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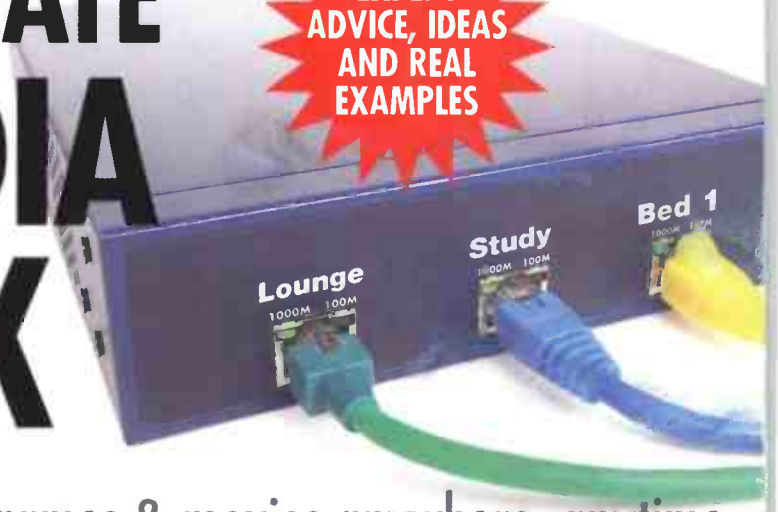

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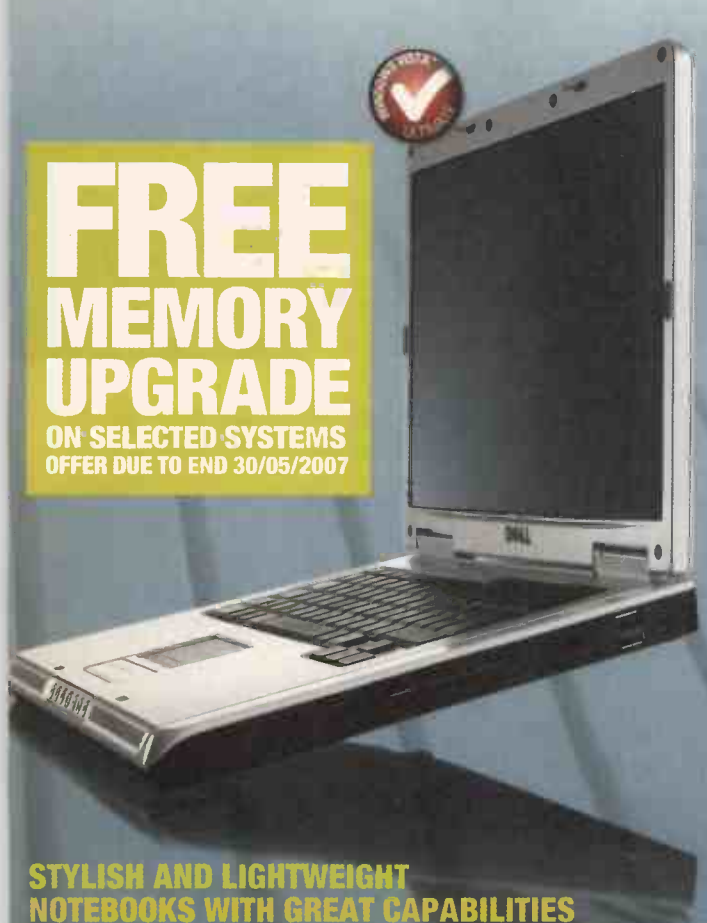

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June 2007

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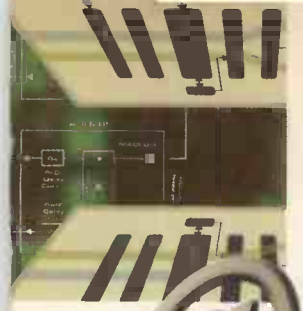

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Editorial

dylan_armbrust@vnu.co.uk

Hello and goodbye

It's all change at the top but PCW is in good hands and great shape, writes outgoing editor Dylan Armbrust

I'd like to wish you a warm welcome and a fond farewell. Sound familiar? Got that sense of déjà vu? If you are a regular reader of *PCW*, you may think so. No, it's not a redesign announcement, and we haven't raised the cover price, either. And amazingly, I'm not talking about the transition from Windows XP to Windows Vista. What I am referring to is an upcoming change in the magazine. In fact, *PCW* won't really change at all, except for one thing – its editor, who is, of course, me.

As with all things, it's time for the old guard to stand aside for the new and as of next month you'll have a new editor take the helm at *PCW*. For those who are curious, you'll find my replacement a familiar face and a long-established industry figure. In fact, you've seen his words appear on this very page. The person I refer to is, of course, Kelvyn Taylor, currently Deputy Editor of *PCW*.

When I came back to edit *PCW* over 15 months ago I said that I'd most likely use the old clichés of 'ever-changing', 'fast-paced' and 'revolutionary' and, of course, I did. To be honest, I don't think we'll ever stop using those terms when it comes to covering the development of technology. But today technology goes well beyond just talking about computers. It's about networks, content, information sharing, home entertainment, and anything that has, or somehow uses, a computer chip and as you've probably noticed, this has been well reflected in the magazine.

'You'll find my replacement a familiar face and a long-established industry figure'

However, I think that *PCW* goes further than just talking about technology. It's also been about getting the best out of technology, whether it's at home, in a small office or even in a large corporate environment. Hopefully, in my time as editor, *PCW* has been able to show you what new developments have arrived or are on the horizon, but even more importantly, how they fit into your life. As I pass on the mantle of *PCW*, I know you can count on the whole team to deliver the best news, reviews, features, productivity and buying advice on the newsstand today.

But it's also important to say that this editorial ethos and progress hasn't been limited to the printed page. As I said 15 months ago, in today's age, you have to be internet savvy and we know that over 98 per cent of our readers are online and have been for well over a decade. And if our readers are that savvy, we have to be too. That's why you'll have noticed some big changes to our website over time. Not only did we move to producing daily news and cutting-edge product reviews, but our very own Test Bed blog (**http://labs.pcw.co.uk**), our reader letters blog (**http://interactive.pcw.co.uk**), and our weekly product newsletters and video reviews have made *PCW* one of the most visited IT websites in the UK. And that's just a small slice of what we plan to offer in the near future. Over the coming months we'll be adding even more content and services to our website to complement the magazine.

I'd like to end my final editorial by thanking all of you who took the time to write in and let us know your thoughts about the issues of the day, about how we got it right or wrong, or even just for simple advice to solve a problem. We've appreciated all the correspondence we've received. And now, after having started my journalism career on *PCW* as a staff writer over 12 years ago, I can happily turn the reins over to a new editor who has proven his passion for *PCW* and its legacy. Here's to another 29 years of *PCW*, long may it continue. **PCW**

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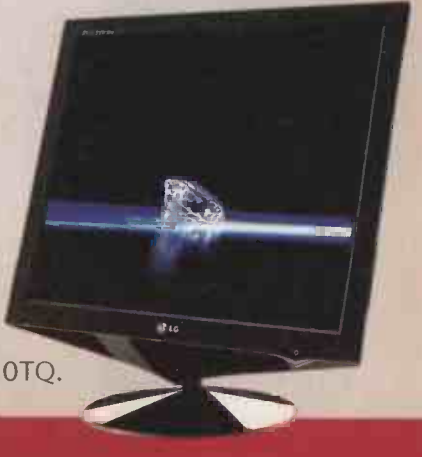

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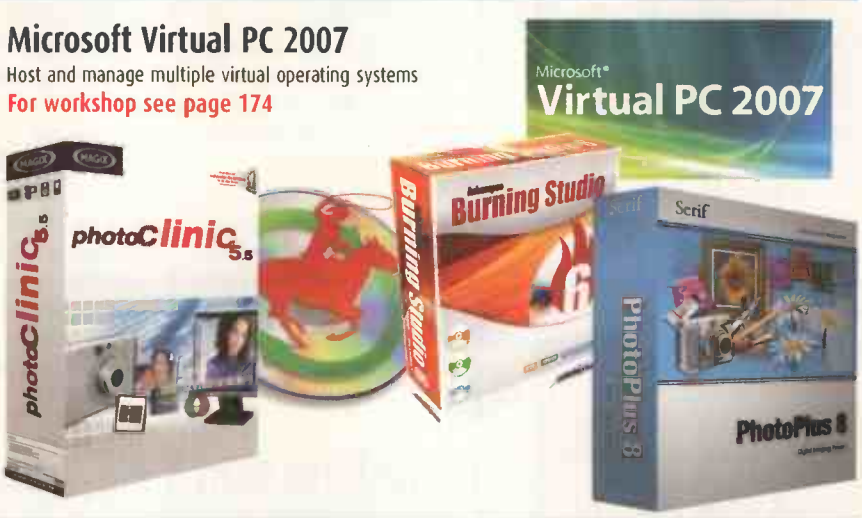

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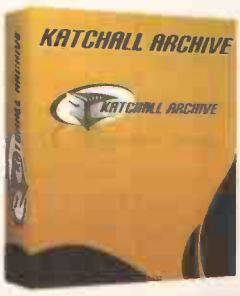

PLUS MUCH MORE!

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Ultra-mobiles start to evolve

Press reports have given the impression that Cebit, the world's biggest computer show, is falling to pieces. Some big names did not attend this year, partly due to a drift of exhibitors to more specialist events.

Yet it will be a pity if plans to refocus the event are taken too far. No other show offers examples of nearly every aspect of computing from all over the world. Cebit 2007 attracted more than 6,000 exhibitors from 77 countries and nearly half a million visitors – well short of its peak, but 10 per cent up on 2006 and hardly a mark of failure.

High-definition TV and video were a key theme, not least because they will encourage people to buy a lot of expensive new equipment – particularly big screens, as there is no point watching high-def on a small one.

Sharp claimed that LCD panels would start to challenge the dominance of plasma at big screen sizes. Panasonic said plasma prices would drop and that the technology is now green-clean (see page 20).

The battle between the HD-DVD and Blu-ray camps over high-def storage continues amid signs that it will end – like the CD and DVD format wars before it – in combo drives that oblige buyers to pay royalties to all competing parties (see page 20).

Star attraction...Samsung's new UMPC

High-def requires better processors (see page 14) and fatter data pipes. Wifi wireless networking is moving to the faster 802.11n spec, even though it will not be finalised until late next year. Notably all the big networking vendors at Cebit were showing kits that transform household wiring into an instant network, most using the Homeplug specification (see page 18).

It is unclear whether either of these technologies can scale up without causing serious radio pollution and Sharp's perseverance with clean, secure, underrated infra-red links (see page 20) could presage a time when the industry is forced to treat the airwaves as the finite resource that they are. No more boasting about the extended range (and interference potential) of your latest Wifi router.

Most fascinating for this reporter is the slow evolution of a truly portable working platform. The ultra-mobile PC, the sensation of last year's Cebit, needs developments in processors, screens, networking infrastructure, and above all the interface (not to mention price) to take it fully mainstream.

But it is getting there. The latest Samsung model (the machine pictured left, rather than the young woman) uses a new low-drain Intel platform, and the Vista version of the pen interface has been opened up to user-defined gestures that could enable it to evolve into something as fast as a keyboard (see page 16).

Meanwhile ultra-mobile designers are trying various ways to integrate a keyboard. The most successful design on show in this respect was an Asus swivel-screen convertible (see page 17).

Whether the keyboard will survive the next few years as the dominant input device is one of the great unanswerable questions. But I'd bet ultra-mobiles will in the long term have a greater effect on our lives than high-def screens.

Clive Akass

No rush for Sony's Playstation 3 despite the queues

The few people who queued outside stores to get the first Playstation 3s to go on sale in the UK could not hide the fact that Sony's new games console is being hammered on the sales front.

Figures from US market watcher NPD show that the console was outsold by Nintendo's Wii by almost two to one in February. Since the launch of both machines in the US last November, Wii had sold a total of 1.9m and the PS3 1.1m.

The other big Sony launch... the BDP-S1E Blu-ray player

Sales-by-value would indicate a closer figure because the PS3 is more expensive. But Microsoft's Xbox, which has been on the shelves a year longer, has sold five million.

Sony also launched its first Blu-ray player, the BDP-S1E, into Europe. It is said to avoid a slight speeding up of videos caused by translation to Europe's Pal format – see **www.pcw.co.uk/2186636**

Girl, 6, hacks Parliament

A six-year-old girl breached House of Commons IT security with a keylogger device that is available for £50 on the web. She sneaked the device past security guards and took less than 60 seconds to fit it to an MP's computer.

All she needed to do was unplug the key, put the keylogger at the end of the lead, and then plug it back in where it was unlikely to be noticed. Even if it was, only someone who knew about computers would think it was unusual.

Happily the incident had been staged by BBC South's Inside Out programme. But Equifax security specialist Neil Munroe told the programme that the use of keyloggers is increasing.

The devices log everything you type at the keyboard, so they can easily capture passwords and other sensitive information.

Most hardware keyloggers have to be retrieved physically to harvest the data, though some models are housed in a keyboard easily big enough to pack a data transmitter.

But software keyloggers, also easily available on the web, can be accessed remotely or primed to send information – and they are becoming the tool of choice for cybercriminals, according to a new report from security firm Kaspersky.

It said keylogger use increased by more than 500 per cent in the 30 months up to last July, and that it is the most difficult form of online fraud to counter.

Prevention gets harder as the software improves.

www.kaspersky.com

Film 'armour' keeps screens up to scratch

3M has introduced a multi-layer film it says will protect the screens of mobile devices from being scratched by other objects in your pocket. The Vikuiti ARMR200 film peels off easily so that it can be replaced every few months.

The film is slightly less easy to use than the pictures on the right suggest, judging from the sample that *PCW* was sent.

Our trouble may have been due to the fact that we tried to cut the stuff to size; as a result we got bubbling.

The film is probably best used in the standard sizes in which it is sold. 3M says it will be available to buy in packs of three from key distributors, but the company has yet to release a price.

What pen screen users will want is a similar product with the surface texture of paper, but it seems 3M does not yet have that one up its sleeve.

www.3m/uk/vikuiti

It's a hard knock life for mobile phones and other devices thrown into a pocket or bag with sharp objects. 3M's film is designed to protect screens

EMI breaks ranks on copy protection

EMI has broken ranks with the music industry to make its entire catalogue available in a copyable as well as a copy-protected version.

Apple's online iTunes store sells tracks protected by DRM (digital rights management) for 79p each, and these are playable only on the company's own iPods.

EMI tracks without DRM will cost 99p each and will also provide higher quality. When the scheme was launched in London, Apple chief executive Steve Jobs said the tracks would be "virtually indistinguishable from the original".

People will be able to buy complete DRM-free albums at the same price as DRM albums. Owners of existing 79p tracks will have the option of upgrading to the DRM-free versions for 20p.

Jobs has lobbied the music industry for some time to drop its use of DRM and he praised EMI for "taking this bold step".

He also said Apple is "reaching out to the rest of the industry" to form similar agreements with the other big record labels.

But Warner chairman Edgar Bronfman Jr said recently: "The notion that music does not deserve the same protections as software, television, films, video games, or other intellectual property... is completely without logic or merit."

However Blur frontman Damon Albarn, who appeared at the EMI event, was reported to have described the move as "brilliant".

Cliff Joseph

In brief

Fast Ramdrive

A new solid state disk using Ram instead of flash memory can run 500 times faster than mechanical hard drives, according to manufacturer Attorn. But it requires power to retain the data. The Hyperdrive4 uses eight slots, each with 4GB DDR1 sticks, to give the maximum capacity of 32GB. The drive without memory costs £1,409 and fits in a 5.25in bay.

→ www.pcw.co.uk/2186232

600GB notebook

A Eurocom notebook features a 600GB disk drive with Raid support. The D900C Phantom FSB1066 is pitched as the first "workstation-class gaming notebook" and packs two Nvidia Geforce Go 7950 GTX or two Quadro FX2500M graphics chips. But at 12lb, it's hardly portable.

→ www.pcw.co.uk/2186343

64Gb SSD

Samsung has doubled to 64GB the maximum capacity available for its solid-state disk drive (SSD). The 1.8in 64GB device, available this summer, is also faster than the first-generation SSD.

→ www.pcw.co.uk/2186783

Vista remorse

Microsoft has apologised for delays in the delivery of Windows Vista express upgrade disks to people who bought XP machines shortly before the launch. Robert Epstein, Microsoft UK OEM group manager, blamed delays on "unprecedented demand".

→ www.pcw.co.uk/2185082

Beaming speakers

Microsoft researchers are developing speakers that focus on your ears, using sound cancellation to ensure others in the room cannot hear the output.

→ www.pcw.co.uk/2186034

In brief

Backus dies

John Backus, who developed Fortran, the first high-level programming language, for IBM's 704 mainframe in 1954, has died at the age of 82. The name derived from Formula Translation because the system could compile mathematical expressions into executable code.
→www.pcw.co.uk/2185927

MacVista

Apple has updated Boot Camp to enable the 32-bit version of Windows Vista to boot on an Intel-based Mac.
→www.pcw.co.uk/2186941

Deepfish beta

Microsoft has released a beta of a browser called Deepfish, which can show full web pages on mobile devices, enabling you to zoom in on items of interest.
→www.pcw.co.uk/2186829

Adobe CS3 targets mobiles

Designers will drool over Creative Suite 3 (CS3), a range of more than a dozen products that represent the biggest-ever revamp of Adobe software. The launch, in the wake of an overhaul of Microsoft software, marks 2007 as the Year of the Software Refresh.

Most of CS3's modules are available as Universal applications. They will run native on Intel-based Macs, on which previous versions would run over a PowerPC emulation layer. They are also available for Windows XP and Vista.

CS3 is Adobe's first big launch since its 2005 purchase of Macromedia, and the suite includes new versions of Flash and Dreamweaver for web designers. Tighter integration allows users to import Adobe and Illustrator files directly into Flash projects.

There is also a new emphasis on design for mobile devices. A module called Device Central enables designers to see how their work renders on the target platform.

This Onlocation module with the Premiere Pro CS3 package monitors a camera's video stream and records it directly to disk

CS3 comes in six editions, targeted at different markets. All editions have Device Central and Bridge, which provides access to Version Cue, Acrobat Connect and an expanded Stock Photos service.

The Creative Suite Master Collection, which costs £1,969, is the only edition with all modules, including Indesign, Illustrator, Flash Professional, Dreamweaver, Premiere Pro, After Effects and Photoshop Extended.

Other editions have modules chosen to suit different markets. CS3 editions of individual products such as Indesign and Photoshop can also be bought as standalones.

New Photoshop features include easier ways to select the outline of objects, and flexible use of vanishing points.

For a full review see page 77.

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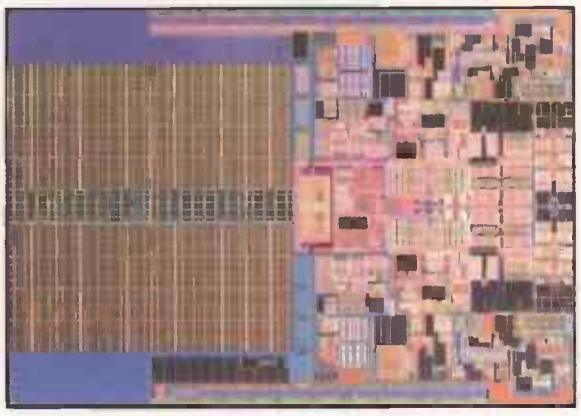
Next-generation chips take High-K diet

Intel is to launch two new processor generations over the next few months that will result in faster chips drawing a tenth of the power of the Pentium design.

The first, codenamed Penryn, will use the existing Core microarchitecture but will be made using a new 45nm miniaturisation process and a High-K dielectric that reduces leakage current, which would otherwise reach prohibitive levels at this scale.

The processor's efficiency will be further boosted by enhanced power management that shuts down parts of the processor that are not being used, Intel says.

It will also support additional Streaming Single-Instruction-Multiple-Data Extensions (SSE4) in order to speed up multimedia processing.



Die shot of the Penryn processor

The second generation, codenamed Nehalem, will introduce a new microarchitecture that will bring the memory controller into the processor for the first time in Intel architecture.

In classic Intel architecture the controller sits in the Northbridge chip, separate from the central processing unit (CPU), causing a bottleneck that helped rival AMD gain a performance edge during the last years of the Pentium generation. AMD processors have long packed a memory controller.

Nehalem will also be able to process two threads at a time, and will scale up to eight cores and up to 16 threads.

Pat Gelsinger, general manager of Intel's Digital Enterprise Group, said Nehelam would be "natively architected" to take full advantage of the 45nm scaling. "It is really going to unlock the full potential of the technology's capabilities beyond what the Penryn was capable of doing."

Intel also plans to integrate dedicated graphics processing units into CPU, taking advantage of the increased transistor count allowed at 45nm scale.

AMD plans to do the same by 2009 in a project called Fusion, which will draw on technology obtained with the purchase of graphics giant ATI.

In that year Intel will shrink the Nehalem architecture to 32nm to produce a generation codenamed Westmere. The next year will see a new 32nm microarchitecture codenamed Gesher.

Roadmap follows two-year cycle of change

The Intel roadmap fulfils a pledge to deliver a new level of miniaturisation every two years, followed in alternate years by a new microarchitecture, says Graham Palmer, Intel's UK and Ireland manager.

"Last year we introduced the new Core microarchitecture. This year we have gone public to say that we will deliver 45nm processors. Next year we will have the new [Nehalem] microarchitecture."

Palmer claimed the new High-K dielectric used in Penryn would put the company a year ahead of rivals.

Each scale of miniaturisation requires new manufacturing processes and investment in new plants. Shrinking processor transistors reduces the power drain and enables more to be packed in.

How new McCaslin platform could change schools

The new power-efficient processors could have a huge effect on education by allowing each child to have a personal mobile computer, according to Graham Palmer, Intel's UK and Ireland manager.

The company is working with the Department for Education and Skills (DfES) on ways to implement one-to-one computing, ensuring that every schoolkid has access to a computer as a way of optimising the use of technology in schools.

Palmer said the yet-to-be-launched McCaslin platform, used in the latest Samsung ultra-mobile (see page 16), had been developed for small-form-factor machines targeted at the education market.

"From kindergarten to the age of 12, kids need a ruggedised device they can use at school and take home in the evening," he said.

Six in ten homes now have a PC, but there is no guarantee a child will have access to the machine because others in the house may be using it.

"So having a ruggedised portable computer is an attractive proposition because it becomes a personal device on which kids can work on the projects they were doing in the classroom."

Palmer says the work is not simply about creating a new type of notebook computer. "It is about how technology can be used to deliver the curriculum by weaving it into the learning experience... lots of online, collaborative content for kids to use."

Education departments in several countries have seen ultra-mobiles not only as a way to introduce kids to technology, but to save money on books. Is this saving going to be enough to get each child a computer in the UK?

Education is not the only market for processors. This Motion Computing C5 tablet is based on an Intel design for the health sector. It is being used in a pilot at Salford Royal hospital

"How this programme is rolled out is part of what the DfES is reviewing," said Palmer. "But some technology is already there."

He agreed that whatever system the government came up with, it would have to be inclusive.

Clearly, education represents a huge potential market for Intel, and Palmer's job is to sell processors. But a move to tablets with pen input in schools could accelerate a profound cultural change, with a further shift from paper to screen.

Intel is agnostic on the use of the keyboard. "We wouldn't want to restrict the creativity of the industry in how the products that we offer are used," Palmer said.

Clive Akass

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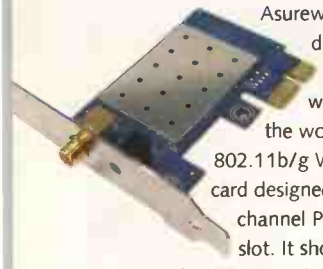
E&OE. All specifications subject to change. Please check web site for current model specifications.

Sim gateway

Bulgaria-based Eurodesign showed a device that enables you to make or receive Skype calls on a standard mobile phone. You put a Sim card into what it calls a Mobigater, and it rings you when your PC receives a call; similarly you can ring it to make a web call.

→ www.mobigater.com

Express Wifi



Asurewave, a division of Asus, showed what it says is the world's first 802.11b/g Wifi add-on card designed for a single-channel PCI Express slot. It should be available in Britain this summer.

→ www.azurewave.com

Key choices for tablets

The Samsung Q1 Ultra was perhaps Cebit's least successful example of keyboard control on an ultra-mobile.

Asus, which has a habit of giving a low profile to interesting products on its stand, showed the smallest model yet to have a swivel screen, enabling you to switch from tablet to notebook mode.

The 7in prototype (pictured far right) has an 800x480 screen, satellite navigation, a 1.3-megapixel camera, and was driven by a Via processor.

There are no plans to bring it to Britain, but marketing manager Lawrence Felice said there had been so much interest in the model that this might change.

Medion showed a model of about the same size with a slide-out keyboard and what looked like calculator-style keys. I didn't like the look of these but then I didn't get a chance to try them out. We expect to get one in for testing soon, though, so I'll reserve judgement.

Keyboard control offerings: (from left) Medion, Hanbit and Asus

Incidentally, Samsung was not the only company to go for a split keyboard. Another Korean company, Hanbit (www.hbe.kr), showed a Linux web tablet called the Pepper Pad 3 (pictured centre), using the same idea.

Oddly, one notable innovation for mobiles on show came from the *New York Times*. It's a software client for displaying pages and stories that makes the best job I have seen of formatting them elegantly for whatever window or display you are using. For more on this, visit http://tinyurl.com/39fszr.

→ www.medion.co.uk

New cool chip powers ultra-mobiles

Screens will stay at 7in and you can define your own input gestures, says Microsoft

Cebit 2007 had little on the ultra-mobile front to match the excitement of the launch of Samsung's Q1 at last year's show. But the format is maturing and I managed to get an update from Bill Mitchell, corporate vice-president of mobile and tailored platforms at Microsoft, on the latest thinking about it.

It seems Microsoft and Intel now expect ultra-mobile PC screens to stabilise at around 7in, which they see as the minimum comfortable size for the sort of applications people are using the machines for.

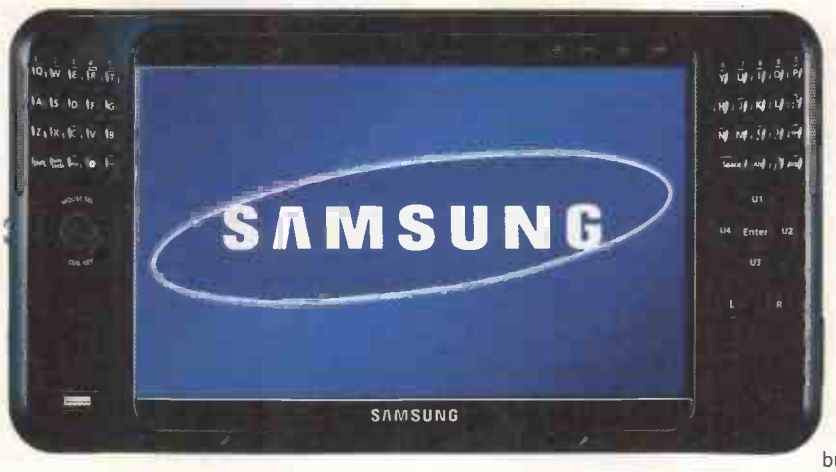
There was talk of smaller sizes at last year's Microsoft Winhec conference. But Mitchell told me: "Our studies have shown that the cut-off point is 7in. Maybe a little less – 6.5in to 6.8in. Below that customer satisfaction drops way off. Intel thought the ideal screen would be 5in but they have come round to our way of thinking."

