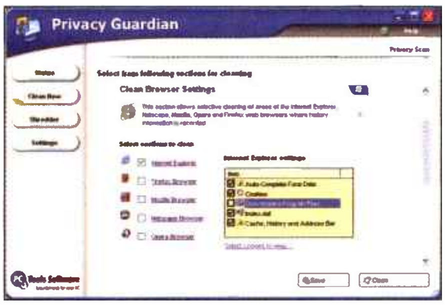
Contact www.pctools.com

Registration Get your code from www.pctools.com/privacy-guardian/free/promo/VNU1006

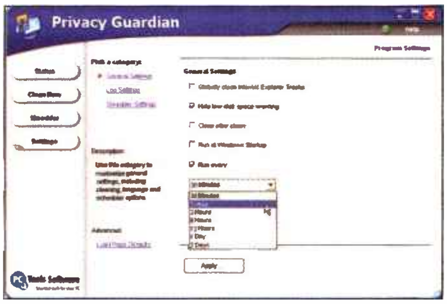
Protect your PC privacy in three simple steps



1 Launch Privacy Guardian, click Clean your computer and expand the Clean windows settings section. Scroll down the list, looking for items you'd like to delete – everything from the Windows Recent Documents list to Microsoft Office's Recent Files lists, temporary Windows files and more – and clearing the check marks next to items you want to keep.



2 Scroll down until you find the Clean browser settings section and expand that in the same way as before. Click each browser you'd like Privacy Guardian to protect, then check the box for every item that the program should delete (form data, history, cache and more). Click Save when you're done to record the selections you've just made.



3 You can now clear all the these items by launching Privacy Guardian and clicking the Clean Now button. But there's an even easier way. Click Settings instead, then check Run at Windows Startup to have your privacy protected every time Windows loads. Or check "Run every" and choose a time period, such as 1 hour, to have your tracks cleared regularly.

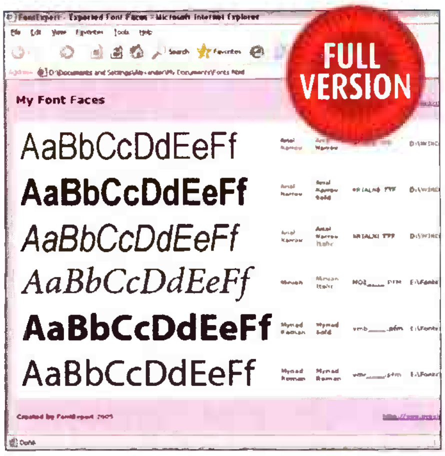
UPGRADE OFFER

SAVE 20% ON PRIVACY GUARDIAN 4.1

NEW FEATURES

Clear history in Media Player
Work with 100+ new programs
Custom cleans files and folders
Wipes specified Registry keys
Erase free drive space
Securely delete confidential files

Install Privacy Guardian and you'll benefit from plug-ins that clean the history of more than 100 third-party programs, including chat tools, P2P applications, image viewers and more. A Custom clean feature lets you define the files, folders or Registry keys that should be deleted to clear the history of other applications, while the Bleach free space option prevents any cleaned files from being undeleted later. The program normally costs £19.95, but upgrade now and you'll save 20%. Use the coupon code VNU1006 or visit **www.pctools.com/privacy-guardian/free/promo/VNU1006** to find out more.



INFORMATION

System requirements 128MB Ram, Windows 98 or later, 5MB disk space

Contact www.proximasoftware.com

Registration To get your code, visit www.proximasoftware.com/vnu

FontExpert 2004

Take control of your fonts with this typeface manager

Of all the technical issues you need to be concerned about when maintaining a PC, fonts normally rank low on the list. Most people leave font management to their applications: install a program and it adds some fonts, remove it and it takes them away.

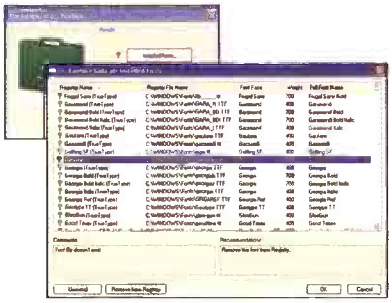
In reality it's not that simple. Some applications add fonts to your PC during installation and leave them behind when they're uninstalled. As time goes by, Windows will inevitably collect more and more unnecessary fonts, consuming system resources and slowing down your PC. FontExpert 2004 can fix this by helping you browse through your fonts, locating any you don't need, then uninstalling them.

Other complications might see corruption in the fonts area of your Registry, with fonts or font substitutions pointing to files that don't exist. Left alone this can cause some programs to have odd display problems, or maybe not even run at all in extreme cases, but FontExpert 2004 can check for and fix any such issues in a few clicks.