This assessment is certainly borne out by our experience of the ill-conceived Sony UX1 ultra-portable, which has a 4.5in screen.

Mitchell agreed that it assumes people will continue to use ultra-mobiles the way they do now and that the issue could be complicated by scrollable screens (see *PCW* May) and smart wireless links that facilitate the use of standalone screens when a larger view is required.

He was talking after the launch of Samsung's second-generation UMPC, the Q1 Ultra, which uses a yet-to-be-launched ultra-low-drain Intel platform codenamed McCaslin with a single-core chip called Steeley. This needs a fan but crucially it can do without a hefty heat sink, enabling a smaller case. The claimed battery life, much criticised in the first Q1, is three-and-a-half hours.

Mitchell pointed out that Intel pledged last year to reduce processor power consumption by a factor of ten. "McCaslin is a step in that direction," he said. "[The chip] was cool enough when I saw it to put my finger on it. So Intel is making great strides."



Your view of the new Samsung Q1 Ultra may depend on your age and texting skills. As an RSI sufferer who can't read small print, the very thought of poking my thumbs at those tiny keys makes me wince. Handwritten input is easier and you can use a plug-in or Bluetooth keyboard for heavy work. But Microsoft's Bill Mitchell (right) points out that the split mini-keyboard is good for people like hospital workers who need to operate the machine away from the desk. Incidentally the screen resolution has been boosted from the Q1's 640x480 to 1,024x600. Watch out for a review soon in PCW

The Ultra's processor runs at a relatively slow 800MHz, but clock rates are now a poor measure of performance and the machine responds crisply and appears to cope well with multi-tasking. Mitchell said a number of manufacturers planned to launch McCaslin-based tablets from around the middle of the year.

Samsung has given the Ultra a mini-keypad, split on either side of the screen, so that it can be operated with the thumbs with the machine held in both hands.

This implicitly rejects the Origami interface's soft keyboard, which is designed to enable similar operation using a screen image.

I don't like mini keypads (see caption) but Mitchell said they are relatively efficient and Blackberry users had made them popular – ten years ago it was hard to get people even to try one out.

The Ultra's most interesting feature is its use of the Vista ultra-mobile interface, which has a number of improvements over the original Origami XP version. Handwriting recognition, which was already impressive, has been much improved and the input box expands intelligently as you type.

The recognition engine can now learn by its mistakes and you can define your own gestures – a potentially momentous move, as it could lead to the evolution of a shorthand that would make pen input faster than a keyboard.

There are several new gestures. You can cross out to erase, which never worked properly on XP, and you can flick the screen with your finger to scroll a page.

Mitchell said Microsoft has experimented with prototypes with multi-modal input – using voice and speech recognition to reinforce each other. "But that is still at the lab level," he said.

His long-term view is that smartphones and UMPCs will converge into a device thinner and perhaps a little smaller, especially at the screen rim, than today's ultra-mobiles. But, though the device would be capable of making a call, people will still have a mobile phone.

"We have some very interesting data, showing that most people who own a smartphone also own another phone," he said. "They don't want to have to carry a large device around all the time."

Mitchell said he was "bullish" on the use of the other major mobile tablet architecture, thin clients, which pack little computing power but draw their resources from the network; but he said Microsoft has had an uneasy history with them.

A project called Jupiter a decade back "never got traction" because people expected the Windows CE-based clients to provide the full Windows and Office experience.

Later Wifi-linked tablets could easily front-end a desktop machine, a setup used by Microsoft's smart display, which acted as a monitor on the desktop and a thin client when you picked it up. But it failed because it was more expensive than Microsoft had expected.

Mitchell said client devices cannot be very "thin" if you want to use a pen interface because you need some onboard processing power. "You cannot get away with an ARM processor. With an ink client you are going to have to do some processing locally, otherwise latency will kill you on a Wifi network. There is a strong negative correlation between a lag on the cursor and customer satisfaction."

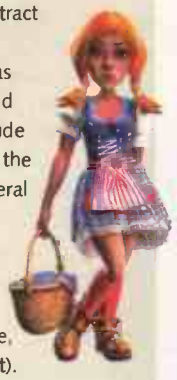
Some manufacturers appear to be holding off on ultra-mobiles. Acer president Gianfranco Lanci said in a Cebit keynote speech that they will not be ready for a mass market for at least 18 months.

But scarce as ultra-mobiles were at Cebit, they were still the most exciting products at the show. At a time when trendy Apple has only to give a whiff of vapourware to get blanket media coverage, astonishingly few people appreciate that it is lumbering old Microsoft that has produced the most advanced and adventurous interface in the world.

In brief

Heidi hi

Combot is confident its instant messaging service has enough new features to attract users away from competitors such as Microsoft, AOL and Yahoo. These include the ability to have the service live on several machines at once. The main selling point is a selection of animated avatars – some free, such as Heidi (right).



→ www.tinyurl.com/2qcvl8

Pirate ID

A watermarking system for broadcast video will enable pirated content to be tracked back to its source. The technology from STMicroelectronics injects an ID code into the video stream.

→ www.pcw.co.uk/2185796

UK prize winner

Translation software called Quicktransit made Manchester developer Transitive Corporation one of the three grand-prize winners at the European ICT Awards at Cebit.

→ www.pcw.co.uk/2185728

Vista timebomb

Vista will be as vulnerable to rogue code as XP within a year, the co-founder of anti-virus firm Kaspersky said at Cebit. Eugene Kaspersky also called for an "Interpol of the internet".

→ www.pcw.co.uk/2185632

Streaming store

Hitachi has unveiled a prototype streaming storage appliance optimised for use with video-on-demand services. It can deliver video without passing through an external streaming server.

→ www.pcw.co.uk/2186114

Body conscious

Zephyr showed smart clothing that enables remote monitoring of the wearer's heart rate, ECG, respiration, body temperature, posture and activity levels.

→ www.pcw.co.uk/2186044

Mains nets go mainstream

Instant networking using mains wiring could become as common as Wifi, judging from the number of companies with products using the technology.

Most use technology conforming to the Homeplug Powerline Alliance (HPA) specification, which is claimed as a de facto standard because it is backed by more than 70 companies, including Sony.

Panasonic has developed its own version and has said it will implement it in consumer electronics products such as televisions, enabling them to be networked simply by plugging them into the mains.

But the project is doomed to failure because even Panasonic is not big enough to push its technology against the HPA tide, according to powerline communications specialist Devolo.

If mains networks are to take off in the living room, products from different vendors will need to subscribe to the same standard, said Devolo's director of product management, Werner Fehn.

Devolo's Homeplug kit based on the Intellon chip – see review at www.pcw.co.uk/2184732. Devolo showed prototypes of a router, a satellite receiver and a network-attached storage box that uses the pocket socket for networking

He said the HPA spec had most support and, in any case, consumer electronics companies will not want to rely on Panasonic chips because they would have only a single source and the company would have complete control over prices. He pointed out that by the end of 2007, at least five companies will be making HPA chips.

Devolo offers products base on both an HPA-compliant Intellon chip and one from the Spanish company DS2 that uses a rival Universal Powerline Alliance spec.

Fehn said the Intellon chip is more robust in noisy environments but the DS2 chips were better in massive enterprise systems needing to control computers remotely.

A UK start-up, Si-Connect, is developing yet another powerline technology that it says can be implemented for $5 (£2.50).

However, there are fears that mains data will raise the radio noise floor, and even interfere with aircraft communication above cities, if widely adopted. Critics say regulations do not consider the cumulative effect of millions of mains network installations.

For a longer version of this story, see www.pcw.co.uk/2186196.

Expresscards migrate to desktops

Expresscard slots, now appearing in most notebook computers, will migrate to desktop machines because they provide an easy upgrade path, according to the executive director of the governing PCMCIA organisation.

Patrick Mayer told a Cebit press conference that he was confident it would happen because the slots give add-on devices a direct route to the host machine's chipset.

Expresscards, a faster and smaller cousin of the PC Card (formerly called a PCMCIA card), were initially seen as a possible replacement for internal PC expansion cards because many users do not like to open up a PC. But they have so far been seen only in notebooks – and not all of those. Mayer said an estimate by analyst IDC that only two in three notebooks would have them by 2010 was an underestimate.

For a longer version of this story, see www.pcw.co.uk/2185666.

Fuel cells are ready to fly, says Toshiba

It is rather a large Bluetooth headset (left) but it is special... the first to run off a fuel cell. The battery pack lasts 10 hours, according to the man on Toshiba's stand at Cebit. Also shown was a smaller cell that packs enough for two mobile phone chargers.

The cells can be topped up by a bottle of methanol about the size of a tin of lighter fuel. Toshiba says its system is safer than selling the fuel by the gallon because methanol is both flammable and poisonous.

The company also showed a laptop with a built-in fuel cell said to last five hours between top-ups. It weighs 2.5kg with the cell.

Toshiba said the fuel cells had been approved by the International Civil Aviation Organisation for use on aircraft. They will be launched "soon" in Japan, but it could not give a date for Europe.

Putting words in your mouth

Mona Lisa finally breaks nearly 500 years of enigmatic silence, courtesy of a new system that enables the sophisticated animation of still images

Easy still image editing has long made it clear that every picture *can* tell a lie. Now researchers in Germany have extended digital deception to video by making people appear to speak words they never said.

They took 3D scans of an actor speaking and built a model of how the face changed when making different sounds. The information was then used to define what they called visemes, which are to facial expressions what phonemes are to the spoken word.

Each viseme is associated with a phoneme and can be used to animate a picture of a face. So the system can be used to make the image say anything you want.

It can be applied to a photo, drawing or even a painting – examples include the Mona Lisa speaking with a distinct English accent (see above).

Demonstrations of the system applied to photographs are also impressive, but perhaps not good enough to fool anyone – but then the researchers at Germany's Max Plank Institute and Siegen University are designing the system purely for cinema animation.

One wonders what Stalin, who knew a thing or two about manipulating photographs, would have made of it.

There is a white paper on the subject at **http://tinyurl.com/23gmpw.** The full animation of Moaning Mona can be found at **http://tinyurl.com/yqeqyx**.

No-sweat PS3 controller

Logitech announced the European availability of four products designed for Sony's Playstation 3 (PS3) console – including a controller (below) with a fan inside to cool hands.

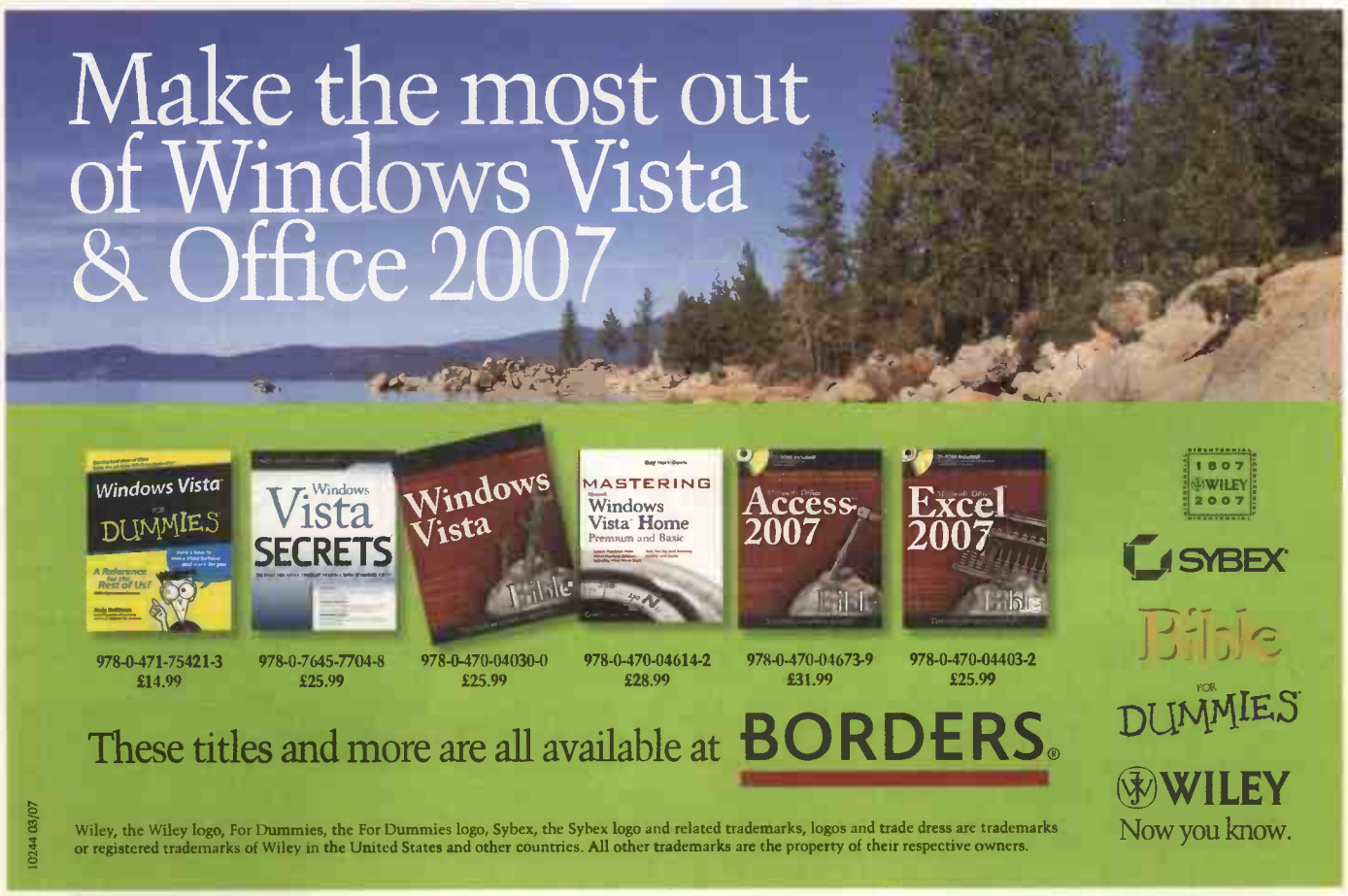
The €40 (£27) Chillstream has three fan settings, so you can get more cooling as the game hots up.

"We introduced it because hands get sweaty when you are gaming," said Jerry Quindlen, senior vice-president of worldwide sales and marketing.

Other products for the PS3 include a keyboard, an HDMI link and a headset.

Logitech also launched two new webcams designed for notebooks.

www.pcw.co.uk/2185523



Six monitors fed by USB

Samsung is to launch a range of flat-panel monitors that can use a USB2 feed rather than standard digital or analogue cables – and up to six of them can be daisy-chained to give a combined resolution of 9,600x1,200.

The monitors use technology from Cambridge-based Displaylink, which converts and compresses the display data and redirects it through the USB2 port. Flash-based software on the monitors processes the incoming data. See **www.pcw.co.uk/2185686**

Displaylink showed a USB2-to-VGA adapter using the same technology to add another monitor to a PC without the need for a second or multiport graphics card.

It also showed a Toshiba universal docking station using the technology, enabling all the ports, including video, to be fed via a single USB2 cable.
www.displaylink.com

Data power

A new range of power supplies from Milton Keynes-based Hiper pack USB2 ports that are powered directly rather than via the motherboard. The HPU-5M830, pictured below, has eight ports, plus one that can be used to charge a mobile phone. A sister model has four ports.
www.hipergroup.com

Cryptic drive

Digisafe has made a hard-drive enclosure with a smartcard slot and keypad that the user has to enter a PIN number into to access. All data on the drive is encrypted on the fly and the keypad means key-loggers cannot steal the entry code.
www.pcw.co.uk/2186039

Sharp sees the point of IR

Sharp launched a Blu-ray drive at Cebit with a new high-speed infra-red (IR) link, raising the profile of a technology that has been overshadowed in recent years by Wifi and ultra-wideband (UWB).

The link uses a new spec called Infra-red Simple Shot (IrSS), developed by the Infra-Red Data Association, with a data rate of 16Mbits/sec. It has been implemented in several cameraphones in Japan, where the player will be sold initially.

The IrSS link will enable the BD-HP10S, the first to be launched by Sharp, to beam video to monitors equipped with the link. This is one of the tasks targeted by emerging ultra-wideband (UWB) radio links.

Sharp is unsure whether the IrSS link will be brought to Britain. Joachim Neils, manager of product planning, said: "Infra-red is not popular in Europe. It has a number of disadvantages... for instance, anyone can walk across the beam and break the link."

But I have long thought IR, or faster free-air optical links, could return. IR never shed the stigma of poor early implementations, but its advantages should not be ignored.

IrSS is rated at 16Mbits/sec but optical beams can carry gigabytes. They are secure because you cannot easily eavesdrop them. They are also clean – no radio pollution raising the noise floor and no interfering with neighbouring networks. Plus they save a lot of complicated addressing; think of the negotiations Bluetooth needs to get through to one machine in a crowd. Humans get up close and point. This is exactly what you have to do with IR.

So what if someone moves across the path? You ask them to move, just as you do if someone is standing in front of the television. Wifi traffic gets blocked all the time; we just don't notice because the obstacle is not physical.

But we will start noticing when radio pollution becomes an issue, as it surely will as wireless links scale up. *Clive Akass*

See http://tinyurl.com/yuw6m9 for a longer version of this article.

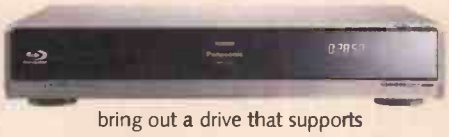
Blu-ray camp bullish as HD-DVD hits 51GB

Toshiba has developed a triple-layer HD-DVD system that can store 51GB per disk – putting it on a par with a 50GB dual-layer Blu-ray disk, according to James Armour, optical specialist at the company's storage device division.

Armour belittled Sony's claim to have made a 200GB Blu-ray disk. "They may have done it in the labs, but have they put it into production? No," he said.

He said he was of the opinion that Toshiba would bring out a drive that supports both Blu-Ray and HD-DVD if the market appeared to want it. "Basically, all these companies are interested in is the format... So if you get a combination drive you are still going to sell movies in your format," he said.

Panasonic BD-10 Blu-ray drive launched at Cebit



Toshiba has developed a slim-line read/write HD-DVD drive that will be sold first in Japan. It is reported to be cutting the price of its entry-level player by $100 (£50).

The opposition was in bullish mood at Cebit. Frank Simonis, chairman of the European Blu-ray Disc Association, said HD-DVD would vanish within three years.

He predicted: "Asia and the US may be the early adopters, but we expect the European markets to follow suit."

See **www.pcw.co.uk/2185760** and **www.pcw.co.uk/2185825** for more on these stories.

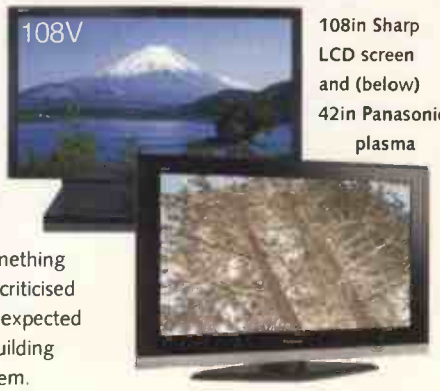
LCDs challenge 'green' plasma

Monitor manufacturers seem at last to be tired of playing 'mine's bigger than yours' at trade shows. This year they were slogging it out on eco-friendliness and quality.

Sharp announced it was adopting 100MHz as the standard refresh rate on its high-definition LCD screens, a size which up to now has been the preserve of plasmas. But it could not resist showing the giant 108in TV (right) it unveiled at CES earlier this year.

Panasonic stressed what it said was the superior quality of plasma screens, saying they have a higher effective resolution.

It also said none of its plasma screens contain hazardous materials – something the technology has been criticised for in the past. Prices are expected to drop as Panasonic is building another plant to make them.



108in Sharp LCD screen and (below) 42in Panasonic plasma

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LETTER OF THE MONTH

Stop moaning about Vista

I have read with great interest the many letters over the past few months relating to Windows Vista and Office 2007. It is frustrating, as a keen user, to see such strong views against Microsoft's new wave of products. JE Jones writes in the May issue of annoyance with driver support in Vista. Microsoft has shipped an unprecedented number of drivers with Vista and many, many more via Windows Update. The responsibility of producing such drivers is on the manufacturer and many have risen to the challenge; of course in some cases, lack of support is seen as a way of forcing people to buy new equipment.

Microsoft has consistently provided huge levels of backwards compatibility from one version of Windows to another, something which is unseen in many parts of the industry. If people want progress, then it will always come at the expense of compatibility to some extent or another. Another example of this issue is Robert Shooter's letter in May's issue. He notes that the default format in Office 2007 is not supported by any other software package on the market. Wrong. Microsoft has made read/write converters available for previous versions of Office and there is no reason why others cannot create their own for open-source software. In addition, Office 2007 can be configured to automatically save all files in the previous format. The OpenXML file format in Office 2007 provides a huge improvement in stability and usability for both businesses and consumers, and should be welcomed. Microsoft has made a huge step forward in its latest releases, bringing usability and ergonomics to a new high. Improvement can sometimes be painful, but let's embrace it, not complain about it, and enjoy the new experiences on offer.

Daniel Murfin

Kelvyn Taylor replies: Perhaps surprisingly, we've had many letters recently with similar sentiments (see Vista Part 2 below). Updated Vista drivers are starting to trickle out from manufacturers, but the process is still going to take an annoyingly long time.

STOP MOANING ABOUT VISTA, PART 2

In the long time that I have been reading *PCW* (over 10 years now), I have not felt the need to write to you, and I feel that, on the whole, a balanced view comes out in the letters page. But on the issue of problems when upgrading to Vista, I finally feel the urge to throw in my tuppence-worth.

I have read with surprise some of the letters and comments about Vista upgrade and compatibility problems – not because I think Vista is flawless, far from it – but because in most cases it seems shocking to some people that not all of their equipment works on Vista after they have upgraded. Vista has in many places been significantly re-engineered under the hood (and not before time), and includes many improvements, but as with any new operating system there will be hardware that is not supported. Vista, just like Windows XP before it, has a compatibility checker, so for an individual or, especially, computer store performing upgrades, there is no excuse not to realise that your existing hardware devices may not be supported To install first and then complain seems ludicrous. The moral of the story? Check your components and software support first before causing yourself weeks of discomfort and wasted time.

James Hamilton-Adams

SECURELY FRUSTRATED

I'm not sure who needs to blink first, but the incompatibility of much new software with internet security tools is getting me down. My latest frustration involves HP and Symantec. Try as I might, I cannot get my new 3300-series printer to install for wireless operation – the Norton firewall

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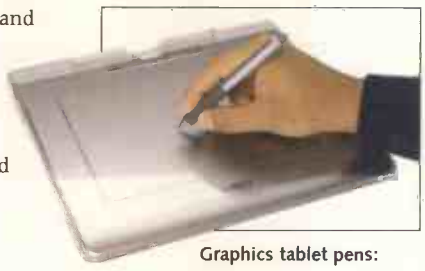
↘ Unless otherwise stated, letters sent to the Editor, PCW team or contributors will be considered for publication. Letters may be edited for clarity or length.

blocks access to my router and as a result, I'm back to trailing cables. Who needs to change here, the security suppliers or the rest? Or are we doomed to using secure PCs onto which we can load no useful tools?
Andrew Vaughan



Graphics tablet pens: easier to use than a mouse?

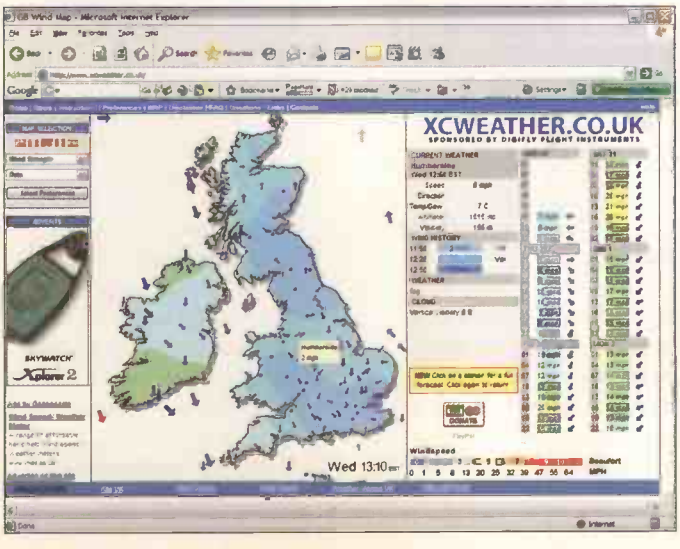
Kelvyn Taylor replies: It certainly is a worrying trend when security starts interfering with productivity.

WHATEVER THE WEATHER

Readers who found Mark Whitehorn's 'Weather report' article (*PCW*, May 2007) interesting might also like to take a look at Dave Billington's website, **www.xcweather.co.uk**.

This gives separate maps for the wind strength, temperature, pressure, visibility, cloud base and general weather situation for the UK and part of Europe, updated every half-hour. Just place your mouse over your nearest airfield, or your intended destination, on any of the maps, to get the current weather report for that point, as well as the wind history and predicted winds.

As a private pilot myself, I consider this one of the best-designed and most useful sites on the internet.
Terry Froggatt



XC Weather has all aspects of the climate covered with a range of maps

KEEP TAKING THE TABLETS

I read with amusement the news item 'Pen Input hits the Desktop' (*PCW*, May 2007) as I have been using a Wacom graphics tablet for just over six years now. Although I still have a mouse connected to the computer, I use the pen and tablet most of the time.

I haven't found the Wacom mouse particularly friendly to use – the constant clatter as you move it around the limited area of the tablet is very irritating. It does take a short while to get used to the pen at first and some people do not get on with it at all.

As a design engineer, I sit at my computer all day using programs such as Autocad LT, Word and Excel. The pen is much easier and more natural to hold for long periods than the mouse, which gave me wrist cramps and other discomforts with prolonged use.

I find that the pen is also much quicker to use, but it does have its idiosyncrasies. Whether I use the pen tip or the side switch for 'left click', the pen tip invariably moves a fraction at the critical moment. This is not a problem when using general office applications, but when drawing it can be tedious.

I have also found that the pen sometimes seems to stick to the window slide bars – a bit disconcerting when the window view moves with your hand even though the pen is not actually grabbing the slider. No doubt this is a Windows XP 'feature' that I am not aware of.

I hope that your journalists enjoy using the pen and tablet, and it would be interesting to hear how they get on with it. No doubt some will love it and some will hate it. Thanks for an interesting and informative magazine, which I have been reading for some 20 years now.
Eric W Perryman

NEXT-GENERATION BROADBAND OPTION

I read with interest your 'Next generation broadband' article in the May 2007 issue. There are a few points that you have missed, however, regarding the use of 3G as an alternative.

Quoting from T-Mobile's website: "Already a customer and don't want to commit to a price plan? Not a problem, simply add the Web'n'Walk monthly option to your current Flext or U-Fix £25 plan and pay just £7.50 a month extra."

So if you already have a 3G T-Mobile phone on a monthly plan you can get the 3G service for £7.50 extra.

I have a USB Bluetooth dongle (£8 from Ebay) for my desktop PC, so as long as my phone is near my computer, I have internet access. Therefore, there's no need to get a laptop just to be able to use a 3G PC Card. With Windows XP SP2, the combination of dongle and 3G phone works perfectly. This works out quite cheaply for 3GB per month, so it's another option for readers to look at.
Eduardo Batalha

A RIGHT TO BROADBAND?

Recent letters and articles in *PCW* about limited or non-existent broadband services prompt me to consider how we ever arrived at a situation where virtually every house in the UK has access to a telephone line. Obviously the answer is that commercial considerations were not part of the equation – the GPO was a public service utility that could not choose to ignore areas that were more costly to connect to the network than others.

This public service utility has been turned into a monopoly that serves its shareholders first and the public second, therefore I feel that the Government has a duty to protect its citizens who live in areas that BT consider it uneconomical to reach. Is it too much to expect that if BT wants to continue to profit from its monopoly in supplying broadband services, both retail and wholesale, it must be forced to supply a minimum level of connectivity for every household?

The T-Mobile 3G data card can save you getting a laptop to use a PC card

A simple rule stating that there must never be an order of magnitude difference in speed between the slowest and fastest service available to any subscriber would suffice to put even the most remote areas on the broadband map and keep them updated as technology progresses. Unless this happens, I fear there will be some areas that will never be connected.
Ralph Bartlett

UNWANTED CDS

I don't doubt that the relevant commercial issues are significant but surely the time has come for environmental issues to take

Synctoy: a snazzy little tool for synchronising files or folders

priority? I am referring to the many thousands of discs that go straight from the cover of your (excellent) magazine into the nearest bin and, thereafter, where? Perhaps some enlightened authorities can now recycle them, but I suspect most go to landfill.

By all means continue to publicise newly issued software and publish links to a site from which it can be downloaded, but please leave the resources that are consumed to produce these discs so that our children can use them for something even more worthwhile.

Peter Snoxall

PC EMERGENCY TOOLKIT

Firstly, thanks for an interesting and informative magazine – I gain a lot from it. I have a query relating to the PC Emergency Toolkit article in the December 2006 issue. It states on page 54 under 'The ultimate recovery disc' that you need three things, one of which is "your XP installation CD with Service Pack 2 integrated".

My XP installation CD was pre-SP2, and although I have updated my PC to SP2, how do I create the CD with SP2 integrated? Perhaps you can help, or have I missed the blindingly obvious?

Peter Penhallow

Kelvyn Taylor replies: Our guide to using the free Nlite software to create an XP CD that includes Service Pack 2 is now available online at **www.pcw.co.uk/2154232**.

DOUBTFUL VIRGIN

Am I alone in having doubts about the new Virgin Media setup? I have been a Virgin mobile customer for many years and never had a problem. But since Virgin has got involved with my TV and broadband services all has not been well.

The much-publicised spat with Sky has left me (and millions of other NTL and Telewest subscribers) several channels short of a full subscription price, and with no chance of a reduction. Although I am only bothered about one channel, others are missing half a dozen.

Also, in my days as an NTL dial-up and, latterly, broadband customer, I got spam delivered correctly into my webmail spam box at the rate of two or three per week. Since Virgin got involved that has rocketed to ridiculous proportions.

This morning alone there were 13. Is this simply a coincidence? Does the normally loquacious Sir Richard Branson have any comment to make on this?

Brian Hopwood

Kelvyn Taylor replies: I've certainly noticed no difference in the amount of spam received on my ex-NTL email account, so it may indeed be a simple coincidence that your email address has been picked up by the spammers. You can set the Virgin server-side spam filtering options by logging into your webmail account and clicking Options / Spam. You can keep up to date with the Sky/Virgin situation at **http://allyours.virginmedia.com/fairplay/index.html**.

TOYING WITH BACKUP

I read with interest Gordon Laing's column in the May issue of *PCW* ('Microsoft is Watching your Backup'). I support a number of 'silver surfers', who use PCs to exchange emails and pictures with family, to produce newsletters and so on.

Terrified that they would lose their digital photos, I had them carry out backups to external hard drives with a batch file I made using the XXCOPY utility. Then I discovered Microsoft Synctoy.

Why is this snazzy little program not promoted instead of it turning up by chance during an internet search I carried out? It is easy to set up, it works a treat and it reports on what it has done. My clients love it and are reassured that with uncompressed backup files they could, in the event of computer failure, hook up the external hard drive to any computer and access their files.

Sarah E Birkin

*Kelvyn Taylor replies: We did mention Synctoy on our blog (***http://labs.pcw.co.uk/2005/09/latest_xp_power.html***) when it first appeared, and agree that it's a marvellous tool for synchronising files or folders. You can download it from* **www.pcw.co.uk/2142367**.

GREENER BUSINESS

In the 'How Green is Your Business' feature in the May issue of *PCW* you state that when it comes to enforcing power saving features "Windows Group policy can't be used (because of the way the power settings are stored)". But they can if you download the free EZ GPO software developed by the Environmental Protection Agency from: **www.energystar.gov/index.cfm?c=power_mgt.pr_pm_ez_gpo**

There's an installer script to deploy it to client PCs and the relevant administrative template to configure the settings.

Graham Mallinson

WIN Next month's prize for the letter of the month is HAUPPAUGE WINTV

The new Hauppauge WinTV Nova-TD USB key tuner uses 'Antenna Diversity' technology to give the best reception for digital Freeview TV on a PC. This tiny USB2 bus-powered key boasts two digital tuners that can be combined in weaker reception areas. In better reception areas or with a roof aerial, the tuners work independently, enabling you to record one programme while watching another, or record two different programmes simultaneously. It comes with twin portable aerials, software and an infra-red remote control.

Fully compatible with Windows XP, Media Center and Vista, Hauppauge's WinTV Nova-TD adds a new dimension to your media experience.

The winner can opt instead for the Hauppauge WinTV HVR-900, a hybrid analogue/digital USB stick tuner if they live outside a Freeview reception area.

For more information, visit **www.hauppauge.co.uk**.

CLARIFICATIONS AND AMPLIFICATIONS

● In our quad-core PC group test in the May issue, in the review of the Editor's Choice system, the Chillblast Fusion Tornado Quadro Q6700, we incorrectly stated that the system featured two 768MB Nvidia Geforce 8800 GTX graphics cards. The features table correctly stated the system configuration as a single card, although the PC is dual-graphics (SLI) capable. We apologise for the error and any confusion this may have caused.

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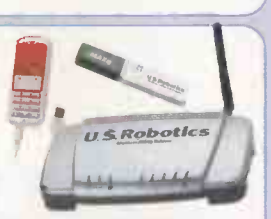

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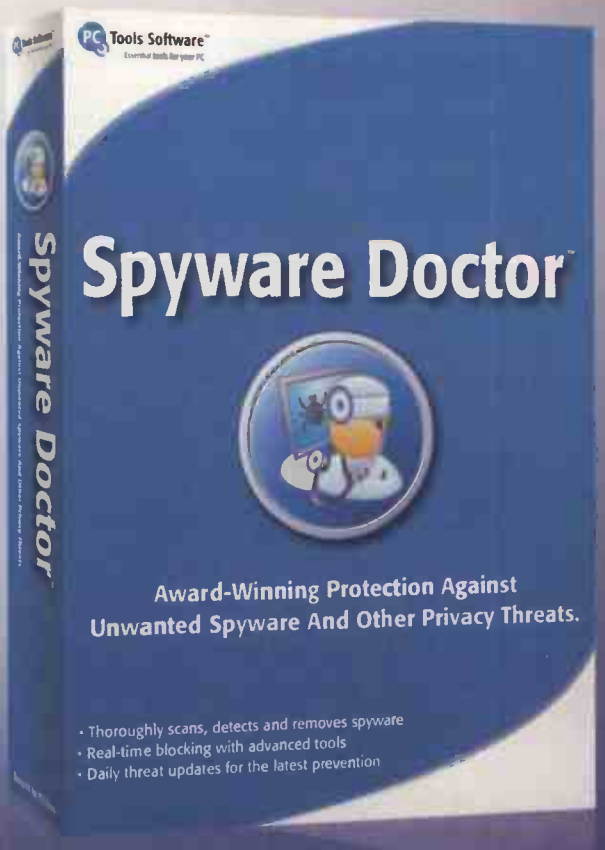

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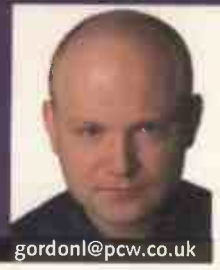

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Revival of the fittest

Olympus looks set to regain its place as one of the top three camera manufacturers. And the other two will be... ?

Like Germany's Photokina show, the US-hosted Photo Marketing Association trade show (PMA) is where the photographic industry unveils the latest cameras and reveals trends for the year to come. While this year's preshow rumour mill went into overdrive on possible upcoming digital SLRs, there was very little new stuff to get excited about.

Nikon's D40x was simply the earlier D40 with a 10-megapixel sensor, Sony only showed concept mock-ups and, while Canon updated its professional sports model to shoot 10-megapixel images at an impressive 10fps, where were the replacements for the top-of-the-range 1Ds Mark II or the increasingly unremarkable EOS 30D?

There's always one manufacturer or product that steals the show, though, and this year it was Olympus. While there was still no solid date or pricing for its long-overdue flagship professional model, it unveiled the new entry-level E-410 and mid-range E-510 DSLRs, which packed in a significant degree of innovation.

'There's always one manufacturer that steals the show. This year it was Olympus'

Like earlier Olympus DSLRs, the new E-410 and E-510 employ the Four Thirds standard. Four Thirds was launched almost five years ago as an open DSLR standard which any manufacturer could adopt, although until the Panasonic/Leica collaboration last year, Olympus was the only company producing bodies.

From day one, Olympus enhanced the Four Thirds standard with its own technology to address common DSLR concerns or weak points. First was its Supersonic Wave Filter (SSWF), which vibrated a filter in front of the sensor in an attempt to shake free any dust. While Canon, Sony and Pentax all offer similar propositions, the Olympus SSWF beat them to it by several years.

SSWF also remains the most effective of the anti-dust systems, although this could be as much to do with the large distance between the filter and sensor surface rather than the vibrating filter.

The second issue Olympus tackled was the inability of a traditional DSLR to use its main colour screen for composition. The resulting Olympus Live View system employed two different solutions: one placed a second, small sensor in the viewfinder to see what you were seeing, while the second simply flipped the mirror up and exposed the main sensor, which was now equipped to deliver a live video feed.

For anyone familiar with composing through an optical SLR viewfinder it was arguably a solution to a problem that didn't exist, but for the many compact digital camera owners who'd become accustomed to framing with their colour screens, it removed a potential barrier from upgrading to a DSLR in the future.

Unfortunately, the Olympus E-330 on which Live View made its debut last year was pricey and unconventionally styled. Worse, while Olympus was solving this problem, the much greater issue of anti-shake remained unaddressed on Four Thirds. Panasonic and Leica may have delivered the first Four Thirds lens with optical stabilisation late last year, but high price and limited availability ruled it out for most existing owners. Olympus in turn had long believed stabilisation built into the body was the preferred solution, but none of its bodies featured it. Until now that is.

The new E-410 and E-510 have taken everything Olympus has developed over the years and packed it into affordable 10-megapixel bodies. Both feature the SSWF for anti-dust, and both feature Live View facilities (like Panasonic and Leica, by using the main sensor alone). The E-510 goes one step further by being the first Four Thirds body to feature built-in anti-shake by shifting the sensor. And, unlike rival solutions from Pentax and Sony, the Live View facility should allow you to preview the benefit on-screen.

Canon claims there'll only be room for three major DSLR players in the future. Assuming two are Canon and Nikon, the question is which will be the third? Pentax, Sony, Panasonic and Sigma are all competing for a share of the DSLR market, but with its latest lens and body announcements, I'd say Olympus is looking the most convincing. So long as the new sensor in the E-410 and E-510 doesn't have any serious quality issues, Olympus and Four Thirds should find themselves in the premiere league of DSLR photography. PCW

Barry Fox

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One laptop, one child – many problems

The stark realities of poverty in the developing world could derail the laudable One Laptop Per Child project

In rural India, kids beg for pens – not pennies, but pens. This tells us a lot about what is happening with education in many of the world's poorest nations. Education is a way out of the poverty trap; without education there would be no advances in technology. Having said that, it's what happens next that really matters.

Computer journalists recently got holier-than-thou laughs at a joint news conference held by Romania's President, Traian Basescu, and Bill Gates to open a technical centre in Bucharest. "[Piracy]... set off the development of the IT industry in Romania," said Basescu.

But Romania isn't even top of the piracy table. In Vietnam, only one out of 10 PCs is running a legal copy of Windows. China is in fourth place with 86 per cent piracy, and India has fallen out of the top 20, down to 72 per cent.

'There could be a black market of kids selling laptops to adults wanting to escape Windows'

The Indian government condemns copyright theft and the country's campaign against piracy, the new phone-home validation checks built into Vista, and similar Windows Genuine Advantage checks now being slid into XP by recent updates, are encouraging more people to consider Linux as an alternative OS. Support for Office 2000, the last version to allow multiple installations, is ending and free Open Office is the natural replacement. There are still gripes about the difficulty of installing Linux, but all that could soon change with the OLPC (One Laptop Per Child) project.

The grand plan, hatched by Nicholas Negroponte, pioneer of computer-aided design and founder of the MIT Media Lab, is for a $100 Linux laptop – the XO – made by a non-profit organisation that brings education to people who cannot afford books. The Libyan government has signed up to buy 1.2 million XOs – one for every school-age child in the nation. Rwanda and Uruguay have also committed (http://laptop.org).

Quanta, the world's largest maker of laptops, will make the XO hardware, which is the size of a textbook and lighter than a lunchbox. A transformer hinge lets the XO morph shape for standard laptop work, ebook reading and gaming, with communication via an 802.11b/g wireless mesh network. Wikipedia will provide content. Red Hat, SES-Astra and Nortel are also involved.

It is powered by a NiMH rechargeable battery, with circuitry to tolerate power input from car batteries, a mechanic crank, pedal or pull-cord. The unit draws a maximum of 500mA, and the batteries are rated at 22.8-watt hours.

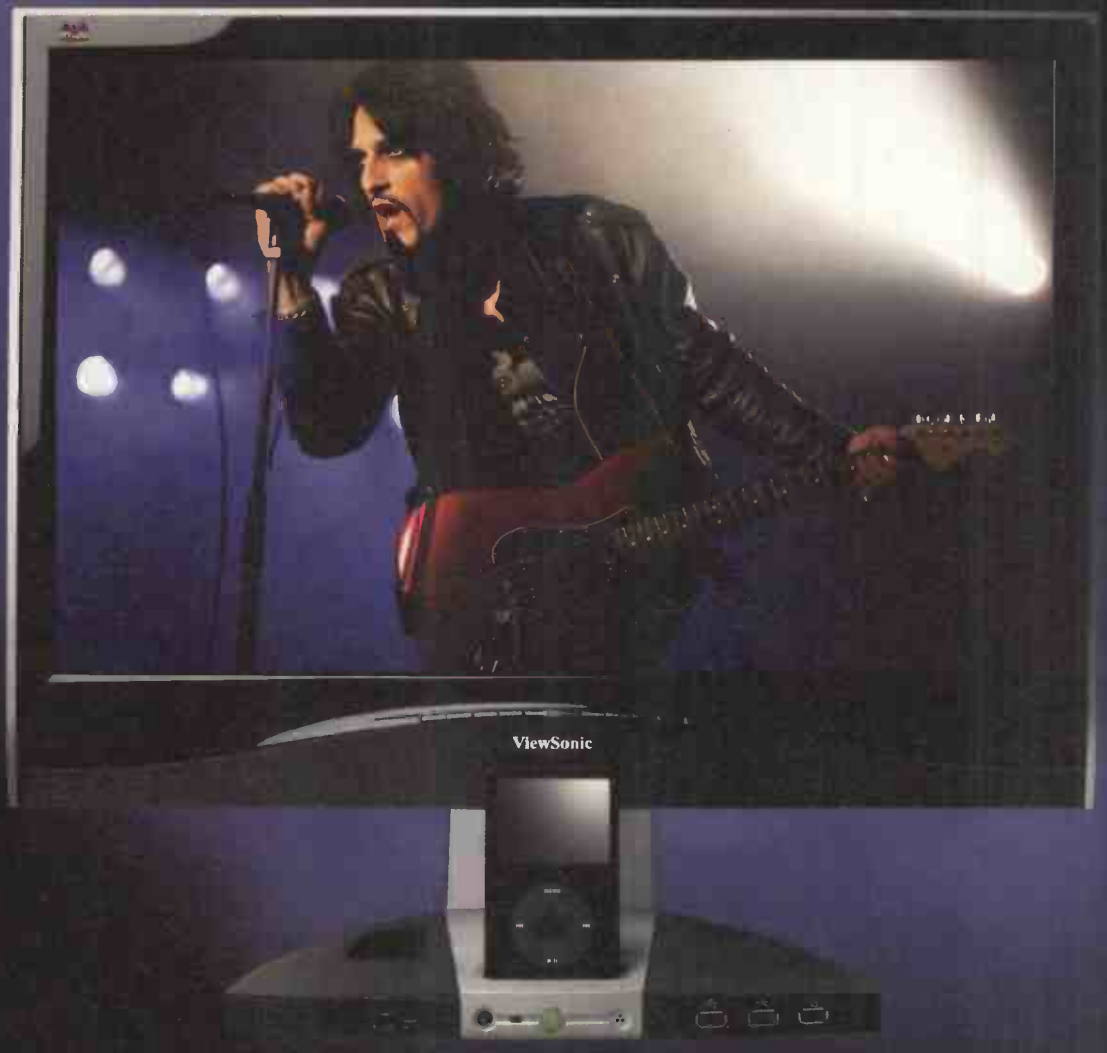
There is no hard drive to crash; mass storage is 512MB of Flash memory. The mesh network antennas double as external covers for the USB ports. The CPU is a 366MHz AMD Geode GX-500, with x86 compatibility and a Linux open-source Bios. The graphics controller is integrated with the Geode CPU and there is 128MB of Ram. The screen is a 7.5in TFT with 1,200x900 resolution. The display is cushioned by internal bumpers in the hope of keeping it working for five years.

A capacitance/resistive touchpad supports written input, with a 640x480 camera, USB2 connectors and an SD Card slot built in. And there is none of the digital rights management (DRM) that now bedevils Windows.

"The Vista Content Protection specification could very well constitute the longest suicide note in history," says Peter Gutmann at the Department of Computer Science, University of Auckland. He was balancing Vista's user benefits against the collateral damage done by DRM, HDTV content protection, HDMI/HDCP connectivity, revocation of insecure drivers, invalidation of Windows if hardware is changed to cope with revoked drivers, and the drain on CPU performance that comes from handling all these hassles.

Perhaps this explains why not everyone is keen on the OLPC idea. There could be a huge black market with kids who now beg pens selling laptops to adults who want to escape Windows.

There are rumblings that Microsoft may sue Linux over patent infringement. This raises an interesting dilemma. The Bill and Melinda Gates Foundation is doing fine work to eradicate malaria from the world's poorest nations – the same nations that will benefit most from the OLPC project. If patent actions cripple Linux and increase the price of the XO, Bill will be hurting the very people he and Melissa are trying to help. PCW



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CISCO

Guy Kewney

guykewney@gmail.com

Is it right to pay taxes to Caesar Bill?

Nobody is under any illusions that Windows is infallible. But perhaps it is our expectations that are way too high

Here's a statistic, which you are free to doubt: about a third of personal computers bought in the UK through small retailers have illegal copies of Windows on them. What happens is that a small retailer loses customers to Dell. Not having Dell's advantages in terms of economies of scale, it economises, and uses the same copy of Windows for a couple of hundred systems.

Well, who cares? I mean, to paraphrase Monty Python's *Life of Brian*, what has Windows done for you lately? And do we really doubt the value of Windows?

People do resent having to pay money for something which, let's face it, does break down. But Microsoft is too big a corporation to cope with being paid on a voluntary basis. So it does its best to make sure we really do pay for every copy of Windows. And, of course, it fails.

'To paraphrase Monty Python's Life of Brian, what has Windows done for you lately?'

The latest way of policing this is by insisting that when you upgrade Windows to the next essential Service Pack, you prove that you have a genuine, paid-for copy. And there are advantages to having the genuine copy; it means you're up to date, less likely to suffer virus attacks... but of course, the users don't see these as advantages. Rather, they see these as problems caused by Microsoft's incompetence in failing to write an OS that can't crash, or can't get infected.

So when Microsoft calls this 'Windows Genuine Advantage' (WGA) the universal response is: "Advantage to whom?" Microsoft screwed it up, and the WGA team will, sadly, admit it without argument. The first WGA system was a horrible mess, and caused people who did have genuine copies unnecessary pain. Trivial changes – a new disk, even a new wireless network card – have been known to confuse WGA into saying: "This is a different PC from the one you registered Windows on, so we think you pinched it; and we're not allowing the upgrade."

The current version of WGA is attempting to mend the relationship. I don't rate Microsoft's chances of doing this, because the better Microsoft does its job, the less it will be valued.

Consider: the perfect operating system would be something you never noticed. The perfect operating system would spring into action a couple of seconds after you switched the PC on. Even if you hadn't realised it needed to be running, anything you'd typed would have been captured, and displayed on the screen, and when the OS was ready, it would be fed into the appropriate software. Files would create themselves, and would include everything you'd put into them, even if you forgot to save and of course, a backup copy of the documents would be stored on a remote server, just in case. And I'm sure you could easily create a list of golden features of your own... probably all fantasy, impossible to achieve.

And if you got an OS that worked like this, would you be grateful, and be happy to pay? Not at all. You'd complain if it broke down but you'd still take the thing for granted. And then, you'd see that Bill Gates makes so much money from this perfect thing that he can afford to be the world's biggest charity donor, and you'd think: "Heck, he doesn't need the fifty odd quid I'd save if I just gave Aunt Meg a copy...!"

The level of rage people feel when their PC dies is universally Olympian. The level of rage they feel when Microsoft actually stops them and says: "Look, sorry to interrupt, but did you know that 5,000 other people have registered Windows with exactly the same key you used?" is even greater. "It's not my problem!" you shout at the screen. "I paid good money for this heap of crap. I just want to use it."

So Microsoft is probably wasting its time making WGA an 'opt-in' feature, which you can refuse to download. For a start, I really don't believe most users will ever understand what that means. And more significantly, I don't think it's the way to go.

What Microsoft should do, is make it a lot harder to use Windows, so people are truly impressed when it does work. And make it look harder, too. And fill the screen with lots of signs that it's working really hard. Did I just describe Windows Vista? **PCW**

Any media, anywhere, anytime

Gordon Laing explains how to plan and create a multimedia home network, and how to ensure it keeps going smoothly

Today, PCs are increasingly found at the heart of our home entertainment systems – and for good reason too. Compared with most consumer appliances, which are designed for specific tasks, PCs boast unrivalled flexibility, and can manage and deliver your photo, music and video collections, and record your favourite TV shows, and distribute them all throughout your home with the help of affordable networking equipment.

It's a powerful and compelling concept, and one we've been talking about for some time. What's changed over the years is that homes are becoming more like small company operations, with networks, multiple client devices, media servers, and all their associated administration.

If you're thinking of building a complete networked entertainment system at home, or perhaps expanding an existing setup, you can save yourself a lot of time and effort by planning and anticipating problems before they occur, to ensure your systems run smoothly. An entertainment system should be just that, keeping you and your family entertained, with as little time as possible spent tweaking or fixing problems.

Over the following pages we'll explain everything you need to know about setting up and running a successful PC-based home entertainment system. We've divided the article into three main sections to help you plan, build and maintain your system, with tips on choosing the right hardware, avoiding incompatibilities and setting everything up so it runs with the minimum effort and maximum return.

We'll also look at the future of networked home entertainment, with Microsoft's forthcoming Windows Home Server; talk to the UK Patent Office about the legal issues of ripping CDs and DVDs; and interview two *PCW* readers who have built PC-based entertainment systems at home and won't ever look back.

PLANNING

Before starting to construct a home media system, it's crucial to think very carefully about what you'd like it to do, both now and in the future. This includes considering storage, and evaluating different media encoding formats and the kind of devices you'd like to play them. Many parts of the system will be inexorably linked, so it's important to think about how the complete system should work, right from the start.

The forthcoming Windows Home Server will come pre-installed on kit such as this HP Mediasmart Server and will be aimed squarely at home users with several PCs

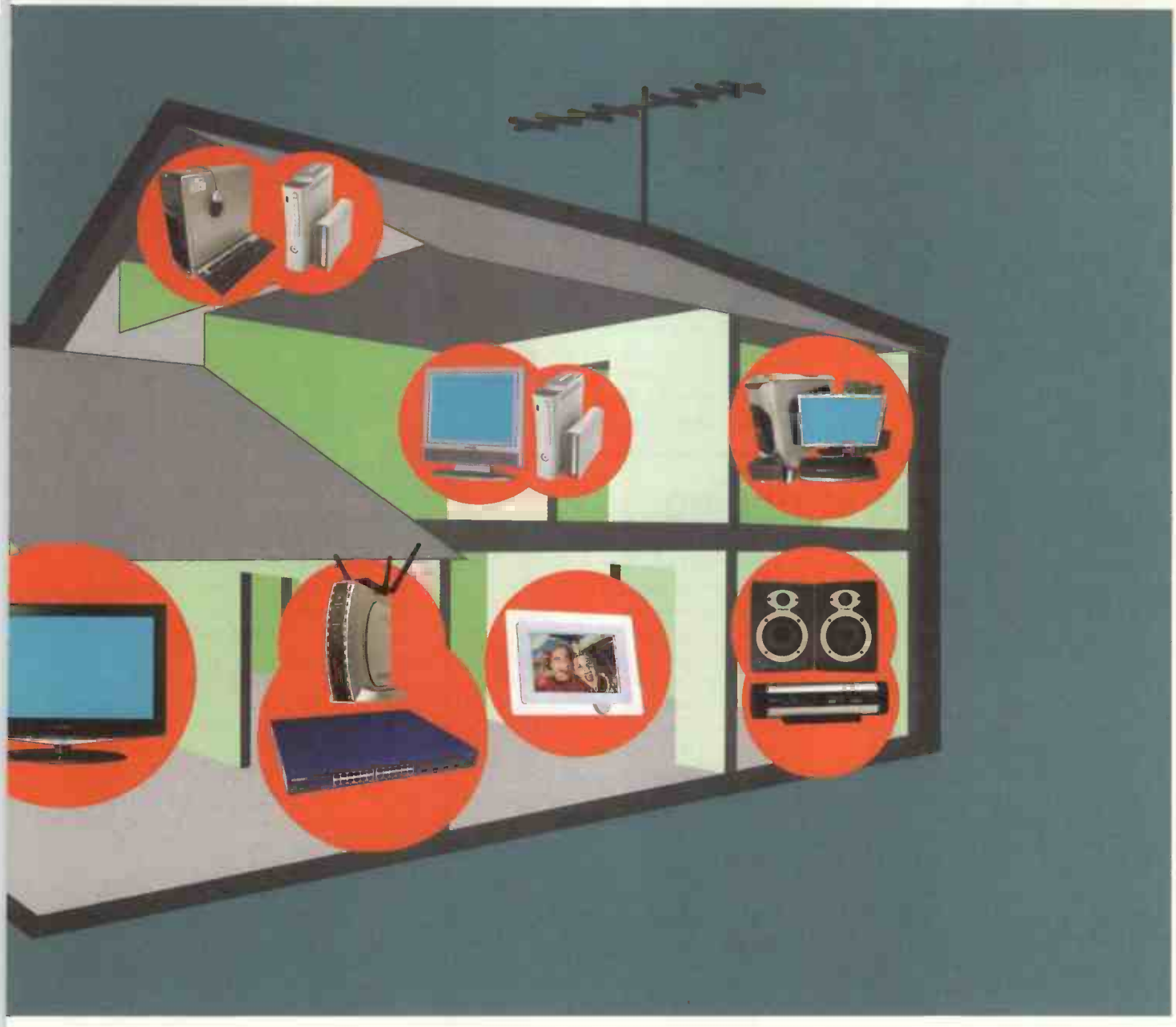
Client and server

The most flexible, powerful and scalable approach involves storing all your media on one machine and accessing it with others around your home. So the first aspect to consider is exactly what kind of hardware and software you will use to store your media, and what kind of devices will access and play it.