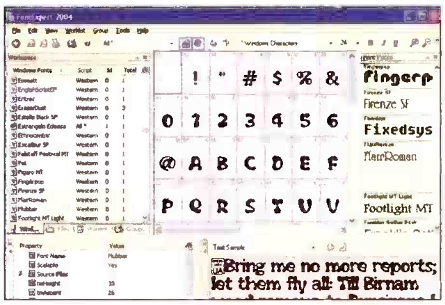
But you don't need to have technical problems to make use of FontExpert 2004. It's also useful for locating font files on your hard drive, installing, uninstalling and even unloading them. Or you can just use the program as a font viewer, browsing through those available to find one you need, or printing reports to see how they look on paper.

Whether you simply want another diagnostic tool to pick up odd PC problems, or you're into desktop publishing and need to choose the best font for a particular application, FontExpert 2004 has the tools to help.

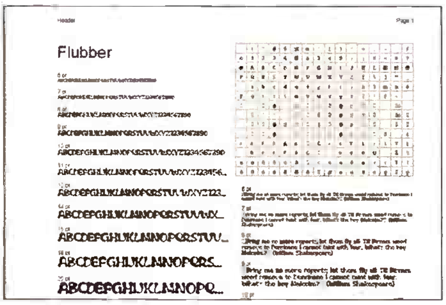
Three reasons why you really need FontExpert 2004



1 Fonts are more important than you think, and if they're incorrectly set up your PC can suffer from all kinds of odd problems. To diagnose your system with FontExpert 2004, click Tools > The Advice of Dr Fontson > Find Problems. A red bulb will appear where the program discovers any issues. Click the appropriate font entry for a suggested fix.



2 Having too many fonts can reduce PC performance, so it's a good idea to check your system occasionally and remove examples you're sure you'll never use. If you find a font that you think is surplus to requirements, right-click it in the left-hand workspace pane and select Uninstall. A backup will be taken just in case you make a mistake.



3 You can use the same browsing techniques to see previews of what a particular font is like and get a feel for how it might work in your documents. But that's not all. Click File > Print and you'll also receive a printed report showing the precise results you'll get when the font is rendered by your printer driver: very useful.

UPGRADE OFFER

SAVE ON FONTEXPERT 2006

NEW FEATURES

- Detects corrupt/duplicate fonts
- Activate fonts temporarily command
- Kerning in text sample view
- Windows Shell extensions
- Automatically activates missing fonts
- Export fonts to HTML page

The latest FontExpert automatically locates duplicate and corrupt fonts, making it even easier to spot and fix setup problems. Font browsing is enhanced by the ability to see kerning in the text sample view, and you can create Gif, Jpeg, Png, Bmp or Tiff images of selected font faces. There's a Missing fonts loader plug-in for Adobe InDesign CS2, and Windows shell integration provides new Open, Print and Install options for your right-click file menu. These new features would normally cost $59, but as a registered owner of version 6 you can upgrade for only $39 (about £22). Visit **www.proximasoftware.com** to order.

COMPETITION

WIN! A copy of Panda Platinum 2006

Internet security is essential to protect PCs against spyware, viruses, hacking attacks, phishing and other threats to which computer users are subjected. We have teamed up with Panda Software to give 25 readers a copy each of Platinum 2006 Internet Security, which will protect against viruses, spyware and online fraud.

The software includes a complete internet security suite. The powerful personal firewall is capable of detecting intrusions in wireless networks, while the new anti-spam technology can block junk mail messages. The software includes systems for protecting privacy and controlling access to web pages.

In addition, the package includes Panda's Truprevent Technology, which can block new and unknown threats by analysing the behaviour of the computer and stopping programs when they do anything suspicious. Panda's anti-virus technology covers viruses, worms, Trojans and other threats to the computer.

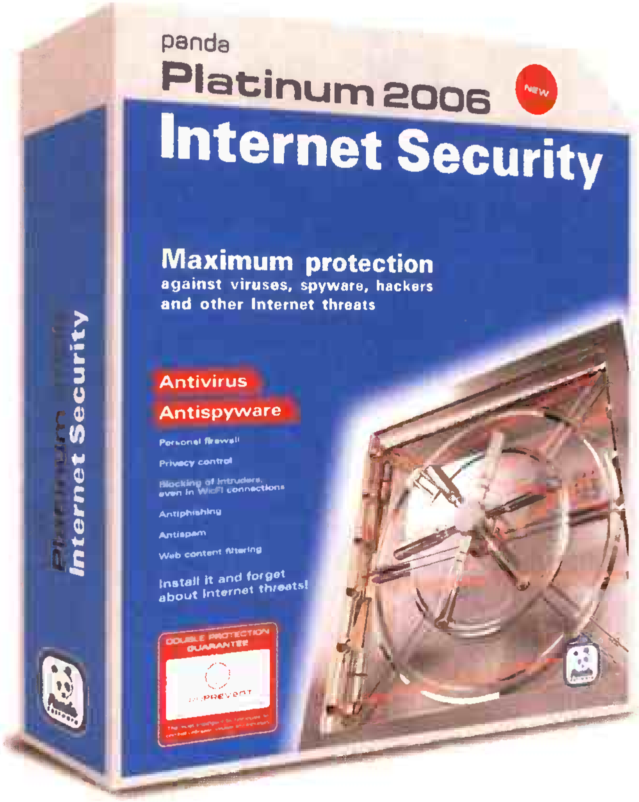
The program includes a one-year subscription to the Panda update program, which offers regular updates to the detection and scanning engine. This enables the software to easily detect new threats as they become known.