In most cases the storage device will be a PC-based server, but if it's just used for storing files, a simpler network-attached storage (Nas) appliance could be sufficient.

The media playback device could be a PC, a networked games console, a dedicated media appliance or any combination of the three. There are many options, but one thing to note is that most media appliances require specific software to be installed on the device that's serving the media files. If this software is only available for Windows, for instance, it rules out Nas devices for storage, unless they're working in conjunction with another Windows machine.

Additionally, beware of mixing and matching different appliances as each may require its own software to be installed and they could conflict; it may seem boring, but



you'll inevitably find it easiest if all your 'client' devices are identical.

Microsoft aims to make the choice of Windows Media-compatible streaming clients easier with its Play For Sure scheme, but there still aren't many certified devices.

Some streaming appliances are also very specific about what they need at the server end. For example, to make the most of the Xbox 360 for streaming media, the 'server' will need to run Windows Media Center Edition (XP or Vista). Equally, if you like the look of the Apple TV appliance, you'll need your media collection managed by iTunes. And if you intend to use a PC to record TV shows, you'll also have to ensure the hardware of the tuner is 100 per cent compatible with the software that's scheduling the recordings.

Microsoft Windows Media Center is at the heart of many PC-based entertainment systems

Media formats

When choosing hardware, it's also crucial to think about the compatibility of media formats. There are many different ways to encode audio and video files, and you can't just assume they'll all be compatible with the devices you have in mind.

For instance, Windows Media Lossless can deliver fantastic quality audio, but not many streaming appliances are natively compatible with it. And the popular Divx and Xvid video formats aren't compatible with the Xbox 360. And while it's possible for a sufficiently powerful server to transcode media files on the fly, it's better to ensure files are natively compatible with whatever's playing them.

If you already have a significant media collection which you're in no hurry to ↘

re-encode or re-purchase, it is likely to influence your choice of media appliances. For instance, people with huge iTunes libraries will find it easiest if they stick with Apple devices or software for playback. Such considerations are particularly important if you've been buying music online and the files are copy-protected, as such files often only work on a handful of client devices.

If you don't have an existing media collection though, or you don't mind re-encoding, then you could choose your hardware first and then encode media in a format to match. Alternatively, for the maximum format compatibility, you can't beat using a media PC for playback.

Just as important as looks, you need to ensure that the devices you choose support the formats in which your media is stored

Storage

Storage is one of the most important aspects of a home entertainment system, and for keeping hefty media files, you really can't ever have too much (see pages 40 and 41 for real examples). When planning the storage side of your system, you should think about how much you need now and how easily you'll be able to expand it in the future. You should also consider how to protect all this data.

Raid arrays are an ideal way of looking after all these aspects because they theoretically protect against disk failure without any downtime and enable you to expand the total capacity easily.

We say theoretically because not all Raid arrays are created equal. For data redundancy, you should be looking at Raid 1 or Raid 5. Raid 5 has the advantage of less wastage, but common software-based solutions place a heavy toll on your processor, while also suffering from poor write speeds, which are insufficient for recording live TV. So if you're serious about Raid 5, we'd recommend investing in a Nas device or an expansion card with a decent hardware-accelerated Raid controller (such as those from **www.promise.com**).

It's also important to remember that Raid only provides protection against disk failure. Fire, flood or theft could still wipe out your precious data, so always back it up onto another system or removable media and keep the backups elsewhere.

Reliability

When planning a PC-based system for home entertainment, it's easy to be bewildered by all the possibilities. But don't forget one crucial aspect: whatever you bring into your lounge simply has to work.

IT experts use the term 'mission-critical servers' to describe the servers that firms depend on, and to indicate why such kit must be reliable. Once your entertainment system fails in front of your friends and family when all they want to do is relax and enjoy their favourite show, you'll demand the same degree of bullet-proof reliability at

Adding an HD-DVD drive to an Xbox 360 is a cost-effective upgrade for high-definition playback

The legalities of ripping

It is common for people to transfer or 'rip' the contents of CDs or DVDs onto their hard disks, usually in a compressed format to make the resulting files small and manageable. The aim might be to stream music and videos within the home, enjoy them on a portable player, protect a collection from wear and tear, or simply tidy away shelves of cases.

But have you considered the legalities? Ripping DVDs and CDs has become so common that many people consider it a perfectly legal activity, or at least fair-use for something they believe they own. Provided you're not duplicating discs to sell at a car boot sale or uploading them to file-sharing sites, it's perfectly reasonable, right?

Wrong. UK law does not currently permit any kind of copying of copyrighted material for private use – and since all commercial CDs and DVDs are copyrighted material, ripping them is illegal. Ripping DVDs, HD-DVDs or Blu-ray discs is doubly illegal because it additionally involves circumventing encryption systems.

If you're ripping material for private use, it's a civil offence, which means the copyright holder is entitled to sue you. If you duplicate the content and pass or sell it onto others, it's a criminal offence and you run the risk of the police calling round.

So does that mean products such as Windows Media Player and the iPod encourage unlawful activity? Well, technically speaking, you can use them legally by only ripping copyright-free material – such as your own home-movies – or buying content from legitimate sources such as iTunes. But let's face it, most people who own these devices do rip discs they've bought, so where do they stand?

In terms of unencrypted audio CDs, you shouldn't lose too much sleep. At a House of Commons Select Committee meeting last June, British Phonographic Industry chairman Peter Jamieson stated: "We now need to make a clear and public distinction between copying for your own use and copying for dissemination to third parties, and make it unequivocally clear to the consumer that if they copy their CDs for their private use to move the music from format to format we will not pursue them."

The Motion Picture Association has not, however, made a similar statement about DVDs. It's also worth pointing out the Time Shifting exception for recording TV shows only permits you to watch the program at a time more convenient for you, after which you're expected to delete it.

The exception does not permit you to legally keep a library of recorded TV.

Anyone who believes this is all a little unreasonable when it comes to discs they've bought will be pleased to hear that the recent Gowers report recommends that the Government should introduce a limited exception for 'format shifting'. The Government will consult on the scope of what will be allowed during spring 2007. It is hoped that consumers will subsequently be able to copy legitimately owned CDs onto mp3 players for their own private use.

However, until the law is changed, anyone who rips even legitimately purchased CDs and DVDs for personal use runs the risk of being sued by the copyright holder. And the need to circumvent encryption on DVDs before they can be ripped means this particular process is likely to remain illegal.

Windows Home Server

Windows Home Server is a new Microsoft product designed for families who own multiple PCs and want to easily store, share and back up their information.

First announced in January and expected to hit the stores this autumn, Windows Home Server (WHS) will initially be sold on pre-built systems, with the new operating system pre-installed and ready to go.

The WHS operating system is based on the robust Windows Server 2003, but adapted for the needs of the home user. It provides a central home for storage, which can easily be expanded by connecting additional disks. Rather than requiring multiple drive letters though, WHS cleverly presents all the available storage as a single area that anyone can use. Connecting multiple disks also enables WHS to deliver redundancy in a similar way to Raid, but without the need for identical disks.

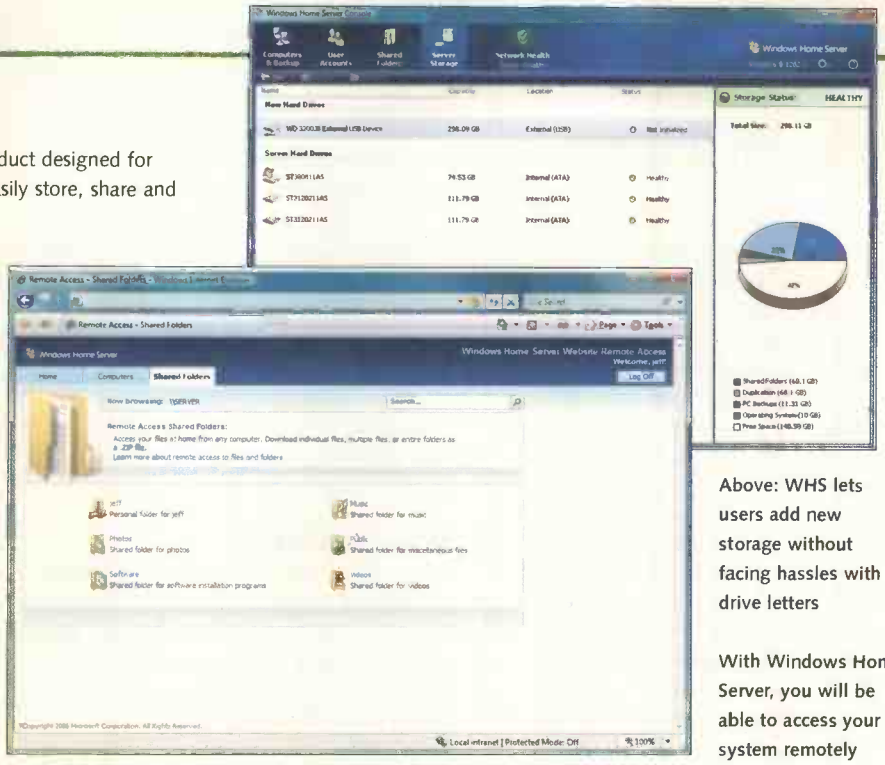
One of the most practical applications for this shared storage is data protection, and WHS will automatically back up all your PCs every night. If the same file exists on more than one PC, it's only stored once to save space. Then, should anything go horribly wrong with one of your systems, WHS can restore the data to a point when things were running smoothly.

WHS is also happy to stream content to devices supporting Windows Media Connect, such as the Xbox 360, Zune portables, or other Windows PCs, although it doesn't go as far as generating or recording content for you – so you'll still need a media PC or another device to record your favourite TV shows.

Every WHS comes with a Windows Live web address, which enables you to upload and download files to and from the server remotely – useful if you're uploading digital images from your holiday or wanting to access your documents on the road.

WHS may have Server 2003 under the hood, but it is designed to be very easy to use, with a Vista-style user interface.

At the time of writing WHS is undergoing beta testing, but the concepts sound promising. The automatic backup and easy-restore facility for PCs could be especially attractive. Like Windows Media Center Edition before it, Windows Home Server will be launched in North America first, with other regions following later. The software may be available separately in the future, so you can install it on your own hardware, but the initial focus will be on pre-built systems. See **http://blogs.technet.com/homeserver** for updates on WHS.



Above: WHS lets users add new storage without facing hassles with drive letters

With Windows Home Server, you will be able to access your system remotely

home. In the next section, we'll discuss the steps you can take to maximise reliability.

KEEP IT SIMPLE

The PC systems you build for home entertainment should be as reliable as possible; no-one wants to start trouble-shooting when they're relaxing in the evening. Consequently, while it may be tough for computing enthusiasts to reign themselves in, the need to ensure reliability generally involves being quite conservative in component selection and construction.

PC construction

To maximise the reliability of your media PCs, use well-known brands and components with certified (WHQL) driver support and don't push them beyond their operating specification. Also note that many PC reliability problems can be traced to a poor or insufficient power supply – so don't skimp here, especially for your server.

A good cooling system for your kit is essential, but it doesn't have to be noisy. By upgrading stock heatsinks to decent models such as those from specialists like Zalman, you'll both improve your cooling efficiency and reduce fan noise.

Also, never mount hard disks directly next to each other and take care with your internal cabling to maximise airflow.

HD considerations

If you'd like to watch high-definition material on your PC, you'll generally need beefier or dedicated hardware to take the strain. This particularly applies when playing movies on Blu-ray or HD-DVD.

Besides a compatible optical drive, you'll need the software and processing muscle to decode the video, along with a graphics card and display that both support digital copy protection.

We've explained the full requirements for Blu-ray playback in this month's Hands on Performance column on page 130 (and they also apply to HD-DVD), but to recap, you're ideally looking at a dual-core processor, a graphics card which supports both H.264 acceleration and HDCP, and a display which also supports HDCP. Alternatively, if you're already using an Xbox 360 as a client device, you could consider the optional HD-DVD drive for it.

Networking

If you're streaming media files around your home, the connection between your systems is of paramount importance. It's tempting to think wireless is up to the job, but while it may be adequate for delivering modest streams to one or two systems, you could find yourself disappointed if you're hoping for three or more streams playing at once, especially if one of them is high definition.

The bottom line is that there's no substitute for the performance of wired networking, and we'd recommend it for any serious home media installation. The ↘

Readers' Drives: A logical choice

PCW reader Martin Jones already had two PCs and a server for business purposes at home, so it seemed a logical step to use them as a basis for a media network. "I wanted to add the capability of recording and storing TV programs on the network, along with having somewhere to store photos from my digital camera. I also hoped to digitise my collection of VHS tapes and stream photos of the kids to the main TV for their grandparents to see."

Martin chose to use PCs rather than dedicated appliances, because he was dissatisfied by his experiences with a Tivo and was attracted to Windows XP Media Center Edition due to its ability to stream content to the living room. "I'd been building PCs and networks for over 20 years so I felt technically comfortable with the idea," he says.

Martin's system now consists of four main PCs: two running XP Professional for normal use, one running Windows XP Media Center Edition 2005 for recording TV shows, and another running Windows Server 2003. All are connected using a Gigabit wired network. "The MCE 2005 box has a single 320GB disk and only holds content until it's deleted or moved to the server. The server has a pair of 500GB Raid 1 arrays, so 1,000GB in total."

In terms of maintenance, Martin says he may never get the MCE 2005 100 per cent right: "I've rebuilt it several times, always using Microsoft-recommended components, but the MCE software still crashes fairly regularly, requiring a reboot."

Despite technical hitches with MCE 2005, Martin believes the system is a success: "The whole family uses it and there's been no particular criticism, so that must be a result. The grandparents have also watched slideshows of photos from the settee, and I like being able to record TV and watch it on any device."

If there's one thing he'd change, it would be the main display. "It's difficult to watch normal TV after using a high-resolution PC monitor, so I'd like to get a large plasma for the living-room in future." His advice to anyone considering building a similar system? "I'd definitely recommend it to 'propeller heads', but the more faint-hearted may prefer a ready-built media centre box instead."

downside is the need to accommodate and hide the cables themselves, but they're not particularly thick and are normally available in a variety of colours. Wall plates are also readily available for the neatest finish.

If you're going to the effort of discreetly laying cables, it's a good idea to do it right first time. Don't skimp on quality – buy decent Category (Cat) 5e cables as a minimum and use Gigabit adapters and a Gigabit switch to connect everything together. Gigabit networks give you much more headroom for future additions to your network and they are surprisingly cheap to implement.

MAINTENANCE

Building a PC-based home media system is actually the easy part; the hardest part is keeping it running smoothly. The best advice is that once your system's working, you should try to avoid changing anything. This can be tricky for an enthusiast who likes to tweak, but as the administrator of your home entertainment system, your job is to keep it running without a hitch.

If you do need to make any changes though, it's much easier to do so by remote control from another PC. Tools such as PC Anywhere, VNC, and Windows' own Remote Desktop enable you to control another PC remotely, enabling you to make adjustments without having to physically touch the machine in question.

This is clearly handy if the machine is only connected to a display tuned for video playback, or doesn't have a mouse and keyboard permanently connected. It also enables you to perform the adjustments from another room without anyone being disturbed or made aware of potential problems.

Backup

Once you've got your media PCs running as you'd like, it's a great idea to back up an image of each system by using tools such as Norton Ghost. These will enable you to revert to a fully functional system quickly and easily should anything go wrong in future. This will also undoubtedly be a killer application of Windows Home Server (see box on page 39). It also goes without saying that you should keep a backup of your actual media files, as mentioned in our earlier planning section.

A Gigabit Ethernet switch should be at the core of your home media network

Stay cool

Media PCs and servers designed to stand by themselves without clutter can often find themselves tucked away into corners or buried under papers or other objects. Though you may have built and configured them to require minimal hands-on maintenance, it's important to remember that you still have to look after them.

Probably the single most important consideration is adequate cooling. We've already mentioned how the PCs you build need to be kept cool with airflow within the case, but this extends to their surroundings too. A PC packed with fans won't stay cool if you wedge it in a corner and block its air intakes and exhausts.

Dust can also reduce ventilation, and direct sunlight on a case can greatly increase internal temperatures. Garages, lofts and utility rooms may sound ideal for housing a server, but check temperatures and watch out for sunlight streaming through windows at different times of day.

Similarly, it sounds almost patronising to warn against drips or leaks, but they do happen and PCs are extremely vulnerable.

Restart

The great tech-support mantra of 'switch it off and on again' is well known for good reason: it genuinely solves a lot of PC problems. So while it may be nice to have servers which run 24 hours a day, and client systems implementing power-saving standby modes, the fact is that almost all PCs will benefit greatly from being restarted on a fairly regular basis. So, instead of waiting for a problem to occur, why not schedule an automatic restart, perhaps once a week when your systems aren't in operation?

We've found this approach can fix all manner of evils, especially with systems operating remotely or those running Windows XP Media Center Edition 2005.

Patches

Turning to patches and updates, you might imagine they would be essential to keep a PC running smoothly, but they actually disrupt many media systems.

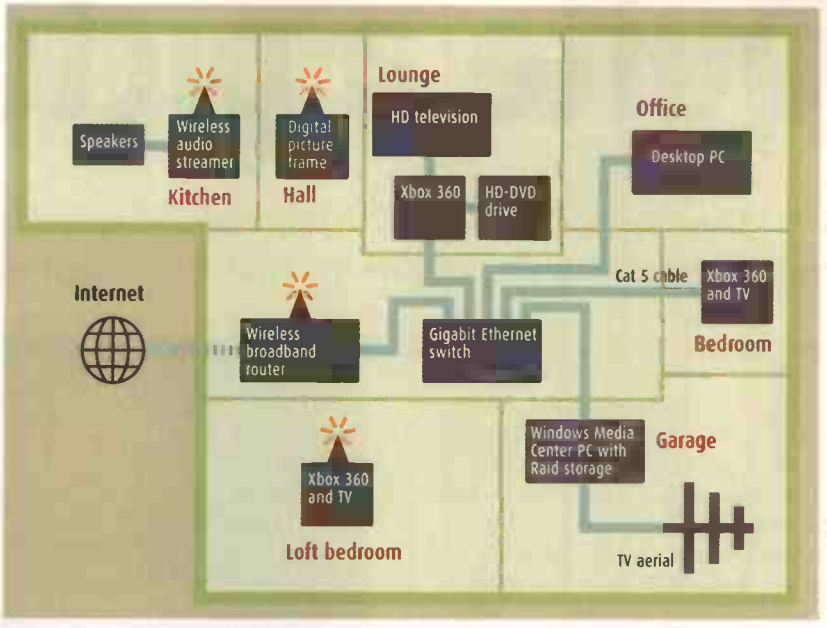
We all know how keen Windows can be to restart after many updates, and the reminders can get really annoying if they interrupt your leisure time. Worse, it's not unheard

Networked digital home

In this example, a Windows Media Center PC in the garage is used to record new content and store an existing media collection. The media is stored in a Raid 5 array with hardware acceleration to support the high bit rates of live TV recording. This PC and the key client devices are all connected using cables to a Gigabit Ethernet switch.

Xbox 360 games consoles are used as network media players in several rooms. These can stream any content from the Media Center PC media and can also be used to schedule new recordings.

The Xbox 360 in the lounge is connected to a HD-ready TV and also has an HD-DVD drive for HD movie playback. Wireless connectivity is used for less demanding devices, such as the Roku Soundbridge and digital picture frames in the kitchen and hallway, or for hard-to-reach locations such as the loft conversion.



of for a PC to lose its display or audio settings following a patch installation and restart, which can clearly be a nightmare for a media system.

Consequently, once your media systems are configured and working smoothly, we'd actually suggest switching off updates altogether – unless of course your machines connect to the internet on a regular basis.

If you feel safer applying updates, then consider putting aside some time every few weeks to install them in one go. Just don't do it immediately before settling down to watch some TV recordings, and remember not to tweak unnecessarily. Ultimately, as the saying goes, if it ain't broke, don't fix it.

Turn on and tune in

Building and maintaining a networked home media system can certainly cause moments of sheer frustration. But arguably its worst aspect – using infinitely variable PC equipment – is also its saving grace. Plenty of enthusiasts have been there before, have solved many of the most obscure problems, and thoughtfully documented them on various forums. Two of our favourite resources are The Green Button (**http://thegreenbutton.com**), dedicated to Windows XP Media Center Edition; and the extensive AV Science forums (**www.avsforum.com**), which cover every aspect of building and running a home-theatre PC (HTPC). We also regularly cover the technical side of home media systems in our Hardware column, and in the Winter 2006 and March 2007 editions we detailed the technicalities of designing and building a media server – you'll find these articles included on the cover disc in the From the Magazine section. There's also a reprint of our Home Networking Superguide from the November 2006 issue that deals with setting up your home network infrastructure.

Once your system's running smoothly, you'll wonder how you ever coped with packed shelves of discs and tapes, countless standalone players and the fact you often had to go to a specific room to watch things like TV recordings. You'll also be making the most of your media collection and your system will be the envy of friends and family. Then with a job well done, you'll be able to sit back, relax and enjoy the show. **PCW**

Readers' Drives: A clutter-free life

PCW Reader Bartley O'Malley had a compelling and all-too-familiar reason for setting up his home media system. "My lounge was chock-full of videos and DVDs. They took up a lot of space, looked a mess and many were forgotten in the back of cupboards. They also always ended up in the wrong boxes and were easily damaged. I wanted a way to protect them."

Bartley already had a dedicated server in his garage, along with PCs in the playroom, lounge and study, so he wanted a system to store his videos and access their content from any computer in the house. After trying Showshifter but finding it didn't support a particular feature, he switched to SageTV and hasn't looked back.

He now has low-spec Celeron systems in the lounge, playroom and bedroom, along with a higher-powered Pentium 4 system in his study, all running Windows XP Pro and SageTV Client software. In the garage is a Pentium 4 server running Windows Server 2003 and SageTV. All the PCs are connected using a 100Mbits/sec wired Lan and can access video concurrently without any dropped frames.

The server has 1.5TB of storage for media, but Bartley currently has no Raid or backup for the files. "I used to have 1.75TB but lost one disk due to overheating. I definitely would not recommend doing it this way – I'm dreading the time I'll have to spend re-recording all the lost files. I am going to move the media over to Raid 5 very soon."

Bartley claims the system only took a few hours to set up initially and has been very low-maintenance. "Setting up the channel-grabbing from the *Radio Times* website was a bit tricky at first, but the only major task since then was building a new case with adequate cooling after the disk failed last summer."

Bartley feels he's achieved more than his original goal because he can now watch live TV and recorded shows on any of his computers. He also has the benefit of an uncluttered lounge and the whole family uses the system.

His only real gripe is that the PC-controlled channel changing on the Sky boxes is slow and occasionally unreliable, but he hopes forthcoming DVB-S support in SageTV will enable him to use satellite tuner cards instead. In conclusion, he'd highly recommend SageTV, but is there anything he'd do differently? "Yes: I would have built the video library as Raid 5 and kept the server better cooled."

Quite a picture

The technology to link your PC to your monitor is evolving, promising easier connections and more flexibility for multimedia. Paul Monckton compares the next-generation interfaces

There's very little you can plug into a PC from 20 years ago that will still connect to a modern system, but one item remains that's well past its sell-by date – the humble 15-pin D-sub VGA connector. It may have been better than its predecessors, but the VGA connector is a terrible match for modern display technology. But still it remains, unchanged, on the back of most PCs.

VGA was designed for analogue video signals, and most of us now use digital flat panels. So we have the bizarre situation where your PC produces digital images that are converted to analogue signals, then sent through a VGA cable and converted back to digital again for display on your monitor.

Thankfully, a little over 10 years after the introduction of VGA, the Digital Display Working Group (DDWG) gave us the Digital Visual Interface standard, or DVI.

DVI is a standard interface for connecting digital displays to computers. Proprietary designs had existed before, usually in the form of monitors with their own dedicated graphics cards, but DVI allowed us to 'mix and match' PCs and digital monitors.

Better still, because the most highly specified version of DVI – DVI-I – supports digital and analogue signals, simple cheap adapters can connect DVI-I graphics cards to monitors fitted only with VGA connectors.

Who needs a new standard?

Can DVI do everything we need? It offers digital connectivity while maintaining compatibility with analogue displays, it can cope with HD resolutions and it can support the latest content-protection schemes. More importantly, most modern PCs and monitors are already fitted with the connectors.

But – as is so often the case in computing – bandwidth is a problem. If you're lucky enough to own a 30in TFT monitor, such as those from Dell and Apple, then you'll need to run your display at a resolution of 2,560x1,600 pixels to get the best out of it, and that resolution already exceeds the bandwidth of a single DVI connection.

These displays use DVI's optional dual-link mode, which doubles the available bandwidth. Dual-link connections require the graphics card, monitor and DVI cable to adhere to the dual-link specification; unfortunately, in the real world you have to try very hard to make this happen.

With more and more people using PCs as media centres, many computers are plugged straight into TVs. DVI has no provision for the transmission of audio, meaning your speakers will have to be connected with their own cabling – even if they're built into your TV or flat-panel display, potentially adding more mess and inconvenience when you hook everything up. And modern multichannel audio requires even more bandwidth and content-protection abilities.

So, let's look at the standards competing in the world of displays and find out how you might connect your monitor in future.

High-Definition Multimedia Interface

In general, people don't like a lot of cabling spewing out of their home-entertainment systems. So, a single cable that can transfer HD video and multichannel HD audio is highly desirable.

High-Definition Multimedia Interface (HDMI) offers similar features to DVI, but adds HD audio capability and longer maximum cable lengths. It has a smaller connector that's much simpler to plug in and doesn't use any fiddly thumbscrews, making it much more attractive for home use. It also uses signalling methods compatible with DVI, so you can use adapters to connect between DVI and HDMI kit, which makes it simple to connect a DVI-equipped PC into the HDMI port of an HD-ready TV set.

Conversely, if you have a graphics card with an HDMI port, or one of the new motherboards with integrated HDMI, then it's simple to connect it to a standard DVI monitor. HDMI isn't a universal solution, however. Dual-link DVI connections still have more bandwidth than the regular 'Type A' HDMI interfaces.

A higher-bandwidth HDMI spec exists, called Type B, which is analogous to dual-link DVI, although it uses a different physical connector, which we've yet to see in any real products. HDMI also supports High-Bandwidth Digital Content Protection (HDCP) for video and audio streams.

Note that HDMI is new and still changing, which can cause compatibility problems. The latest 1.3 specification is found only in a handful of products, including Sony's Playstation 3; most new products are based on AMD's 690G chipset and only support HDMI version 1.2. Nevertheless, HDMI is gaining a solid foothold, due to its simplicity and current compatibility.

Displayport

Approved in May 2006, Displayport was designed by the Video Electronics Standards Association (Vesa) as a future-proof multimedia interface. It has solid support from AMD/ATI, Nvidia and Dell, among others, and is due in AMD motherboards this year.

Like HDMI, Displayport supports both video and audio in high definition. Displayport has some advantages over HDMI. It can run at its full bandwidth – up to 2,560x1,600 at 60Hz with 30-bit colour – using cables up to 3m in length. It can also transmit at resolutions of up to 1080p over cables stretching up to 15m from the source. And it can support up to eight channels of audio, and synchronise between video and audio to within 1ms accuracy.

Displayport can be used for both external and internal connections, giving compatibility between components and devices and simplifying manufacturing processes. It will be possible to build TFT monitors using panels that use Displayport natively, avoiding the need for complex circuitry in the monitor. The external connector is designed to be compact, allowing up to four connections on a single full-height PCI bracket.

Unlike other proposed standards, Displayport offers no easy interoperability with HDMI or DVI, and uses entirely different signalling methods.

While such a lack of compatibility may be a disadvantage, Displayport's Micro-Packet architecture allows great flexibility. You can transmit picture-in-picture streams over a single cable, and displays can be daisy-chained from a single connector. Up to six 1080i or three 1080p streams can be connected in this way. Displayport also has advanced two-way communication capabilities, including bi-directional audio for applications such as VoIP and audio chat. There's also a low-bandwidth video back-channel that's ideal for webcam use.

Displayport supports optional content protection, but as standard it uses its own Displayport Content Protection (DPCP) scheme, rather than the well-established HDCP, though version 1.1 of Displayport adds the option for HDCP. Both of these content-protection schemes require separate licence fees, potentially increasing the end-user price of Displayport-enabled equipment, especially if they're both implemented.

Although the Displayport spec doesn't include backward-compatibility with HDMI or DVI sources, it's possible to use both of these standards via the physical Displayport connector. Not all Displayport-compatible devices will be able to do this and those that can will sport 'multimode' logos.

In the early days of Displayport, Vesa expects the PC market to drive demand for the interface, while consumer electronics products stick to HDMI. However, given the increasing number of HDMI-enabled PC graphics cards and motherboards, it remains to be seen whether PC users can be shifted so soon onto yet another interface.

'The VGA connector is a terrible match for modern digital flat panels'

Unified Display Interface

Managed by a working group of several major manufacturers, the Unified Display Interface (UDI) was designed for low-cost and volume production. At present, the DVI interface is too costly for mass integration into PC chipsets. UDI offers a smaller, cheaper connector that, like HDMI, is simple to plug in with one hand. All the functions of DVI, including HDCP support, are available in UDI.

Unlike HDMI or Displayport, UDI has no audio capability. It's aimed at PCs, where it is hoped that it will become a cost-effective replacement for DVI. And because of its low cost, the promoters hope that digital-only, flat-panel monitors will be made without the need for legacy analogue VGA connectors and hardware. Far from competing with HDMI, UDI is designed to be able to share a single connector supporting both standards. Where both standards are supported in a single device, it will detect whether a UDI or HDMI device has been connected and automatically switch to the correct protocol.

Although UDI doesn't include some of HDMI's features, such as audio, the spec allows for their optional support. This means it's permissible to create a UDI device that can connect to an HDMI device with full audio support, although such functionality is never required by the UDI spec.

UDI has features to help it work well when connecting to DVI displays, although the UDI spec says that implementing these features will not guarantee DVI interoperability without additional design, implementation and testing. UDI, like Displayport, also has an internal form. Again, this will create greater compatibility between components, and it will allow simpler designs that do not need to convert between internal and external signalling systems, meaning less hardware and cheaper monitors. Like HDMI 1.3, UDI supports higher bit-depths than DVI, enabling support for billions of colours. It's also capable of far higher bandwidths than either of these two standards, allowing for much higher image resolutions in the future.

Current trends

With UDI gaining little support outside Asia, and the once UDI-friendly might of Intel now also behind Displayport, the future in the UK looks set to be filled with HDMI and Displayport devices. But although analogue connections will become less common, you won't need to think about replacing your DVI-based kit for a while yet, especially if you buy equipment that supports HDCP.

Whichever new interface dominates, your current kit will remain useful for many years, and both UDI and Displayport bring the promise of less costly replacements when you do finally decide to upgrade. PCW

HOW THE CONNECTION STANDARDS COMPARE

INTERFACE	HDMI	DISPLAYPORT	UDI
Pros	Small connector; HD audio and HD video support; wide acceptance; high bit-depths in version 1.3	Widest bandwidth; small connector; audio support; industry backing; longest cable lengths	Cheap to implement; small, user-friendly connector; compatible with DVI and HDMI; no big licence fee; high bit-depths
Cons	Different dual-link connector; too many versions already; licensing costs	Not compatible with DVI, HDMI or UDI; question over licence fees; optional HDCP	No audio support; late to market; lack of current industry support
Links	www.hdmi.org	www.vesa.org	www.udiwg.org/home

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Publish yourself

Everyone, it's said, has a book inside them. Thanks to online publishing services, it's easy to become an author. Ken McMahon explains how

Self-publishing and its relative, vanity publishing, have unfavourable reputations. Vanity publishing has long been looked down upon as a refuge for aspirational authors who don't have what it takes to make it in the 'real world'. Vanity publishing is possibly one of the few industries whose reputation lags behind that of estate agents.

But the real world is changing rapidly, and with the rise of print-on-demand technology, there has never been a better time to get yourself published. Digital presses designed for short-run, personalised output are making it possible to produce single copies of books at an affordable price. All kinds of people are taking advantage of this trend – from budding authors unable to convince publishers of the merits of their work, to people simply wanting to produce an affordable a genealogy, memoir or photo album as a memento for family members and friends.

'There has never been a better time to get yourself published'

A new industry is emerging to serve this market. There is only a handful of self-publishing companies using print on demand. Of these, Lulu.com may be the only one that has harnessed the economies to offer a web application that is accessible to everyone.

Lulu.com was launched by Red Hat Linux founder and former CEO Bob Young. An open source evangelist, Young had a frustrating experience publishing his first book and decided there must be a better way. He set up Lulu, whose UK site was launched in August 2005. Lulu.com also publishes music and videos and is an online seller, providing a marketplace for your published work. Each product is printed as it is ordered, so you only pay to produce books that have already been sold.

Unlike most other self-publishing companies, Lulu.com expects you to do most of the work. You provide your finished book written, edited, laid out and proofread, complete with cover artwork and, as they say in the jargon, press-ready. If that sounds like a lot of work involving things you don't know much about, don't worry – it's less difficult than you might think. In this feature, we'll get you started on the road to becoming a successful self-publisher.

Lulu maintains a directory of recommended publishing services, including copy editors and cover designers

You can put together a Lulu cover in seconds using gallery templates, but it's better to get one designed properly by a professional

First steps to production

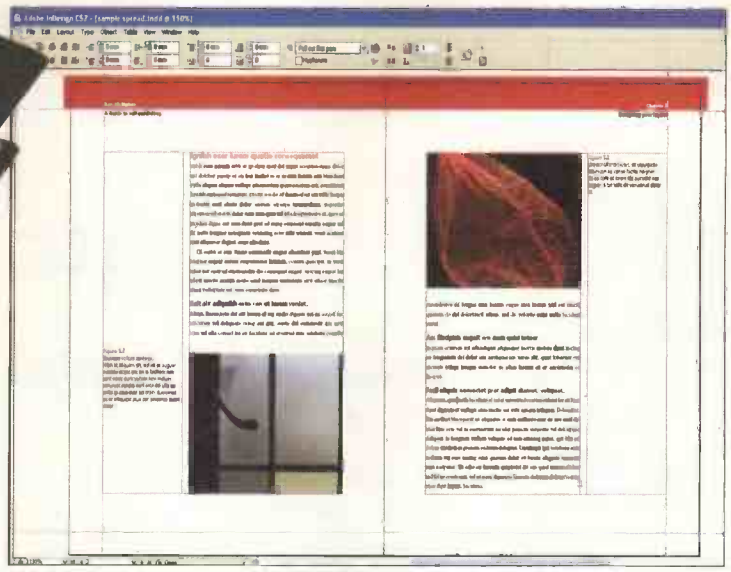
Whether you're considering publishing a book for commercial gain, or just want a few copies to give to friends and family, the production process is essentially the same.

Inevitably, there are several tasks that you'll need outside help with. It's tempting when working on a tight budget to think that you can do some or all of these things yourself. If you wrote the book, what's so difficult about copy-editing, or even cover design, that you can't undertake those as well?

Although you could probably take a stab at these tasks, a professional will do a much better job. If you are self-publishing a personal family history and intend to print a dozen copies to give to relatives, that may not be a problem. If, on the other hand, you intend to sell your book in the marketplace, it will be competing with other professionally researched, written, edited and designed books. Even if you're in a niche market your book will not stand a chance unless it looks the part and reads well.

Assuming that your copy (the text) is written and you have all the photos and other illustrations you need, the first step is to hand the text over to a copy editor, who will suggest ways in which the copy should be altered to improve your book. This could mean rewriting, or even deleting, some sections to make the book more readable and more marketable.

If you don't know where to find a copy editor, take a look at the Services Marketplace section of Lulu.com, which is a directory of approved third-party publishing services. Alternatively, you may know someone in the publishing business who is willing to help out as a favour. In terms of qualifications, it's more important to find someone with publishing skills than an in-depth knowledge of your book's subject area.



Use a single- or double-column layout with a wide outer margin for a clean, readable and contemporary look

Covers

Using a professional applies even more strongly to the cover. It will have a huge impact on the sales potential of your book. If it isn't properly designed, your book won't be taken seriously and won't sell. Ninety per cent of Lulu's bestselling books have a custom-designed cover.

Professional designers will have access to a wide library of royalty-free photography and illustrations, as well as an understanding of how to use these images and appropriate typography to give your cover the maximum impact. You can also find cover designers in Lulu.com's Services Marketplace. Their fees range from less than £50 to several hundred pounds and, judging by the sample covers on show, you get what you pay for.

Don't rely on the designer to make all the decisions about your cover. Check out other recently published books in your chosen genre and decide what you like in terms of illustration and typography. If you present the designer with some initial ideas, you're more likely to end up with something that works and that you like. Go in empty-handed and there's every chance you'll be presented with a template-based design that's been used before.

Don't leave your cover until the last minute. If you make an early start you can get on with other things. When you've made the copy editor's changes you're ready to start on the layout of your book. An approach that works well for experienced designers and novices alike is to base your layout on someone else's design. Go to the library or your local bookshop and check the shelves for recent titles in the same genre.

Layout

Pretty much all layout works on some variation of a column grid system. If your book is a novel, the page size and single-column layout is largely standard. When pictures or other illustrations are included, the scope for creative decision-making becomes broader.

For big books, two-column layouts work well. For a contemporary look, leave a wide outside margin so that you can extend pictures beyond the outside column text and put your captions in the margin. Make sure to set your document up for facing pages, so that you can set different inside and outside page margins and correctly align folios, running heads and other repeating elements.

The next stage of the production process is proofreading. This is another job for which you should employ a professional. A trained proofreader will pick up every instance of mis-spelling, incorrect punctuation, bad grammar and usage and inconsistency within your copy. They will also draw your attention to other problems, such as bad line-breaks and incorrect cross-references.

A professional proofreader will also save you a great deal of time by using standard proof correction marks. You can download a Pdf of the most commonly used ones, compiled by Conrad Taylor, at **www.ideography.co.uk/proof/marks.html**.

'Ninety per cent of Lulu's bestsellers have a custom-designed cover'

Most proofreaders prefer to work on a hard copy version of your manuscript. You can print one out and post it to them, or email them a Pdf, which they will then print, read, mark up and post back to you.

Publishing with Lulu

The most difficult part is now behind you and submitting your finished book to Lulu is a very straightforward process. Sign up for a free account at **www.lulu.com** and go to the My Account page to start a new project. Select the type of project from the list and then fill in the details of title, author and other information.

The next step is to upload source files from your PC. See page 49 for more on Acrobat and advice on how to create suitable Pdf files for uploading to Lulu. There's more detailed information about how to do this on the website, too.

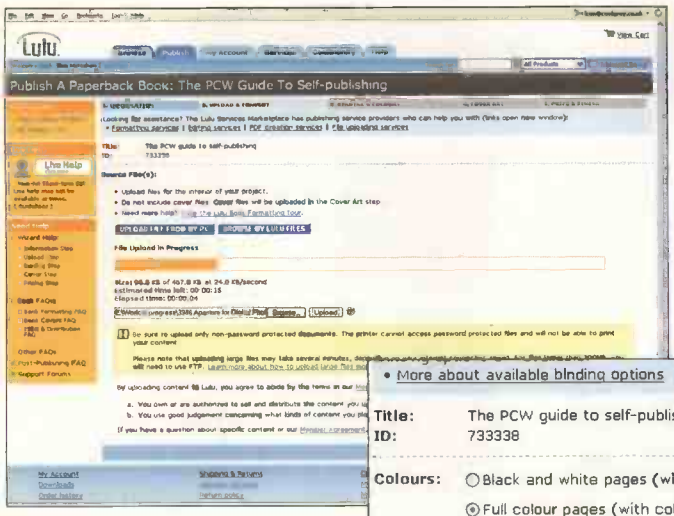
Money matters

A key difference between Lulu.com and other self-publishing companies is that there are no up-front fees and you pay only for the books you produce. So you only pay for a book to be produced when you have an order – either from Lulu.com or another source. There's a calculator for prices on the Lulu site and extensive FAQs.

When you sell books on Lulu you set the 'creator revenue' – effectively your royalty added to the production cost to give the price at which the book is sold. Lulu's commission is 20 per cent of the total profit (or 25 per cent of the creative revenue).

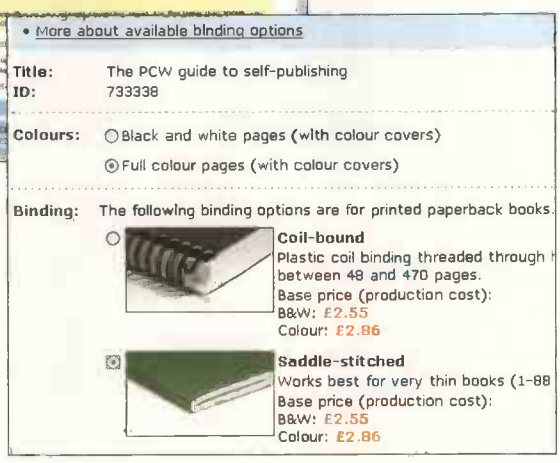
For example, if your book costs £3 to produce and you set the creator revenue at £4. Lulu adds £1 commission, making the book price £8. The total profit is £5, of which you get £4 (50 per cent of the selling price).

To put this in context, commercial book deals usually pay authors a commission of ten per cent of the book price or thereabouts. But don't forget that the taxman will also want his slice of any income you make.



Lulu converts some file formats, but the best option is to upload a press-ready Pdf

Lulu offers only the binding options that are suitable for your specific book



If your source files aren't in Pdf format, or need resizing, Lulu will convert them and you can see an on-screen preview before going on to select binding options. The binding options are limited to those that are appropriate for your book format, so if, for example, your book has only eight pages, you won't be offered the perfect binding option.

You don't need to worry too much about getting it right at this stage as you can change any of these options later, or delete the project and start over.

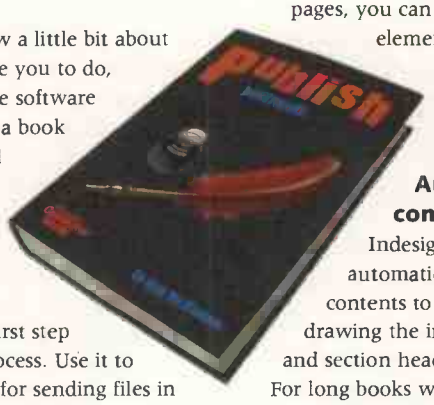
Covers are uploaded separately from the inner pages, either as two Jpegs – one each for the front and back – or a one-piece Pdf including the spine.

If, despite the earlier advice on cover design, you just want to go for a quick and easy solution, a selection of pre-designed gallery templates can be adapted on-screen to suit your needs.

The final stage tells you how much Lulu will charge to print your book and enables you to set the price at which it will be sold on Lulu.com, should you decide to make it available. At this stage though, it's a good idea to order a single proof copy to check through it thoroughly, prior to making your book available to the public.

One final choice you need to make is how to license the content of your book. The default options include a standard copyright licence, Creative Commons and the GNU public licence, or you can use your own licence.

So, now you know a little bit about what Lulu will enable you to do, let's take a look at the software you'll need to create a book in the first place, and how to use it.



Word processing

Word processing software is a useful first step in the production process. Use it to write your copy and for sending files in .rtf format to editors and anyone else you need comments from. It's better to get this kind of work done and the copy finalised before you start on the layout.

Unless your book is text-only, or you really don't have any other option, don't use a word processor to do your layout. Word processors aren't generally very flexible when it comes to laying out text and pictures (the clue is in the name – word processor) and they often don't provide the kind of features like master pages, automatic table of contents and indexing that makes light work of book production. Having said that, Openoffice.org Writer, (www.pcw.co.uk/2128963) does provide some of these features.

Page layout

Page layout applications vary quite a bit in terms of price and sophistication and, generally, you get what you pay for. If, like Lulu.com publisher Chris Brady, you're planning on producing a 364-page technical guide to the Boeing 737, life will be a lot easier if you use a commercial layout application such as Adobe Indesign or Quark Xpress. Budget programs such as Serif Pageplus are also worth a look.

The layout application is where the bulk of the production work on a book is done. If you don't already have layout software, there are specific features to look for that will make the job much, much easier.

Master pages

For book production, master pages are a must. As well as allowing you to set common column grid, margins and gutters for all pages, you can add repeating graphic elements such as chapter titles and sidebars. Master pages can also include automatic page numbers.

Automatic table of contents and indexing

Indesign and Quark will automatically generate a table of contents to a predefined style sheet, drawing the information from chapter and section headings within the book. For long books with lots of sections this is a big effort-saver. Indexes, by their nature, require a large degree of manual editing, but the sophisticated automatic indexing tools in Quark and Indesign make an awkward task much easier.

Style sheets

Style sheets make it possible to format your copy quickly and consistently. You can assign keyboard shortcuts to style sheets, enabling you to format chapter titles, section heads, captions, body copy and anything else with a single keystroke.

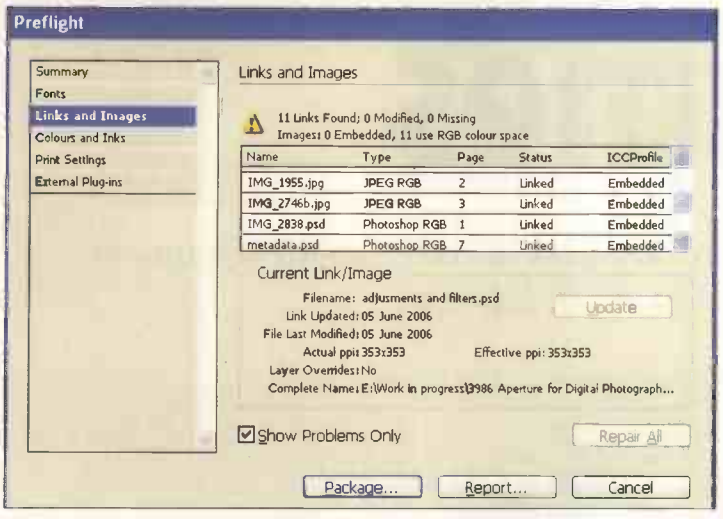
Chapters and sections

Long books are not only easier to read, if split into chapters, they are easier to work on. Professional layout applications enable you to split your book into chapter files, which you can work on individually. They also provide

How do I get my book on Amazon?

Lulu offers two fee-based distribution options. 'Published by Lulu', which costs $99.95 (approx £50), is available outside of the US. With this distribution service you grant publishing rights to Lulu and receive a Lulu-owned ISBN for your book, which makes Lulu the registered publisher. You retain the copyright.

Lulu then lists your book in a wholesaler's catalogue, which gives you 'access to online retailers such as Amazon and Barnes & Noble'. We searched amazon.com for five books on Lulu's bestseller list and managed to find three of them listed, with copies in stock and ready for delivery.



Use your layout application's pre-flight check to highlight potential printing problems like missing fonts and pictures

tools for linking the chapters together, making sure the page numbering is correct and ensuring style continuity.

Tables

If your book contains lots of tabular information, a professional layout application will help you organise and present it. You might also apply different colours and styles to alternate rows to make them more readable, merge cells, break long tables between pages and even put pictures in tables. If you have a lot of tabular data in spreadsheet format, you can import it into a Quark or Indesign table easily.

Pictures

Although you should prepare photos in an image-editing application, a good layout application will enable you to make the most of them. You can run text around them, put them in odd-shaped frames (ellipses, stars, or any other vector graphic) and use them inside big text for creative titling.

Layers

Layers can help you keep your material organised – use different layers for text, photos, captions, and so on. They can also be useful for producing alternate versions – language translations, for example.

Pre-flight

Pre-flight checks ensure that your publication is ready for printing and that you won't get any nasty surprises when the hard copy arrives. The kinds of problems a pre-flight check can flag up include missing fonts and pictures, images that lack sufficient resolution for printing, and photos that are in the wrong colour mode (for example RGB photos in a CMYK document).

A less expensive page layout or DTP application will provide some of these features – most budget programs will have master pages and style sheets, and will allow you a degree of creativity with text and pictures.

Image-editing software

If you do nothing else with your chosen pictures prior to placing them in your layout, you should at least crop them and ensure that they are the correct resolution for printing – Lulu, in common with most commercial printers, specifies 300ppi at output size.

Unless you're producing a specialised photo book, almost any basic photo-editing application, such as Google Picasa (**www.pcw.co.uk/2129034**) or the Gimp (**www.pcw.co.uk/2128969**) – both of which are free – will provide these basic features.

Press-ready output

Though Lulu will convert some file types (including .doc .rtf and .xls files) to Pdf for printing, it's usually better to do this yourself. The best way to do this is using Adobe's Acrobat software (**www.adobe.com**). It's not cheap, however, and unless you've got a lot of books to publish, the expense may be difficult to justify.

Many layout applications now output directly to Pdf and, although you don't have the same degree of control over the distillation process that Acrobat provides, in most circumstances they are adequate. As you might expect, Adobe Indesign CS2 can export to Pdf, as can Quark Xpress 7.1. Among the budget DTP applications, Serif Pageplus X2 and GSP Printshop Pro Publisher can save to Pdf.

Microsoft Publisher 2007 includes a new save-as-Pdf feature, so if you're using an earlier version this is a worthwhile upgrade. The Openoffice Writer word processor can also save Pdfs. There are free and shareware alternatives to Acrobat; the advantages are obvious, and the drawbacks are a limited feature set and unpredictable results.

Another disadvantage is that Lulu's optional distribution service requires that Pdfs are distilled by an Adobe Pdf application, so if you want to go down this route, budget for a copy of Acrobat. **PCW**

Copyright & licensing

The copyright in a book automatically belongs to the author – there's no need to register anything. When you publish your book on Lulu.com, you can choose from a number of licensing options. The standard copyright licence applies all of your rights under copyright law. You can elect to publish your book under a Creative Commons attribution-non-commercial-sharealike licence. This gives others the right to copy, alter and distribute your work as long as you are credited as the author. You can find out more about Creative Commons licences at **http://creativecommons.org/about/licenses**

Copyright works both ways, and you should take care to ensure you do not infringe the copyright of others in your own work.

Other self-publishing organisations

It's difficult to find anything else in the self-publishing world that matches Lulu.com for simplicity and value for money. In spite of the fact that they use print on demand, most self-publishing companies demand a substantial up-front fee that varies from a few hundred pounds to, in one case, nearly £2,000.

In exchange for this they offer a package that, depending on the company, can include book production, marketing and distribution.

They might provide a better alternative to Lulu.com if you don't feel confident about doing it all yourself. However, you need to be absolutely clear about what you're getting for your up-front fee, exactly what the company will do to market and distribute your book, and what percentage of profits from the book's sales you can expect to retain.

Most importantly, you should make sure that you retain control of your own work.

A good first step is to avoid the outright scammers. The Science Fiction and Fantasy Writers of America maintains a Writer Beware section on its website which contains 'Warnings About Literary Fraud and Other Schemes, Scams, and Pitfalls That Target Writers'. You can find it at **http://www.sfwa.org/beware/**.

Testing times

Websites can quickly be built, but making sure they work in every browser is a lengthy process. Tobias Hause looks at some of the tools that will help you

To build a successful website you have to do more than just put the pages together using a tool such as Dreamweaver or Frontpage. You also need to test and optimise the site. This is usually done by developing with one or two browsers and then testing the site on a few more.

Links are tested with the help of the site map when the site is finished. Often that's as far as testing goes, and it leaves gaps. This approach misses some important browsers, perhaps because no Mac or Linux setup is available for testing. And dead links and similar errors are difficult to track down by hand. To ensure your site is working properly, you need suitable tools and a plan for testing. In this feature we'll describe a typical test cycle and look at some useful tools and optimisation tricks.

Browser compatibility

If beauty is in the eye of the beholder, on the web it's often due to the browser. What the user sees in their browser can determine the success or failure of the site. It's obviously crucial to know what individual browsers can do. You can find lists comparing the capabilities of browsers at sites such as **www.aadmm.de/en**.

If you're a web designer you'll also have to do a juggling act with various operating systems. Konqueror needs to be tested on Linux, Internet Explorer on Windows and Safari on the Mac. Konqueror and Safari might have common roots, but they are now sufficiently different that you need to test your site with both.

If you find it impractical to keep multiple computers or partitions running different operating systems, the best solution is virtualisation. A virtual computer runs in its own window on your system. Microsoft offers two products for this: Virtual PC 2007 and Virtual Server 2005. Virtual PC is fine to test websites and the Windows version is a free download from **www.microsoft.com/windows/virtualpc**. The Mac version of Virtual PC has to be paid for unless you own the Mac version of Microsoft Office Professional. VMware offers a much wider range of products. Its entry-level product is the Player, which allows you to run previously-created virtual computers, and can be downloaded free from **www.vmware.com/download/player**. At **www.vmware.com/vmtn/appliances** you can find a wide selection of virtual computers for use with the Player. If, however, you would prefer to create your own virtual machine, then you will need to buy at least VMware Workstation version, although the free sample virtual machines will often do for simple testing.