The software is able to actively help prevent online fraud through phishing attacks by preventing the most confidential of personal information (such as passwords, bank account numbers and credit card details) from being sent out of the computer without specific authorisation from the user.

Panda, which is a member of the Anti-Phishing Working Group, has added new mathematics-based and HTML analysis-detection methods to break down the chances of phishing attacks working, and the program uses web filtering to improve efficiency.

The 2006 edition of the program has new, more powerful detection technology included, making it more effective against spyware. Platinum 2006 Internet Security normally costs £45, but Panda is giving 25 lucky readers the chance to win a copy of the software. For your chance to win, answer the question below and enter online at **www.pcw.co.uk/competitions**. The competition opens on 19 October and closes on 17 November 2006.

For more information on Panda and its products, visit **www.pandasoftware.co.uk**.


panda
Platinum 2006
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against viruses, spyware, hackers and other Internet threats
Antivirus
Antispyware
Personal firewall
Privacy control
Blocking of intruders, even in WiFi connections
Antiphishing
Antispam
Web content filtering
Install it and forget about Internet threats!
DOUBLE PROTECTION GUARANTEE
Platinum Internet Security

Panda's Platinum 2006 can block new and unknown threats

The subscription period of the Panda update program is

a) One month
b) One quarter
c) One year

This competition is open to readers of PCW, except for employees (and their families) of VNU Business Publications, and Panda. PCW is the sole judge of the competition and the Editor's choice is final. Offer applies to residents of the UK and the Irish Republic only. Entrants must be over the age of 18 and only one entry per household will be accepted. 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. VNU reserves the right to substitute the prize for one of greater or equal value if circumstances make this unavoidable. Prizes will be dispatched 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.

The winners of the October competition are David Abel, Beryl Mellor and Jill Zimber, all of whom won a 30GB iPod Video, plus DVD2Pod, iExtend, PodMediaCreator, WebPodStudio and PodPresenter.

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Printed and bound by St Ives (Roche) Ltd
Distributed by Marketforce (UK) Ltd, 5th Floor, Low Rise Building, King's Reach Tower, Stamford Street, London SE1 9LS

ABC 76,020
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10 tips for buying safely

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2 Use a credit card if possible for purchases of £100 or more; you could get compensation from the card company if a supplier goes out of business.
3 Keep good records, storing receipts, correspondence in one place.
4 In England and Wales, the onus is on retailers to prove that faults found within six months on purchases are not inherent.
5 Goods ordered online, by phone or post can be returned under the Distance Selling Regulations without explanation within a reasonable time - this is widely accepted as being seven days.
6 Open and inspect all goods as soon as possible after delivery and make sure they work.
7 Companies are not obliged to repair or replace goods damaged by accident or misuse, unless it is caused in transit by a delivery service.
8 Companies cannot charge for a service that isn't being delivered, but never stop a direct debit while under contract.
9 Consumers should not suffer financial loss for repairs that are not their fault, so claim back carriage charges.
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Green computing guide

With all attention focused on climate change, how can PCW readers help minimise the environmental effects of using high-tech hardware? We show you with our practical guide to green computing.

Core 2 Duo laptops

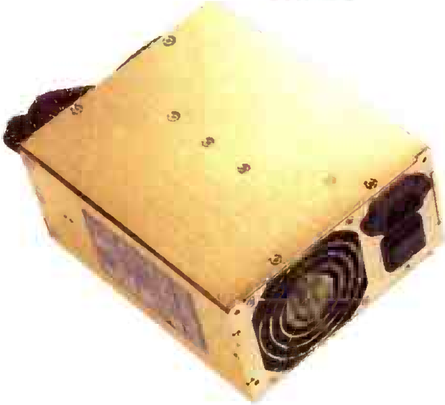
OLYMPUS
E-500

Double the processing power, but certainly not double the price: we see what the UK's cheapest Core 2 Duo laptops have to offer in this group test of 10 entry-level models.