'Free sample virtual machines will often do for simple testing'

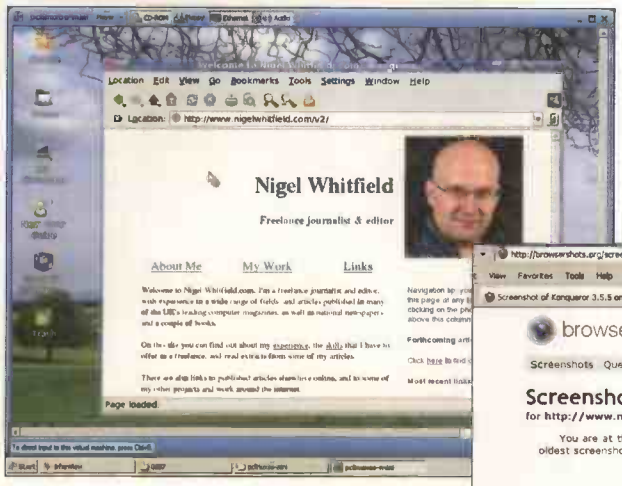
Screenshot services

Virtual machines are practical for testing but require a fairly powerful host computer to run on, and all of the browsers to be tested have to be installed and configured. That's a lot of effort, especially if you want to cater for the more exotic browsers. Help is at hand in the form of websites that capture browser screenshots of a specified URL. All you have to do is to put the site to be tested on the web and then request a screenshot.

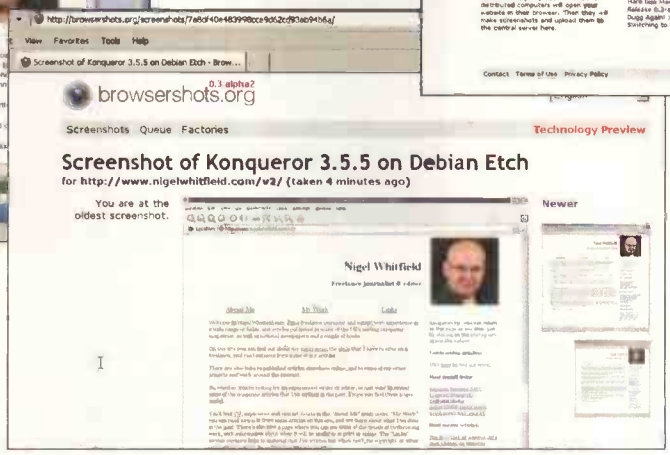
Browsershots.org is a good free service. Currently, it's still in the testing phase, and to ensure reasonable performance it works with a queueing mechanism. This means you enter the URL to test and the browser and resolution to use and then you'll receive a URL for the results in the form **http://browsershots.org/website/http://pcw.co.uk/**. You can check that address regularly until the screenshots have been made and you can use the Queue page to see the current state of the queue at **http://browsershots.org/queue**.

This service has its disadvantages. The queuing obviously doesn't help your workflow, and both the queue and screenshots are publicly available. In addition you can't take screenshots of areas protected by HTTP authentication.

Many web developers have access to all of the big browsers except Safari, which is only available for Mac OS X. Help with that is offered by sites such as **www.browsrcamp.com**, which specialises in providing free Safari 2.0 screenshots. The screenshots this service provides don't show the browser frames; if you do need to see them, we recommend **www.webdesignerstoolkit.com**. This has



Left: Using virtualisation is one way to install multiple browsers



Above: Enter the URL of your website and the browser to use...

Left: ...and Browsershots.org will show you how your site looks in the selected browser

Photoshop files of the various current browsers at different resolutions. Thanks to the clear way in which the layers are structured, draft designs and tests can easily and quickly be inserted.

As well as the free screenshots, Browsrcamp offers paid-for remote access to a virtual Mac; prices start from $2 (about £1) on a daily basis, reaching $100 for a year. Screenshots are also available from commercial sources such as **www.browsercam.com**. The big advantage here is the huge choice of browsers and operating systems. You can also request screenshots of sites protected by HTTP authentication. There's also remote access to various operating systems. The prices for screenshots start at about $20 (about £10) per day, and a year's access costs about $340 (about £174).

Running more than one version of IE

A common problem for testers is that you can't install different versions of Internet Explorer; each one will replace the other, so many web developers resort to using virtual systems with a different IE version in each. However there is a workaround for installing multiple versions of Internet Explorer, and you'll find a handy install routine for it at **http://tredosoft.com/Multiple_IE**. You should only use this solution on test systems or on a virtual PC, as older versions of IE are not always stable in combination. The installer includes Internet Explorer 3, 4, 5, 5.5 and 6. You can install Internet Explorer 7 in parallel. Javascript is supported, alongside HTML and CSS.

Futureproof with XHTML

XHTML is one of the key buzzwords for web designers. You gain little from XHTML conformity in itself. The most important argument in its favour was always that HTML should follow the XML rules in order to be portable and editable in different parsers. But this is usually brushed aside in practice, as that kind of flexibility is really only required in very complex workflows.

On an ordinary website, HTML's only purpose is to enable the browser to display content – and at the moment it still does not matter whether HTML or XHTML is used. XHTML conformity is usually only introduced along with CSS layouts and accessibility optimisation, as it does not require much additional effort. If you're concerned about future-proofing your newly created website, however, XHTML should be the language of choice.

Valid code

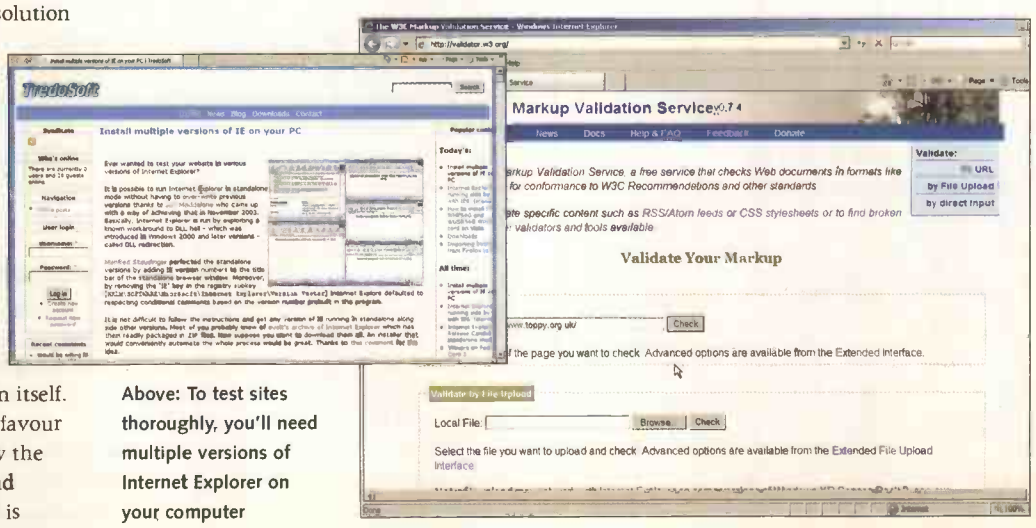
You can complain about this bilingualism, or you can take a more relaxed attitude, like the father of the web and W3C chairman Tim Berners-Lee **http://dig.csail.mit.edu/breadcrumbs/node/166**. Accepting that HTML and XHTML can exist side by side is arguably more appropriate to the real world than vehemently demanding standards-compliant websites.

Whether you choose HTML or XHTML, it's crucial to stick to the standards. Newer browsers, such as Internet Explorer 7, adhere more closely to them and are more likely to give display errors with sloppily coded pages – so validating your code is vital.

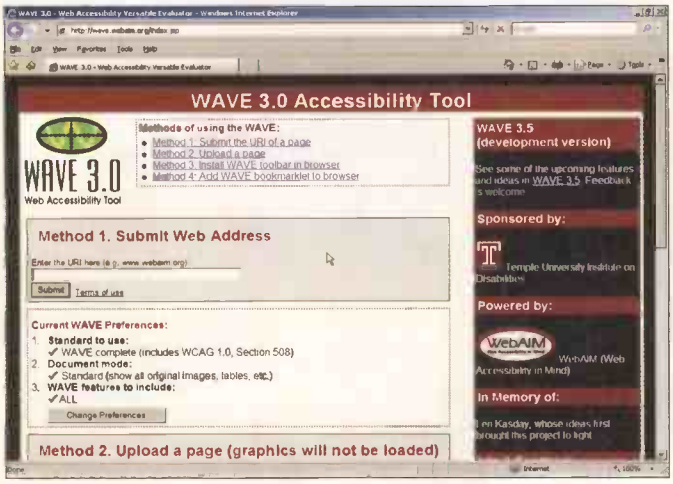
The first port of call should be the W3C's official validators at **http://validator.w3.org** for HTML and XHTML, and **http://jigsaw.w3.org/css-validator** for CSS. In addition to this, similar tests are implemented in the current versions of HTML editors such as Dreamweaver.

Many editors make use of Tidy or similar libraries which clean up your HTML and CSS code. Tidy came from Dave Raggett **www.w3.org/People/Raggett** and is now available as a command-line tool and as a PHP library. The main project is hosted by Sourceforge at **http://tidy.sourceforge.net**.

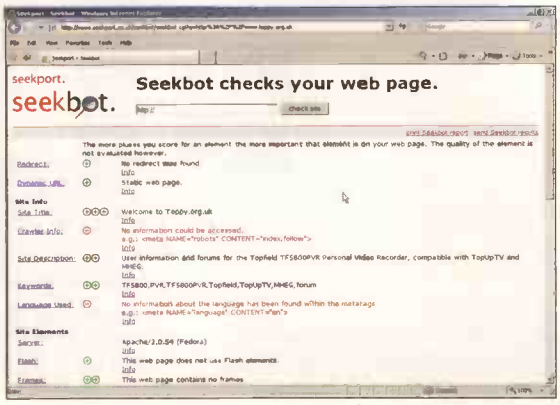
Below: The W3C provides an online validation tool



Above: To test sites thoroughly, you'll need multiple versions of Internet Explorer on your computer



Left: Wave checks the accessibility of a website. Icons show warnings and notes



Seekbot can tell you how useful your page will be to a search engine's robot

Accessibility

Even if accessibility is not your top priority when first designing the pages, accessibility test tools can be very useful as an adjunct to simple validation. And, of course, you will need to consider accessibility sooner or later.

The W3C offers testing tools at **www.w3.org/WAI/ER/existingtools.html** and there are other testers available online. One classic is the offering from Watchfire **http://webxact.watchfire.com**, which was originally called Bobby. Watchfire's tools are integrated in many HTML editors. An unusual online test can be found at **http://wave.webaim.org**. The results of the analysis are shown on the page with icons and you can click on the icons to see sub-pages. A similar approach is taken by **http://valet.webthing.com/access/url.html**. The source code is displayed, highlighted for accessibility.

Most of these testers, of course, work on a 'snapshot' basis. It's more difficult to evaluate the overall user experience and usability of a site with automated tests. Although there are some tools that attempt to filter at least the most common errors from the code (for example **http://zing.ncsl.nist.gov/WebTools**), they are really just academic and experimental in nature. The only really effective way to test usability is with real users.

For search engine optimisation, it's useful to know who is linking back to you, something which Check-link.com can find out

Once you have HTML code and browser compatibility under control, it's time to perform more specialised tests for particular purposes. For search engine optimisation a good starting point is the basic test offered by Seekport. The site's Seekbot **www.seekport.co.uk/seekbot** tests your site against vital criteria for search engine friendliness.

Search engine optimisation

There are plenty of sites that offer classical link tests; you can find one list of them at **www.cryer.co.uk/resources/link_checkers.htm**. Some of the free ones work in a similar way to the free browser screenshot service – you have to join a queue and wait to receive a URL where you can retrieve the result.

Link checks do not have to be carried out as an online test, but can be performed as a script, because the underlying logic is not particularly complicated.

Link checking is the basis of all search engine optimisation. You can check the links that point back to your own site. To do this, **www.check-link.com** offers a useful online tool. The results also show estimated page rankings. Other sites provide a similar forecast, as of course does the Google Toolbar.

There's a lot more that the diligent web developer can do to check their site before it goes live. There are software tests and load and stress tests, to check the resilience of the webserver. This begins with working out the download times and server response times. There are free online tests, and commercial solutions such as Froglogic's (**www.froglogic.com**) browser-independent tests and comprehensive test suites from Empirix or Mercury.

However, these solutions can be costly, and are far more than most small sites will need. You can find a roundup of tools at **www.softwareqatest.com/qatweb1.html**.

Read the benefits

Websites obviously need to be tested. What isn't so obvious is how to do it thoroughly – without taking too much time. Our collection of online and offline utilities is by no means comprehensive, but it should save you a little time and give you a few new perspectives. Because if testing in other browsers becomes less trouble, it might be done more often in future. And that's to everyone's benefit. **PCW**

Useful tools for testing your site

Capabilities of the individual browser: **www.aadmm.de/en**
Browser compatibility for CSS: **www.webreference.com/authoring/style/sheets/browser_support/Microsoft**
Virtual PC: **www.microsoft.com/ windows/virtualpc**
Vmware Player and assorted virtual computers: **www.vmware.com/download/player** **www.vmware.com/vmtn/appliances**
Free browser screenshots: **http://browsershots.org**
Free Safari screenshots: **www.browsrcamp.com**
Installing multiple versions of Internet Explorer: **http://tredosoft.com/Multiple_IE**
W3C HTML and XHTML validator: **http://validator.w3.org**
W3C CSS validator: **http://jigsaw.w3.org/css-validator**
List of Accessibility test tools: **www.w3.org/WAI/ER/existingtools.html**
Online accessibility test: **http://webxact.watchfire.com**
Optical accessibility test: **http://wave.webaim.org**
Accessibility test with source code viewer: **http://valet.webthing.com/access/url.html**
List of link-checking tools: **www.cryer.co.uk/resources/link_checkers.htm**

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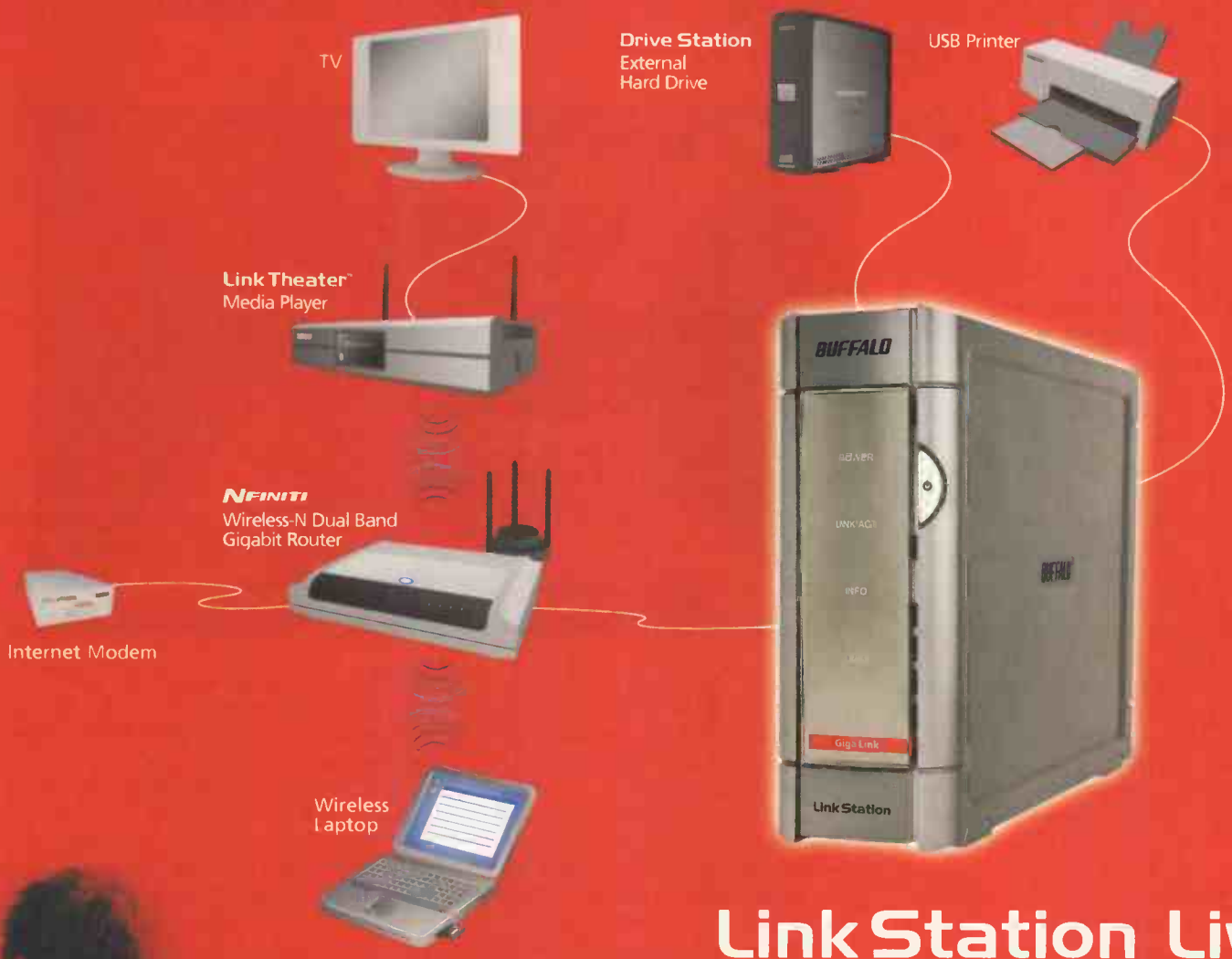

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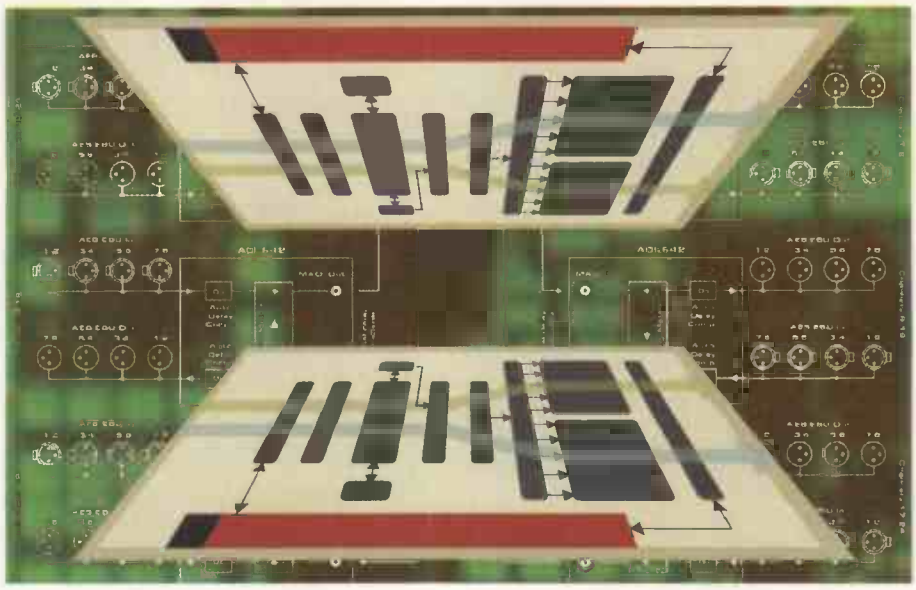
Parallel futures

Peter Jackson explores the challenges and choices involved in moving from today's processors to a new generation of massively parallel systems

As dual-core processors become mainstream in PCs, and the first quad-core desktop systems emerge, there's little doubt that we are all heading towards a multicore future. But the academic world is already expressing doubts about how far current processor trends can go before they run into architectural and software problems.

A group of researchers at the University of California-Berkeley's department of electrical engineering and computer sciences has spent nearly two years considering the implications of multicore and future 'manycore' processors. In a recent report (**http://tinyurl.com/yqaxhz**), the researchers highlighted the problems – and the opportunities – that lie ahead.

Their report was well timed: in February this year, Intel showed an 80-core processor chip developed as part of its terascale computing research project, capable of a trillion floating-point operations per second. Although this chip will never go into full production, it's intended to test the basic concepts of manycore processing and help to explore the problems of software development for massively parallel computing.



Core growth

This might seem of little relevance to typical PC users. Putting a dual-core, or even quad-core, processor in a PC motherboard produces extra throughput without any software changes, as the operating system takes care of scheduling specific tasks for the separate cores and automatically kicks off new threads as processing resources in either core become available. For the average user, more cores just mean better performance. But as the number of cores rises to eight or 16, the multicore benefits seen in the conventional programming model begin to fall away. There might be hundreds of threads active whenever you run Windows and several applications concurrently, but most of them are not doing much and there is actually little to be gained by running more than a couple in parallel. A game engine, for example, will need substantial rewriting to take advantage of an eight-core or 16-core processor and a separate graphics co-processor chip.

Getting the best out of future multicore processors won't be as simple as it might look. The Berkeley report starts from the premise that multicore chip development has been driven not by technological research but by practical and economic limits on the efficiency of traditional single-processor designs. As chip geometries shrink and their complexity and clock speeds rise, power dissipation becomes a major concern, and other esoteric problems (such as soft errors caused by cosmic rays, or the increasing effects of signal delay caused by wiring) make development and debugging a slow and difficult process. This is why there have been diminishing returns in processor performance over the past five years, following a long period when performance figures doubled every 18 months. With uniprocessor development beginning to stall, performance would double only every five years at the present rate.

A chip off the old block

Multicore designs get round many of these problems. Using simpler, duplicated processor cores makes chips easier to design and build reliably, and enables performance improvements without excessive power demands. In addition, multiple cores make finer-grained dynamic voltage scaling and power-down routines possible, again saving power. Examining current research, the Berkeley team concluded that shallow six- to nine-stage instruction pipelines with in-order execution offer the best trade-off between performance and power consumption for general applications, and that this would allow a thousand cores on a single chip using an economical 30 nanometre (nm) fabrication process. This may not be too far away either, as Intel has already produced processors using 45nm technology and Cisco has built a 188-core dedicated communications chip using 130nm fabrication that dissipates only 35W at 250MHz, while offering a throughput of 50 billion instructions per second.

Mix and match

So, is a chip with 1,000 identical processor cores really the most efficient use of silicon for maximum throughput? So far, multicore processors have simply duplicated two or four cores, with eight to come. In the future, though, there might be additional benefits to be gained by paying attention to a theory formulated 40 years ago by computer mainframe pioneer Gene Amdahl. He pointed out that all software has sequential operations that gain no benefit from parallel processing, and that adding a single larger processor to speed up the sequential code would produce higher throughput than adding 10 more small parallel cores. For example, assume that 10 per cent of a program gets no extra speed on a 100-core processor. By replacing 10 of the cores with a

single core dedicated to speeding up that 10 per cent of code, we end up with a much more efficient 91-core processor.

Such heterogeneous processors are still a research project rather than a reality. A single replicated processor core is much easier to design and build, and offers a standard platform for software. Trying to optimise multiple execution threads in a heterogeneous environment might be too difficult to manage efficiently. Even so, Amdahl's law may have some implications for operating system software developers at Microsoft and Apple in particular, as the number of cores grows beyond eight.

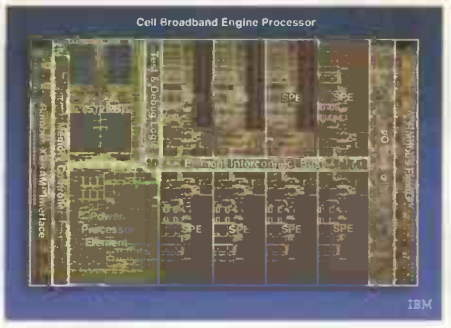
The other keys to manycore processing are the interconnections between the cores and the memory architecture that keeps them supplied with data.

The Intel teraflop research chip (see picture below) uses a high-bandwidth mesh network to link its 80 cores, for example, and can move terabits of data from place to place each second, while IBM's massively parallel Bluegene/L supercomputer combines a high-bandwidth ring network for point-to-point communication with a 'tree' network for collective communications that apply to all cores at once. Again, the Berkeley team suggests that further research is needed to find the best communication architecture, and concludes that a reconfigurable mesh system may be necessary, which adapts dynamically to the communications requirements of applications at run-time.

Cache me if you can

When it comes to memory, on-chip cache is crucial in manycore designs. Intel's Core 2 Duo has a shared cache that can be dynamically allocated between its two cores as required, while AMD's dual-core design has a dedicated cache for each core. The Berkeley report suggests that some combination of these two designs may be necessary in future.

Some applications may require a large private cache for a core, for example, while others would benefit from a dynamically sized shared cache across multiple cores simultaneously. In any case, improved



IBM's eight-core Broadband Engine is based on the cell processor core and is aimed at embedded applications, including the Sony Playstation 3

cache-coherency protocols will be needed to ensure that memory accesses are kept separate and processor core operations synchronised.

One solution could be so-called transactional memory, where multiple processors update shared memory but will only commit the changes once the particular transaction is completed without conflicts from other processors. If the transaction fails or conflicts occur, the changes are rolled back and the shared memory restored

'When it comes to memory, on-chip cache is crucial in manycore designs'

to its pre-transaction state. This architecture simplifies programming, at the cost of execution time and complex hardware implementation, and is another area in which research continues.

There will also be developments in Ram architecture outside the multicore processor itself. As processor throughput has increased, the penalty involved in off-chip Ram access has worsened to hundreds of wasted clock cycles. However, looking inside a 512-Mbit Ram chip there are hundreds of banks, each thousands of bits wide.

With new packaging techniques such as 3D stacking, it should be possible to increase the bandwidth of Ram-to-processor transfers, and perhaps even install substantial amounts of Ram on the processor chip itself, rather than restricting it to separate chip packages connected over a fairly slow memory bus, as happens now. This will be crucial in the manycore future, where the demands of perhaps thousands of processor cores will rise, far exceeding the capabilities of current memory chips.

Intel's 80-core research chip can perform more than a 1 teraflop – 1,000 billion floating point instructions per second – using identical processor cores and a mesh network interconnect

Programming multicores

Of course, any hardware platform is only as good as the software running on it, and much of the Berkeley report is concerned with software development for the multicore designs that are on the way. As ever, a trade-off will be involved, this time between 'opacity', abstracting the software architecture from the hardware so that programmers do not need to know the intricate details of the processor, and 'visibility', which makes all the hardware elements visible to the developer so that optimisation possibilities can be spotted and maximised. Interestingly, the researchers suggest that greater attention is paid to human psychology in developing programming models for parallel multicore systems, to limit mistakes and match development to the way people think, rather than to the hardware or the functional building blocks of a system platform.

For example, programmers work better when they do not have to think about the explicit mapping of computational tasks to processors, so the report suggests that programming models should be independent of the number of physical processor cores in the target system, particularly as cores multiply in number. They also work more efficiently when provided with a wide range of allowed data types, from single-bit Boolean to integers larger than 128 bits via various fixed-point and floating-point options.

In operating systems, the report recommends that rather than rewriting monolithic operating systems for massively parallel operation, greater use should be made of virtual machines and flexible system libraries, so that only those functions needed by the applications are loaded. Intel, for one, seems to have taken this lesson on board, and makes a strong case for virtual machines in its terascale project research papers.

The Berkeley report is not for the beginner, and its source shows in the emphasis placed on scientific computing problems and number crunching rather than mainstream business applications and games. And it might be thought that nobody will ever need a terascale manycore system on their desktop. But the 'tera' does not just refer to floating-point operations; it refers to data, too – the terabytes of data that a PC connected to the internet can potentially access. Managing huge amounts of data efficiently, with fast sorting and data mining, is perfectly suited to manycore parallel operations, and by scaling the processor more useful results can be obtained.

In a world of massively scaled data, there will be a need for massively scaled processors. Hopefully, software developers will be able to keep up with the hardware that the multicore future throws at them. PCW

Lock up your emails

The contents of an email can usually be seen on any machine it passes through. But it doesn't have to be that way, as Stefan Greiner and Mark Schröder explain

When it comes to email and data encryption, one of the most well-known tools is PGP – Pretty Good Privacy. Since version 9.0, Pretty Good Privacy has been a complete solution for data protection on the PC. As well as encrypting and decrypting emails in Outlook, Outlook Express, Eudora and Entourage, it can also encrypt conversations in AOL's Instant Messenger. In addition, PGP can even encrypt entire hard disks to protect them from unauthorised access. The PGP Zip module also enables you to compress and encrypt files and directories. The current version, PGP Desktop Home 9.5, costs about €95 (about £65) from the PGP online shop at **www.pgpstore.com**.

But you don't need to spend money to protect your email. GNU Privacy Guard – or GnuPG – has proved itself to be one of the best open-source solutions. It integrates with most email clients to offer powerful encryption technology. If you can't come to terms with the command-line version, there's a complete bundle, gpg4win, at **www.gpg4win.org**. The installer contains GnuPG and the Windows Privacy Tools (WinPT) key manager.

How it works

Encryption with GnuPG works according to a fairly simple principle, known as public key infrastructure (PKI). Every GnuPG user has a key pair that comprises a public key and a private key. Email and files that are encoded with the public key can only be decoded by using the private key. The public keys are stored and correlated with email addresses centrally on a database held on a GnuPG key server. The private key is known only to its owner, and a password has to be entered every time it is used. In order to encrypt a message, you have to know the recipient's public key by getting it from the key server.

Generating keys

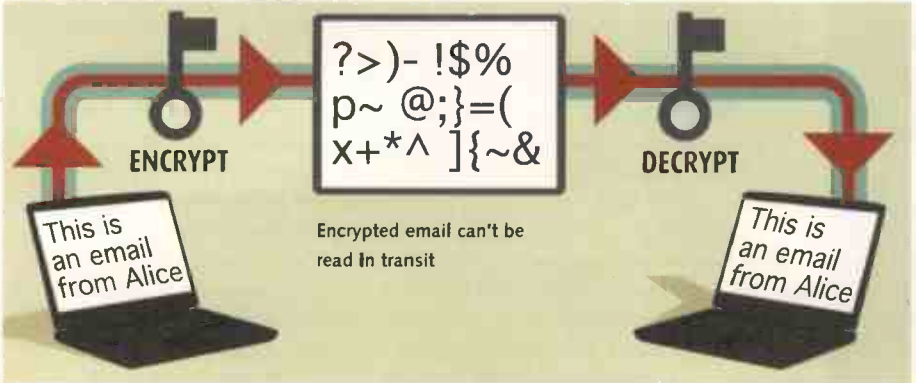
Before that, you need to create your pair of keys. Start by clicking on GnuPG Key pair generation and enter your name, email address and password. The program uses this data to generate a public and a private key. You can make the public key available to other users by right-clicking on the WinPT icon in the system tray and choosing 'Key management' from the context menu. In the window of the same name you will find the key that you have just created. Click on the entry and select 'Send to key server' from the context menu. Choose a server from the list and confirm your choice by clicking on Yes. The box on the next page shows how to use your GnuPG keys to encrypt email in some of the most popular mail clients.

A key can be used for more than just encrypting messages. Digitally signing an email is the only way to ensure that the recipient can be certain that the message really did come from the person who claims to have sent it. To use a digital signature in Outlook for example, open the Security setting from Tools/Options/Security. To generate the electronic signature, click on Request Digital ID. After doing this, you will be sent an email. Follow the instructions in the email and to finish, click on Settings. The digital signature (ID) will be displayed. Accept the certificate and activate the options 'Append digital signature to message' and 'Send message as plain text'. The recipient of the email can now look at your certificate by clicking on the signature icon and identify you as the sender.

'There are free commercial services out there that try to make the process painless'

There are other uses for encryption; in future the Freenigma tool – see box on facing page – will be able to encrypt appointments and entries in Google Calendar. Like the Google webmail program, Freenigma uses Ajax technology to encode the personal contents in Google's appointment planner.

And if this all sounds a bit too complicated for you, there are free commercial services out there that try to make the whole process painless. One we've tried that works very



Setting up PGP encryption in popular email clients

Outlook

To use encryption in Outlook, you'll need the English version of the free GnuPG plug-in from G Data (**http://tinyurl.com/yszus**). Install it and restart Outlook. When you receive an encrypted message, you have to type your password to open the mail. To send an encrypted message, you need to have the recipient's public key in your keyring. You can import this by copying and pasting the PGP Public Key Block from your correspondent's email signature into a text file. The block begins with

```
--BEGIN PGP PUBLIC KEY BLOCK---
```

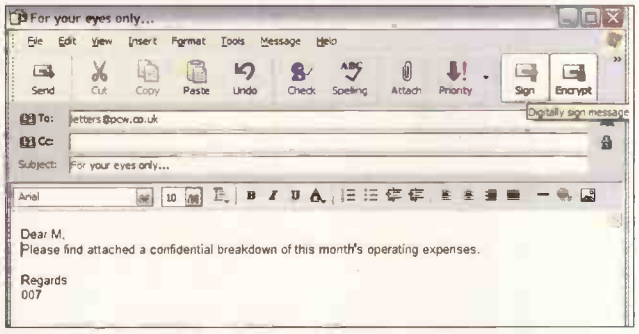
and ends with

```
--END PGP PUBLIC KEY BLOCK---
```

Save the start and end markings and everything between them to a text file and then import that file into WinPT's Key management. You can access this function by choosing Open and then Import to keyring. Write an email and click on the plug-in icon to activate encryption.

Outlook Express

To encrypt email in Outlook Express using GnuPG, you need the GPGOE plug-in. First of all, install GnuPG. It's very important not to change the installation path from the default. Next unpack the GPGOE archive to a folder of your choice. The link between GPGOE and GnuPG is created by a new registry entry, generated by double-clicking on the gnupg-w32.reg file. If GnuPG is installed in a different directory to C:\GnuPG, then you'll have to alter the path in the reg file.

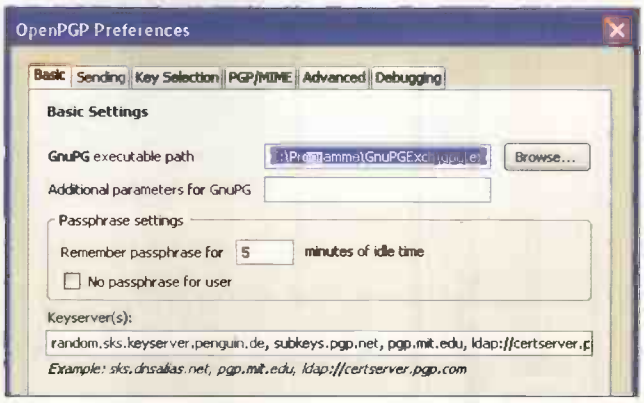


Outlook Express users can activate email encryption with a single click of the mouse

To encrypt a message you need to start the initgpgoe.exe file. It's a good idea to create a desktop shortcut for this. The program displays an icon in the system tray to show that it's ready for use. After starting Outlook Express, you'll see a new Encrypt button in the compose window's toolbar.

Mozilla Thunderbird

To set up the Enigmail plugin (**http://enigmail.mozdev.org**), start Thunderbird and under Tools/Extensions open the XPI file that you downloaded. Restart Thunderbird and the menu bar will now have Enigmail option. Select Settings from this menu and under General



In Thunderbird, the Enigmail utility looks after decryption and encryption, using GnuPG

enter the path to the file gpg.exe (this file will be in the GnuPG folder), and then close the window.

To send an encrypted message to a recipient with a public key, click on Compose. The mail editor window will have a button labelled OpenPGP. Click on this to encrypt both the message and attachments.

Gmail, MSN Hotmail and Yahoo Webmail

If you use Firefox, you can use Freenigma to protect your Google, Microsoft and Yahoo Webmail boxes. The encryption technology used is GnuPG but a local installation isn't required. Freenigma is still in beta and before using it you have to register at **www.freenigma.com**. Freenigma users can swap encrypted emails via the Firefox plug-in.

When you log into one of the supported webmail services, the plug-in brings up a toolbar on screen. You can compose messages to other Freenigma users as normal and encrypt them by clicking on Encrypt. To decrypt incoming messages click on Decrypt and enter your Freenigma password; you can then read the message in the webmail screen.

well is Ciphire Mail (**www.ciphire.com**, reviewed at **www.pcw.co.uk/2139537**). It is available for Windows, Mac OS X and Linux clients and works with most email programs.

Secure instant messaging

Very often these days, people use instant messaging software to swap information. Most messaging software lets you use a plug-in to add encryption.

One solution for secure chat in MSN, Windows and Windows Live Messenger is Simp Lite. This program is free for private use; however, for use in a commercial environment the French manufacturer – Secway – insists that you use the paid-for version, Simp Pro. Encrypted connections between Simp Lite and Simp Pro are possible. The multiprotocol Trillian client is also supported for chat with AOL, ICQ and Yahoo users.

Simp Lite uses a 1,024-bit or 2,048-bit RSA key for encryption. If the program is installed on both users' PCs, then the messaging clients perform the key exchange automatically. The program also enables conversations over unencrypted connections, if one of the users does not have Simp Lite (or Pro) installed.

Alternatively you could simply switch to the Jabber network and protocol. The Jabber Open Source Project (**www.jabber.org**) has created a communications platform with interfaces to other instant messaging systems. The Jabber protocol allows for SSL encryption of messages. This task is undertaken by the Jabber servers, so that the messaging client doesn't have to worry about implementing security.

For secure communication between employees and customers, companies can use software from **www.jabber.org** to set up their own Jabber server. You can then have confidential chats in a closed user group. **PCW**

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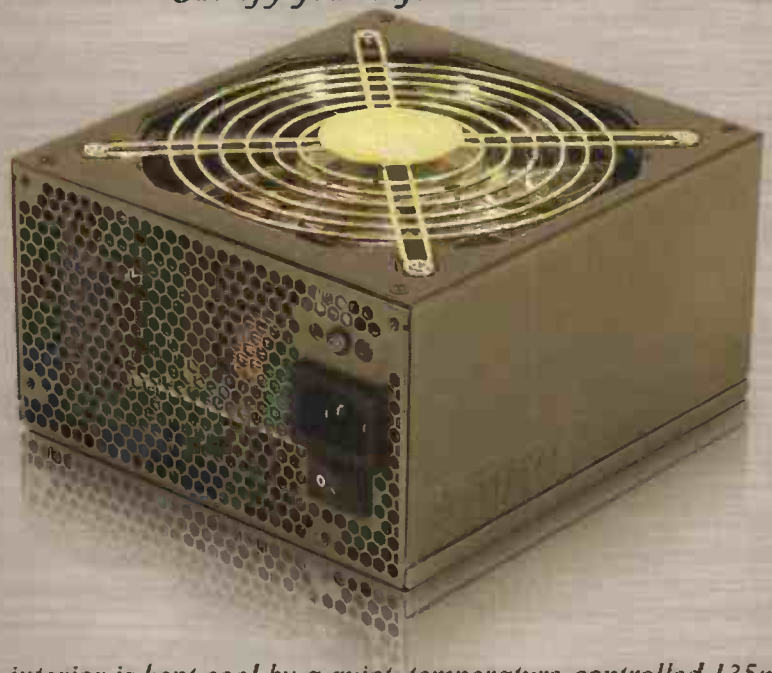

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Custom PC magazine, March 2007

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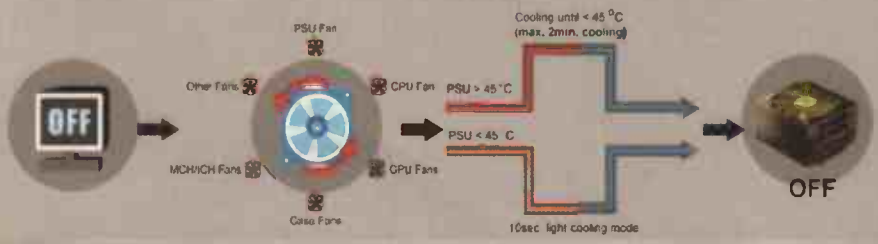

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REVIEWS

NEW RESOLUTION

Not so long ago, a 15in TFT on your desktop was something to boast about. But with panel prices now falling at an alarming rate, it's possible to pick up a 22in screen for little more than £200. If this sounds like a tempting proposition, check out our group test of eight 22in TFTs on page 87.

With 1,680x1,050 native resolutions, they make the most of fast graphics cards while providing extra desktop space for those applications that fill your screen with floating toolboxes. Speaking of which, we've got a review of Photoshop CS3 this month. Adobe's latest edition of its high-end image-editing application comes with a revamped interface, selection of new tools and the usual sky-high price tag. The good news is that improvements will most likely filter down into the next release of Adobe's cut-down and more affordable Photoshop Elements.

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OUR SCORING

Excellent ★★★★★ Very good ★★★★½ Good ★★★½☆ Below average ★★½☆☆ 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

'The design of this PC injects a certain degree of fun into many applications'

Read the review on page 61

TABLET PC

Fujitsu Siemens Lifebook P1610

A truly portable Tablet PC, but one that's dogged by poor battery life

The P1610's screen can flip round and fold back on itself to enter full Tablet mode

With Windows Vista now housing full Tablet PC functionality, Microsoft must be hoping for a boost in sales of the much-maligned platform.

As it happens, the relatively low specification of Fujitsu Siemens Lifebook P1610 means it only just meets the minimum specification for Vista Basic. Since Tablet functionality is only available with Home Premium or above, Fujitsu Siemens has been forced to opt for the older Windows XP Tablet Edition.

If you crave Vista, a higher-spec model (1GB Ram, 80GB hard drive) is available for a smidgen over £2,000 – this also includes a UMTS module for high-speed HSDPA internet access on the go.

Software aside, the Lifebook P1610's obvious draw is its portability. Just 230mm wide and weighing only 1.2kg, you'll barely notice it in your bag. Opening up the lid reveals an 8.9in screen and full Qwerty keyboard. The keys are small and crammed in pretty close together, which hinders typing speeds considerably. That said, it's certainly easier than using the miniature keyboard on Sony's UX1 ultra-mobile PC.

There's no room for a trackpad, so you're left to navigate via the nipple, keyboard shortcuts or the touch-screen display.

The screen can flip round and fold back on itself, should you want to switch to full Tablet mode. A small stylus for scribbling notes is stored on the right side of the chassis, which had a tendency to get stuck in its slot during testing.

Handwriting recognition in XP Tablet Edition is excellent, though not as fully featured as the new version included with Vista. The small screen also makes it difficult to write much more than short notes.

The exterior is home to a fingerprint reader, two USB2 ports, a PC Card slot and an SD card reader, while networking is available via 802.11g, Bluetooth, wired Lan and a 56k modem. The 60GB hard drive is pretty small, and may cause you later storage concerns.

The Lifebook P1610 is powered by an Intel Core Solo U1400 processor trundling along at 1.2GHz. Just 512MB of Ram occupies the single Micro-Dimm slot, which will have to be ditched if you upgrade to 1GB. As expected, it struggled through Sysmark 2004 SE with a score of 108. Although adequate for office tasks and browsing, processor-intensive applications such as video editing are out. Graphics are taken care of by Intel's 945GM chipset; fine for Tablet tasks, but a score of 322 in 3Dmark05 shows how unsuited it is to gaming.

Although we can forgive sub-standard graphics and low processor power on a Tablet, poor battery life is another matter. In our benchmarks, it managed two hours 43 minutes in the productivity test. When out and about, with a good mixture of usage, it rarely kept going over two hours. A six-cell battery is available for £81, which should power the P1610 for an extra hour or so, but it's still not great.

At £1,464, Fujitsu Siemens would have done well to include both batteries as standard. As it is, you're paying a hefty premium considering the poor battery life and low specification. Take a look at HP's new Pavilion tx1000 Tablet, with its dual-core processor, 1GB Ram and 120GB hard disk all for £899, and the Lifebook P1610 starts to look outrageously expensive. But then the HP's larger dimensions won't suit everyone.

Portability is without a doubt the Lifebook P1610's best asset, but the high price tag and poor battery life don't do it any favours

Will Stapley

Performance

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

Details

Price £1,464
Best price www.pcw.co.uk/bestprices
Contact Fujitsu Siemens www.fujistu-siemens.co.uk
Specifications Intel Core Solo U1400 (1.2GHz) • 512MB Ram • Intel 945GM integrated graphics • 8.9in display (1,280x768) • 60GB hard drive • 802.11g wireless • Bluetooth • Windows XP Tablet Edition • Three-year collect and return warranty • 232x167x37mm (wxdxh) • 1.2kg

Verdict

Pros Light; small; good features
Cons Poor battery life; low-spec components; expensive

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

Overall Ideal for those after a lightweight Tablet PC, but it's expensive and battery life is poor

★★★★☆

ALL-IN-ONE PC

HP Touchsmart IQ770

A touchscreen kitchen or living room PC with notebook innards

The IQ770 crams in features and adequate performance to live up to its all-in-one status. But with no waterproofing or ruggedising, would you put it in your kitchen?

As PCs go, the Touchsmart IQ770 doesn't look like a machine on which you can do any useful work. Strange angles and an excellent finish make it look more modern art than Hewlett Packard.

HP says this computer has been selling well in the US as a kitchen PC. It's designed to be the digital hub of a family home; children can watch TV on it (via the hybrid analogue/digital tuner) as they eat their breakfast, or it can be used to check the weather or even traffic news before rushing out the door.

However, it's not waterproofed or ruggedised and so it seems a bit risky to have a PC in the kitchen permanently – especially with the risk of spilling flour, eggs or washing-up liquid on it.

The whole unit is made of black plastic. Its curves look peculiar at first, but they create a shelf below the screen to store the bundled keyboard, mouse and remote control.

The touchscreen LCD panel has a 1,440x900 resolution. This is common for 19in widescreen displays, but it leaves you with little desktop real estate to play with. The screen has a reflective coating, which gives a good contrast and deep blacks. It also has great viewing angles and brightness levels.

The display tilts vertically, so it can be viewed from various angles. However, when placed on a standard-height desk it doesn't tilt up far enough to be used standing up by anyone 6ft or over.

A small, well-made rubberised mouse and keyboard are supplied. Navigation can also be performed on-screen with fingers or a plastic pen. The screen must be pressed firmly, otherwise the operation becomes sporadic.

A lowly AMD Turion 64 X2 TL-52 with two 1.6GHz cores (each with 512KB L2 cache) powers the system, backed up by 2GB DDR2 of So-Dimm Ram running at 533MHz. These are notebook components, which are difficult to upgrade, and performance left us wanting more – a PCmark05 score of 3,910 is what we'd expect from an average notebook.

The IQ770 notched up 3,840 in 3Dmark05, which indicates that it will be capable of light gaming, but one of the most strenuous real-world games, Fear, could only muster 8fps (frames per second). However, games such as Mahjong Solitaire are great fun to play on the IQ770. In fact, the design of this PC injects a certain degree of fun into many applications.

A small button just below the screen loads HP's Smart Center software. It's similar to Windows Media Center (which is also bundled as part of Vista), but adds a calendar, notes section and a customisable front page with one-touch access to your favourite programs.

During testing we noticed a flaw with this program – the virtual keyboard uses a standard alphabetic layout instead of the traditional Qwerty design.

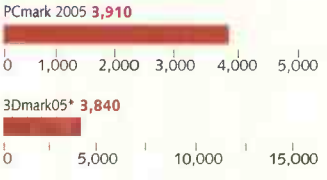
The speakers either side of the display are more powerful than most built-in speakers, comfortably filling any room the PC is placed in. Video conversations are made easy, thanks to the 1.3-megapixel webcam and stereo microphones embedded just above the screen.

A plentiful 320GB desktop hard disk comes loaded with Windows Vista Home Premium and a basic software selection, including Microsoft Works 8.5, Roxio Creator Basic and Cyberlink DVD Play. The one year collect-and-return warranty is similarly uninspiring.

HP has made a fun, easy-to-use and well-constructed PC that has bags of features and adequate performance for office tasks. Where it will be used remains to be seen.

Emil Larsen

Performance



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

Details

Price £1,199
Best price www.pcw.co.uk/bestprices
Contact www.hp.co.uk
Specifications AMD Turion 64 X2 TL-52 (1.6GHz) • 19in touchscreen LCD • 2GB DDR2 553MHz • Nvidia Geforce Go 7600 256MB • 320GB Sata 7,200rpm hard disk • DVD writer • Multiformat card reader • 1.3-megapixel webcam • Six USB2 • Firewire • Hybrid TV tuner • 802.11g • Bluetooth • 5.1 surround-sound capable

Verdict

Pros Funky design; easy to use; excellent construction and finish
Cons Poor performance for the price; no upgrade path

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

Overall It's one of a kind and looks great, but its price needs to drop significantly
★★★★☆

NOTEBOOK

Panasonic Toughbook CF-Y5

A durable, portable and stylish notebook, but you'll need deep pockets

The Toughbook CF-Y5 is Panasonic's latest foray into the corporate rugged laptop market where businesses might not mind paying a little bit more for something that will last.

One of the first things we noticed was its weight. Including the power supply, the notebook weighs just 1.95kg, which is superb for a 14.1in LCD-based laptop with an in-built DVD writer.

Special tricks include being able to withstand a 100kg mass placed on top of the laptop. We tested this with a hardback book to distribute the weight, and when an 80kg *PCW* staff writer stood on it the ribbed-LCD back depressed to take some of the strain, and the notebook seemed to cope with it fine.

The CF-Y5 is also splash-resistant and Panasonic was happy for us to pour a cup of water across the keyboard to test this out. Water seeped through two holes beneath the keyboard, but most of it seemed to flow straight off the side of it. The laptop continued to function normally but we did notice a little bit of water had trickled into the DVD drive.

The notebook can also be dropped from a height of 30cm, although this isn't spectacular in any sense – most laptop falls are likely to be from a desk more than double that height.

Despite its tough-guy features, the CF-Y5 is a very attractive notebook PC. As on the CF-W5, the circular mousepad is a bit small but it performs well, while the scroll function enables it to act similarly to an iPod click-wheel.

At the laptop's heart lies a low-voltage Core Duo L2400 processor, running at 1.66GHz with 2MB L2 cache. Although this dual-core chip may appear defunct next to Core 2 Duo processors with 4MB cache, low-voltage Core 2 Duo chips have only just started to appear so it's no surprise to see the CF-Y5 shipping with this CPU.

Performance is adequate for most system tasks. In Sysmark 2004 SE it knocked out an unremarkable yet capable score of 171. The laptop scored a disappointing 2,547 in PCmark05 – a score we'd associate with high-end Pentium M systems of yesteryear.

In the battery reader test, which simulates a document being read continuously, the laptop lasted an astonishing six hours and three minutes. In our DVD playback battery test the laptop ran for four hours 24 minutes, making it capable of playing back two long films without a problem.

The 14.1in LCD has a native resolution of 1,400x1,050 pixels, giving plenty of desktop real-estate for documents. Unlike the CF-W5 and other Toughbook laptops the backlight bleed, which results in an apparent gradient of colour near the bottom of a screen is barely noticeable on this model.

The screen is powered by Intel GMA950 integrated graphics that dynamically grabs up to 224MB of system memory. Few prospective Toughbook customers will be interested in playing computer games and, as expected, it returned very low scores in our tests – 369 in 3Dmark05 and 6fps (frames per second) in Far Cry.

The supplied 512MB of DDR2 533MHz Ram is stingy and we'd much prefer 2GB at this price; an upgrade to at least 1GB is definitely recommended. A 60GB shock-resistant hard disk is also included, while a single PC card slot and SD slot are also available.

The keyboard is impressive for a laptop of this size. Keys are firm with no sponginess at all and no space is wasted, with the keyboard filling out close to the edges of the laptop.

This Toughbook doesn't have a dedicated numeric keypad, which is to be expected, but at 28.5cm wide it is as big as most notebook keyboards (without the keypad) – even a 20in monster notebook from Rock we're currently testing. The only key that is noticeably smaller is the spacebar, although it is still very usable.

With an improved screen over previous Toughbooks, a dual-core processor and its all-round sturdiness, we liked this CF-Y5 Toughbook even more than the CF-W5.

However, nothing can overshadow the fact Panasonic is charging £1,938 for a laptop with a Core Duo L2400 and just 512MB Ram. An integrated 3G HSDPA slot for mobile broadband can be added, but the price then rises to an eye-watering £2,260. It's a shame because if it were just a few hundred pounds cheaper and had 2GB Ram, we'd have no reservations in recommending it. *Emil Larsen*

Performance

PCmark 2005 **2,547**

3Dmark05* **369**

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

Details

Price £1,938
Best price www.pcw.co.uk/bestprices
Contact Panasonic www.toughbook.eu
Specifications Intel low-voltage Core Duo L2400 (1.66GHz) • 512MB DDR2 533MHz Ram • Intel 945GMA Express integrated graphics • 14.1in TFT (1,400x1,050) • 60GB hard disk • Intel 945GMS graphic controller • DVD writer • Wifi (802.11a/b/g) • Bluetooth • 1.95kg

Verdict

Pros Excellent battery life; light; solid feel; reasonable performance
Cons Dire graphics performance; expensive; only 512MB Ram

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

Overall A durable notebook with a high-res screen. It is overpriced though

★★★☆☆

INKJET PRINTER

Canon Pixma IP2500

No speed demon, but a decent alternative to high-street printing

There's no shortage of printers under £50 these days, many housing built-in scanners. Canon's new budget model, the Pixma IP2500, lacks a scan function but is surprisingly good at photo printing.

The shiny black casing gives a good first impression, although it doesn't take long to work out that this printer is a budget model. There's no memory card reader or LCD screen and, thanks to the lack of an output tray, prints simply get spat out onto the table, or possibly the floor. Canon has done a good job of making the IP2500 compact, though, sitting just 237mm deep.

The printer is served by two cartridges – one containing dedicated black ink, the other a three-ink colour cartridge. The black cartridge (PG-37, £8.99) is rated at 220 pages when printing text, while the colour (CL-38, £11.99) is good for 205 pages or 120 6x4in photos.