A very techie Xmas

Run out of ideas for Xmas gifts or wishlists? Don't panic, we've rounded up dozens of great high-tech presents for every size of wallet. Whether you want something seriously useful or something that's just a bit of fun, we've got all the angles covered.

Understanding power supplies



PC power supply units (PSUs) are one of the most common causes of PC hardware crashes, yet very few people realise this. We explain what to look for in a good PSU and how to troubleshoot a problematic one.

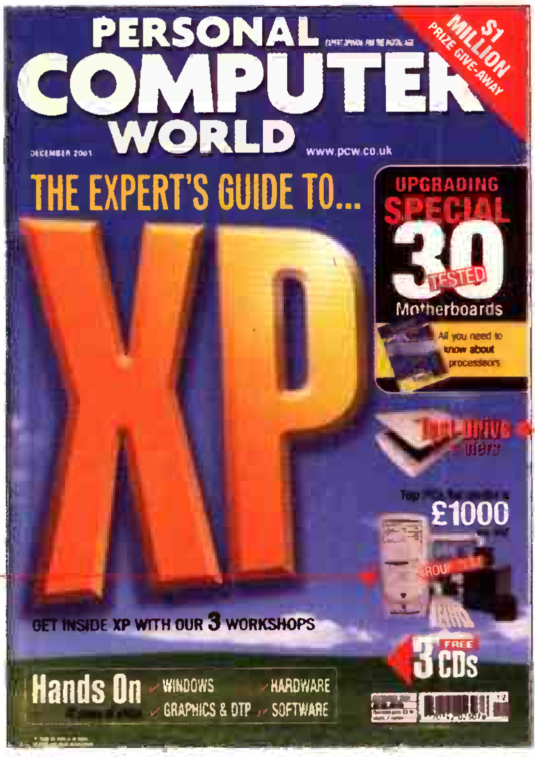
There's lots more in January's PCW DON'T MISS IT...

DECEMBER 2001

From the archives: take a look at the important events in technology five, 15 and 25 years ago.

As the Christmas season drew closer in our December issue, we looked at 10 sub-£1,000 family PCs with all the trimmings. Software, scanners and peripherals were all included in the price.

We received plenty of 1.4GHz Athlon processors, and we selected Windows ME as the operating system. Evesham's Axis 1.4 impressed us most, scoring five out of five in all four rating categories. Its system performance was tip-top and it came with USB, Firewire and PCI slots, as well as an ultra-fast Leadtek Geforce2 Pro card. The small 30GB hard drive was the only thing that let it down.



We asked a novice and an expert tester to put three flatbeds and a compact scanner through their paces. As these peripherals had matured through multiple generations, we expected the installation and user processes to be smooth – but in some cases it proved a nightmare. The Epson Perfection 1250 appealed to both novice and expert as it was easy to install and lightweight.

Finally, Clive Akass reported from London Fashion Week, where Intel were showing how to monitor the event by live video streaming over a 802.11b wireless net. Suitably inspired, Clive pondered returning to PCW Towers in a pair of white pantaloons, but decided the "sight might have overwhelmed weaker colleagues".

DECEMBER 1981

As part of an initiative to increase the public's awareness of computers, the BBC devised a television series about information technology. It also commissioned a microcomputer to accompany the series, causing numerous problems for the programme makers, including delaying the TV launch.

PCW's Guy Kewney examined the troublesome machine, but found the BBC Proton to be a 'nice' micro. It boasted one of the most powerful graphics systems around and, once pre-written programs were available, Guy predicted it would be faster than the Commodore VIC.

Dick Pountain bench-tested Sharp's latest general-purpose microcomputer. The MZ-80B comprised 64K of Ram, a full-sized keyboard, a built-in 9in green-screen display, a loud speaker, a cassette drive, and a version of tape Basic, which loaded in just 105 seconds. He was impressed with the built-in LEDs that warned when the Shift and Graphics keys were engaged. How things have changed.

DECEMBER 1991

Compaq's Portable 486c boasted truly innovative technology for its 1991 release date, yet its £6,995 price tag led reviewer Peter Jackson to wonder just who would be tempted by this new system.

The high-powered 486c was Compaq's first 33MHz 80486-based colour portable. It also boasted the company's first LCD, and was its first portable with full-size expansion slots inside the case. Available with 120MB or 210MB hard disks, the Compaq was as powerful as any desktop PC, but Peter decided it would be more likely to end up in the Smithsonian Institute than on a user's desk.

Meanwhile, Guy Swarbrick previewed the eagerly awaited Windows 3.1. From start-up the improvements in this edition were noticeable, as most applications felt faster and previous irritations seemed to have been ironed out. Microsoft had enhanced Program, Printer and File managers, as well as adding new keyboard shortcuts. We currently await Windows Vista, which will hopefully prove a worthy successor to XP.

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