High-speed printing is unlikely to be top of your list when opting for a printer in this price bracket, but Canon says the Pixma IP2500 is capable of spitting out 22ppm (pages per minute) of text. You might get near this in draft mode, but real-world speeds are much slower. In our tests, with 10 full pages of text, we only achieved just over 9ppm, with a 20-second wait for the first page.

Meanwhile, a 6x4in photo on glossy paper at the highest quality settings took one minute 30 seconds, while an A4 photo print left us waiting a little under four minutes.

When printing on glossy photo paper, quality is excellent for such a cheap printer. Look closely and you'll see fine detail missing and some speckling, but colours are both vivid and realistic.

Canon's Pixma IP2500 might not be the fastest printer available, but at this price it serves well as a budget home printer and is perfectly capable of outputting decent photos. *Will Stapley*

Details

Price £49
Best price www.pcw.co.uk/bestprices
Contact Canon www.canon.co.uk
Specifications Up to 4,800x1,200dpi • 4-ink printing • 100-sheet input • Max A4 paper size • USB2 • 442x237x152mm (wxdxh) • 3.3kg

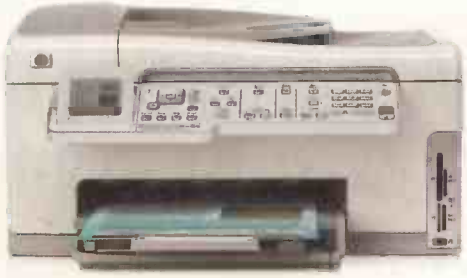
Verdict

Pros Cheap; good-quality photos considering the price; compact
Cons No output tray; some issues with fine detail; a little slow
Features ★★★½☆
Performance ★★★★½
Value for money ★★★★★
Overall A decent, compact printer that's capable of outputting some quality photos
★★★★½

MULTIFUNCTION DEVICE

HP Photosmart C6180

We put HP's "world's fastest" claims to the test



HP claims the Photosmart C6180 is the world's fastest multifunction device (MFD), at 32ppm (pages per minute) for mono prints and 31ppm for colour. Claims such as this are often misleading and, sure enough, if you dig into the specs, HP actually rates mono, standard-quality A4 prints at a more realistic 8.2ppm.

In our tests, this dropped to 6.8ppm for text and 3.9ppm for a mixed Pdf. These are good speeds, but Canon's Pixma MP800R achieved slightly faster results in our labs.

While fast text printing is unlikely to sway home users, HP's claim of being able to produce lab-quality photos in 12 seconds will be an obvious draw. However, we found this to be wide off the mark. Colour A4 photos took four minutes 56 seconds, while borderless 6x4in versions were ready in two minutes 12 seconds.

The Photosmart C6180 houses six individual ink cartridges using a technology it calls 'Vivera', which provide sharp, detailed and vibrant photo prints. It's certainly impressive; the only flaw was that prints had a bit too much yellow in them, but this really is nit-picking.

The downside is the cost of replacing these cartridges. In total, you'll have to shell out £38 every 350 pages, which is relatively expensive.

Standard pages of text were disappointing; letters were soft with a few fuzzy spots. If text quality is a priority, then a laser printer would be a far better option. The scanner produced better results – at 200dpi it scanned an A4 document in just 37 seconds.

The USB connection is joined by 802.11b/g Wifi and Ethernet alternatives. You'll also find a card reader on the front of the unit and a bright 2.4in LCD for PC-less operation.

At £199, it's not the cheapest MFD we've seen, but it is well built, has good speeds and great photo print quality. Just don't expect 32ppm. *Emil Larsen*

Details

Price £199
Best price www.pcw.co.uk/bestprices
Contact www.hp.co.uk
Specifications 4,800x1,200dpi printing • 4,800x4,800dpi scanning (48-bit) • 50-sheet input tray • 2.4in LCD screen • USB2 • Ethernet • Pictbridge • 802.11b/g wireless • 100-sheet input tray • 50-sheet automatic document feeder

Verdict

Pros Good photo prints; fast print speeds for an MFD
Cons Poor text quality; unrealistic print speed claims
Features ★★★★★
Performance ★★★½☆
Value for money ★★★★½
Overall Although it has substandard text printing, it does everything else very well
★★★★½

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Selfridges - Trafford Centre, Manchester, upper level technology hall.
Selfridges - Exchange Sq, City Centre Manchester - Lower ground floor.
Selfridges - Bullring Birmingham, Level 1 in the technology hall.

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.
Please contact us direct if your model isn't shown new devices added regularly.

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

Bluetooth™

19IN TFT

Hanns.G HX191DP

Budget 19in screen with digital and analogue inputs

Hanns.G's entry-level monitors are priced so low that it's always interesting to see just what they've managed to deliver for the money. We're usually very impressed, so when we received the latest 19in model, the HX191DP, we were ready for something good.

The specification indicates no corners have been cut when choosing the panel. Its 300cd/m2 brightness and 700:1 contrast ratio are a match for monitors costing considerably more, and a 5ms response time means it's up to speed with games and video.

It also has built-in audio and, most remarkably for a monitor of this price, both VGA and DVI inputs.

Where the HX191DP is let down is in its design. It has a silver and black case that looks fine from a distance, but not so good close up. It's not ugly or poorly constructed – it just looks cheap. We're not expecting miracles, but Hannstar is a master of monitor design – just take a look at its Hannspree (www.hannspree.com) products – and we feel they could have built something that looked just a little more sophisticated.

The HX191DP is unsurprisingly basic in operation. It has a simple on-screen menu accessed by five front-mounted buttons, one of which triggers auto setup.

In our tests, performance was average to good. Some minimal banding was present on fine gradients and the rather narrow viewing angles meant we had to get the monitor tilt spot on to get the best picture. There was also a small amount of backlight bleed at the top of the screen, but results were certainly more than acceptable for a budget monitor.

It's not aimed at demanding users, but if you want a decent digital 19in monitor and are on a budget, the HX191DP is superb value for money and comes with a full three-year on-site warranty. *Paul Monckton*

Details

Price £119.99
Best price www.pcw.co.uk/bestprices
Contact Hanns.G www.hannsg.com
Specifications 19in TFT display (1,280x1,024) • 16.2 million colours • 300cd/m2 brightness • 700:1 contrast ratio • 5ms response time • Viewing angles: 150°/135° (horizontal/vertical) • VGA and DVI inputs • Two 1W speakers • Three-year warranty • 415x200x415mm (wxdxh) • 4.4kg

Verdict

Pros Price; VGA and DVI inputs;
Cons Unimpressive design; slight backlight bleed
Features ★★★½☆
Performance ★★★½☆
Value for money ★★★★★
Overall Average performance, but an excellent price for a DVI-enabled 19in monitor
★★★½☆

WIRELESS PRINT SERVER

Belkin Wireless 802.11g all-in-one

Connect multiple computers to a single printer or MFD wirelessly

Personal Computer World RECOMMENDED

A large proportion of homes now have more than one computer and this is reflected in the increase in home networking. But even if a household has several computers, space tends to limit the number of printers and scanners to just one. While it is possible to share a printer between networked computers, this requires the machine to which the printer is attached to be switched on – if it's turned off, printing from other computers is not possible. Sharing a scanner or the scanning facility of a multi-function device (MFD) is possible, but far from easy.

This is where Belkin's wireless print server can help. The device features a standard Ethernet port to connect it to a router and a USB port to attach the printer or MFD. The configuration process involves assigning the print server an IP address on a network so that it can be accessed by any of the networked machines, providing that the server software is installed.

Only one computer can be connected to the printer at any one time, but each can be configured to connect automatically when required, and the connection set to time out after a period of inactivity to allow others to connect. The wizard-style configuration makes set-up simple and in a matter of minutes any computer on the network can print, scan and fax using the same device.

If the attached printer features a memory card reader, this can also be accessed from any machine with the server software installed. Performance is excellent with both wireless and wired PCs on the network.

Print servers have traditionally been expensive pieces of equipment, but Belkin has broken the mould by making this device available at an extremely affordable price. Ideal for homes with multiple computers, this print server is also robust enough to cope with the demands of a small office. *Mark Wilson*

Details

Price £59.99
Best price www.pcw.co.uk/bestprices
Contact Belkin www.belkin.com
Specifications 802.11b/g Wifi • USB port • Supports printers and scanners • Power supply • Ethernet cable

Verdict

Pros Wonderfully easy to set up and use; great price
Cons Only supports a single device
Features ★★★★½
Performance ★★★★★
Value for money ★★★★★
Overall A simple, elegant and cheap print server for homes and small offices
★★★★★

DIGITAL CAMERA

Fujifilm Finepix Z5fd

Personal Computer World RECOMMENDED

A stylish compact that looks as good as the pictures it produces

Hot on the heels of Fujifilm's Finepix F31fd, comes the Finepix Z5fd. This svelte digital camera is a fine advert for the company's Super CCD HR, a 6.3-megapixel sensor which is claimed to be up to four times more light-sensitive than a conventional CCD.

The functionality packed into the camera's diminutive frame is impressive. Fujifilm is inconsistent when designing compacts, sometimes delivering uglies (see the A-series) alongside the chic Z series. This aluminium-clad model benefits from an absence of ugly protrusions – the 3x zoom lens doesn't even extend from the body when in use – and comes with a tidy set of on-body controls.

It's pocketable and lightweight at 148g sans battery and card, although shame on Fujifilm for not bundling an Xd Picturecard. There's a measly 26MB of internal storage, so budget for a 1GB (about £15) Xd that's good for 341 best-resolution stills, or approximately 15mins of VGA video (Avi as Motion-jpeg).

In use, the Z5fd is undemanding. Good LCD menus give access to numerous functions, including plenty of scene modes for camera novices, continuous shooting at 2.2fps (frames per second), macro and a healthy variety of white balance presets.

There's also Fujifilm's signature F button for calling up ISO sensitivity, which ranges from 100 to a noisy 1,600, image quality from 6-megapixels Fine down to web-friendly 0.3-megapixels, and a choice of standard, black and white and chrome colour modes. The Chrome setting boosts colour saturation and once you've tried it, you're unlikely to go back.

Power-up and pause between shots is a pinch under a second, so it's acceptably speedy, and the combination of a sensitive CCD and dual noise-reduction to boost high-IS fidelity means camera shake is less of a problem than with some compacts. A dedicated anti-blur button optimises the Z5 for sharp shooting, while a natural light and flash mode is also available, providing the means to take a straight photo, then a flash variant immediately after.

It's the 'fd' in the name, however, that indicates the Z5's key feature – face detection. If a human face is in the frame, the camera near-instantly locks onto it (detection is as quick as a claimed 0.05sec and configures the camera for best portraiture. Should the subject move, the camera will follow it, so you can experiment with different compositions without having to reset. And if there are multiple faces all over the frame, it will track up to 10 simultaneously.

In replay mode, faces can be zoomed in on instantly to check for sharpness, and there's also a Trimming for Blog feature to quickly crop and re-size any image. Also, Irsimple infra-red connectivity is included for transmission of files to other compatible devices, alongside USB2 for connection to a Mac or PC.

When reviewing images on computer, it's plain, even with the diddy Fujinon lens, aberrations as vignetting, distortion and fringing along high-contrast edges are seemingly absent. Colours are natural, or super-rich if chrome is engaged, and the camera's 256-zone metering does a great job of balancing exposure.

While the camera's tiny controls will be off-putting to the large-fingered, those after a reasonably versatile compact for social shoots will find ease of use, Face Detection and swift performance most welcome. The more discerning, meanwhile, will have few quibbles about capture quality.

Karl Foster

Details

Price £219.99
Best price www.pcw.co.uk/bestprices
Contact Fujifilm www.fujifilm.co.uk
Specifications 6.3-megapixel super CCD HR sensor • f3.5-4.2 • 3x optical zoom (36-108mm at 35mm equivalent) • 1/1,000sec to four sec shutter speed • IS 100-1600 • Max image 2,848x2,136 pixels (3,024 x 2,016 at 3:2) • 30fps VGA max video 26MB internal memory • Xd Picturecard slot • Jpeg and M-jpeg (AVI) capture • USB2 • Irsimple infra-red connectivity • 148g • 92.8x19.4x55mm (wxdxh)

Verdict

Pros Face detection makes taking people photos a cinch; impressive image quality; very easy to use
Cons Small controls; easy to switch on accidentally; no memory card or case bundled

Features ★★★★½
Performance ★★★★★
Value for money ★★★★½

Overall A very capable, easily pocketable digicam with the bonus of rapid face detection – ideal for the style-conscious

★★★★½

DIGITAL CAMERA

Ricoh Caplio RR730

A low-cost compact camera that's simple enough for the first-time user

While they're hardly the most stylish cameras on the market, Ricoh's digital compacts have an uncanny knack of performing much better than we expect them to.

The Caplio RR730 is an entry-level point-and-shoot camera, designed to fit easily into your palm or pocket. It doesn't try to impress you with anti-shake functions or a huge zoom range, but it's tidy and well constructed while remaining impressively light.

The back finds room for a full-sized 2.5in LCD panel, albeit with a rather low 115,000 pixels, and a menu system that's pared down to the bare essentials. Unlike many cameras of this type, it's not crammed full of features you'll never use, making it very quick and easy to navigate.

While shooting you have a selection of six scene modes, including full auto, program, portrait, landscape, sports and night scene. It would have been nice to see a little more on-screen help, but the settings are basic enough to get to grips with fairly quickly.

Flash mode, macro, self-timer and exposure compensation are all available directly from a four-way thumb pad, but settings such as white balance and Iso sensitivity must be changed from the menu. The latter is also limited to the range 64 through to 200, giving the camera somewhat restricted low-light performance.

We were a little disappointed with the image quality from the Caplio RR730. While it's acceptable for snaps and even enlargements, other cameras, such as Ricoh's own Caplio R5, produce far better pictures from their 7-megapixels, with considerably lower noise and better edge clarity.

With an RRP of £129.99, the Caplio RR730 is inexpensive for a 7-megapixel camera – you'll also find it for a lot less online. But bear in mind that as it uses standard AA batteries, you won't get a battery or charger included in the price. *Paul Monckton*

Details

Price £129.99
Best price www.pcw.co.uk/bestprices
Contact Ricoh www.ricoh.co.uk
Specifications 7.16-megapixel CCD • 3x optical zoom • 34-102mm lens (35mm equivalent) • Movie mode (320x240) • Six scene modes • 32MB internal memory • SD and SHDC card-compatible • 2.5in LCD monitor with 115,000 pixels • Iso 64-200 • AA-battery support • 89.4x26x60mm (wxdxh)

Verdict

Pros Price; easy to use; compact and light
Cons Image quality; limited low-light ability
Features ★★☆☆☆
Performance ★★★☆☆
Value for money ★★★☆☆
Overall An inexpensive, well-built camera that's very easy to use
★★★☆☆

DIGITAL CAMCORDER

Panasonic NV-GS80

An entry-level model that attempts to get the basics right

The NV-GS80 is Panasonic's latest entry-level digital camera and it uses familiar MiniDV tapes to record digital widescreen footage.

When we first picked the camera up we noticed it was very plasticky and reasonably chunky. The 2.7in widescreen viewfinder is bright and clear and can rotate 270°, but it won't point downwards.

One of the key features of the NV-GS80 is a 32x optical zoom Leica Dicomar lens. Zooming is very smooth thanks to Panasonic's optical image stabiliser (OIS), which reduces shaking and blurring. The OIS is especially effective when you zoom all the way to 32x.

The NV-GS80 has a single, 800k pixel CCD sensor, which is par for the course in a camera in this price range. The effective pixel count reduces to 540k pixels when shooting in its native 16:9 widescreen mode.

In low-light conditions, video exhibited a lot of noise. However, in well-lit conditions footage looked clear and vivid, which is fine for outdoor point-and-shoot recording.

There's a limited manual focus mode, which is controlled by the joystick and fairly tricky to use. It can also record an image, followed by seven seconds of audio to the MiniDV tape – albeit rather awkwardly.

To transfer video to your PC, you must first disconnect the battery to get access to the mini USB2 or Firewire ports. You also have to plug in the power supply, which is a fatal flaw for those looking to edit footage on the go.

We did wonder if this part of the design was due to Panasonic not being convinced battery would last transferring a whole film across. However, battery life was reasonable at just under two hours, with 20 minutes of actual footage shot and the rest of the time spent with just the viewfinder turned on.

The NV-GS80 has a series of flaws, which are partly forgiven due to its excellent zoom and ease of use. Its £229 price point should have widespread appeal among families. *Emil Larsen*

Details

Price £229
Best price www.pcw.co.uk/bestprices
Contact Panasonic www.panasonic.co.uk
Specifications CCD sensor (800k) • 32x optical zoom • 2.7in LCD (widescreen) • Image stabilisation • Mini-firewire • USB2 • VGA still picture recording • Webcam function • 79x136x73mm (wxdxh) • 450g

Verdict

Pros Crisp image quality; smooth and stable zooming
Cons Poor in low light; awkward manual focus; battery needs removing during transfer
Features ★★★☆☆
Performance ★★☆☆☆
Value for money ★★★☆☆
Overall Excellent zooming and good image quality in well-lit conditions make it a reasonable choice for home users
★★★☆☆

MOTHERBOARD

ECS NF650iSLIT-A

A mainstream motherboard with good features and performance

The new ECS NF650iSLIT-A motherboard is based on Nvidia's middle-of-the-road 650i chipset. This is closely related to Nvidia's 680i, which is widely regarded as the best chipset for overclocking Intel processors.

The board sports an aluminium heatsink on the southbridge and a small and fairly quiet fan on the northbridge.

One of the biggest differences between the 650i- and 680i-based boards is that the 650i will only provide eight PCI Express lanes per card in SLI mode, slower than the 16 lanes per card the 680i can manage. If you only plug one graphics card in you'll get a full 16 lanes and no performance hit.

But to all intents and purposes, the difference between eight and 16 PCI Express lanes is minimal.

Motherboards based on the 650i chipset also have a PCI Express slot lopped off compared with 680is, so you can't have three graphics cards.

There are four external USB sockets (internal pins enable four more if required).

Full 7.1 audio output and four 3Gbit/sec serial ATA ports make it an all-rounder in terms of features.

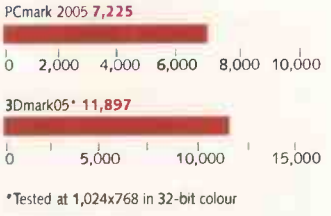
The 650i SLI doesn't officially support a 1,333MHz front-side bus (FSB). However, after digging through the slightly clumsy ECS Bios, we managed to successfully overclock to this – theoretically, it can go far beyond 1,333MHz. The Ram can also be overclocked to 1,400MHz.

During testing, performance was a tiny bit slower than 975X and 680i motherboards in Sysmark 2004 SE, scoring 342. Check **www.reportlabs.com** for more on our test results.

For the vast majority of PC users looking to build a single graphics card, single CPU system, this motherboard is ideal. At £74, it carries a lot of the 680i's features, without the high price tag. Additionally, this ECS board is slightly cheaper than other 650i motherboards.

Emil Larsen

Performance



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

Details

Price £74
Best price www.pcw.co.uk/bestprices
Contact ECS www.ecs.com.tw
Specifications LGA775 socket • 1,333MHz FSB • Four Dimm slots

Verdict

Pros Wide range of voltage options
Cons Slower PCI Express lanes in SLI
Features ★★★★½
Performance ★★★★½
Value for money ★★★★★

Overall An ideal motherboard for enthusiasts on a budget

★★★★½

TV TUNER

Hauppauge WinTV-HVR 3000

PCI tri-mode TV tuner card with satellite, Freeview and analogue support

The Hauppauge WinTV-HVR 3000 is a PCI TV tuner card that provides both analogue and digital tuners.

Connected directly to a dish aimed at a suitable satellite such as Astra or Eutelsat, the WinTV-HVR 3000 can receive free-to-air DVB-S digital satellite TV and radio.

TV and FM aerial inputs allow for analogue TV, terrestrial Freeview digital TV and radio reception.

Included with the PCI card are a 45-key remote (with two AAA batteries), a short RCA to S-video adapter cable, a T-style FM aerial and an IR remote eye cable.

The back panel of the WinTV-HVR 3000 features a co-ax plug for the FM aerial, a co-ax socket for the TV aerial and a type F socket for the satellite connection.

There's also an S-video connector, a 3.5mm jack for audio line level input and a 1.5mm jack for connecting the IR remote sensor. A note on the supplied S-video breakout cable states that only the white video-in phono input is active on the UK version of this product.

During installation, the Hauppauge set-up software installs 12 software components for the WinTV-HVR 3000, including an optional 30-day trial of the TVTV EPG (electronic programme guide).

Following installation, an initial channel scan must be performed. And with three possible signal formats, this is quite a protracted and complex task.

On our test system, the TV aerial input performed well. Analogue reception places a heavy processing load on the system, so a fairly recent and powerful CPU is required, while DVB-T/S is much less demanding.

The Hauppauge WinTV-HVR 3000 is an obvious choice of tuner card if you are building a home theatre PC. Alternatively, for rather more money (£179), there is the WinTV-HVR 4000 – a quad-tuner card that adds high-definition TV capability to all the options available with the 3000.

Terry Relph-Knight

Details

Price £99
Best price www.pcw.co.uk/bestprices
Contact Hauppauge www.hauppauge.co.uk
Specifications PCI TV tuner • DVB-S, DVB-T and analogue tuners • S-video, composite and stereo audio inputs • Windows XP/Vista

Verdict

Pros Multiple tuners; good value
Cons Drivers aren't Microsoft certified; no HD capability
Features ★★★★½
Performance ★★★★½
Value for money ★★★★½

Overall The WinTV-HVR 3000 hybrid tuner is feature-rich and turns in a solid performance

★★★★½

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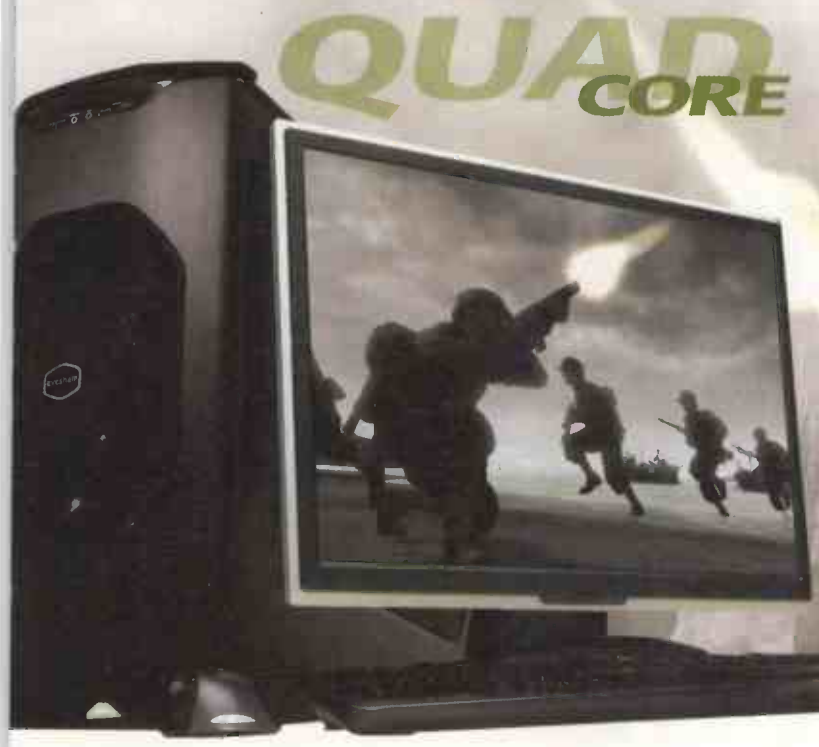

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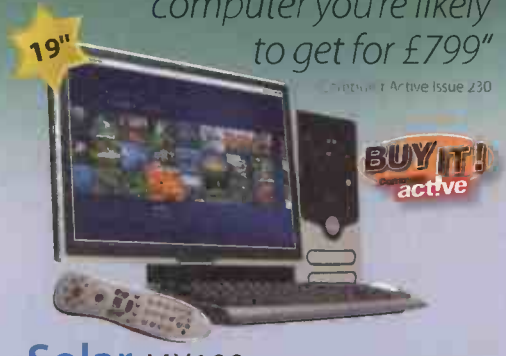

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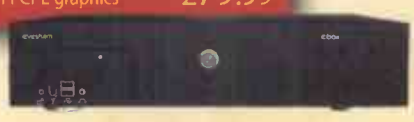

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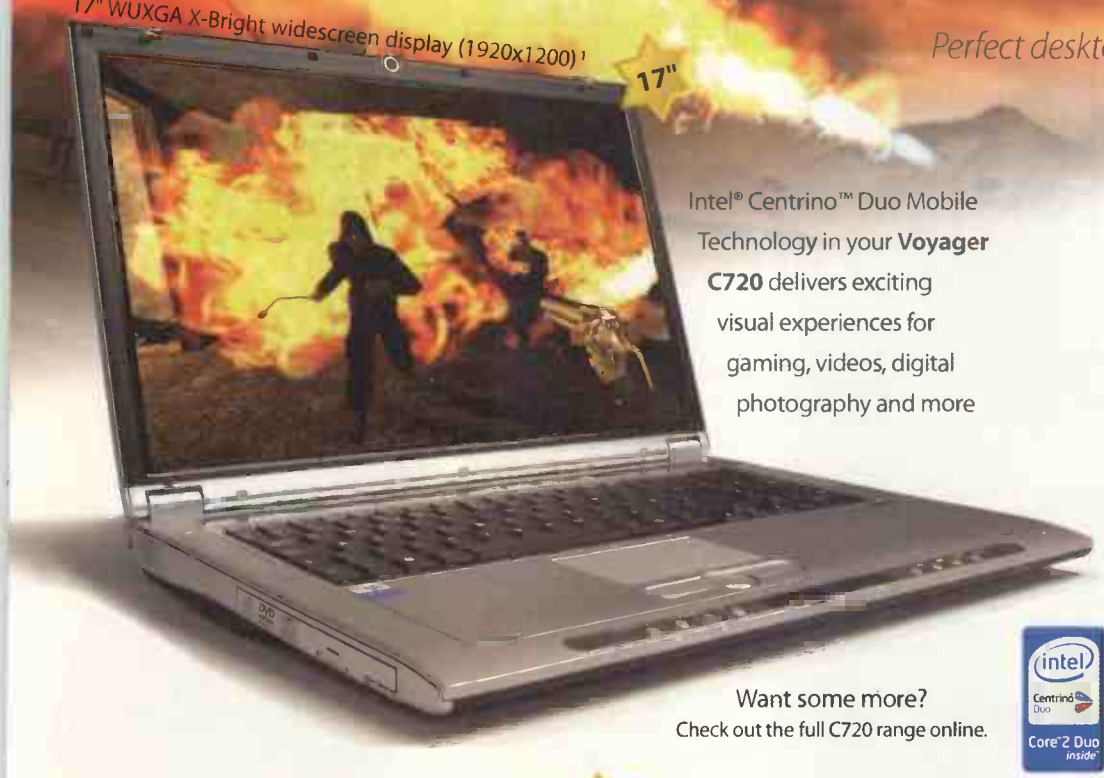

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What Laptop, Dec 06 **Gold Award**

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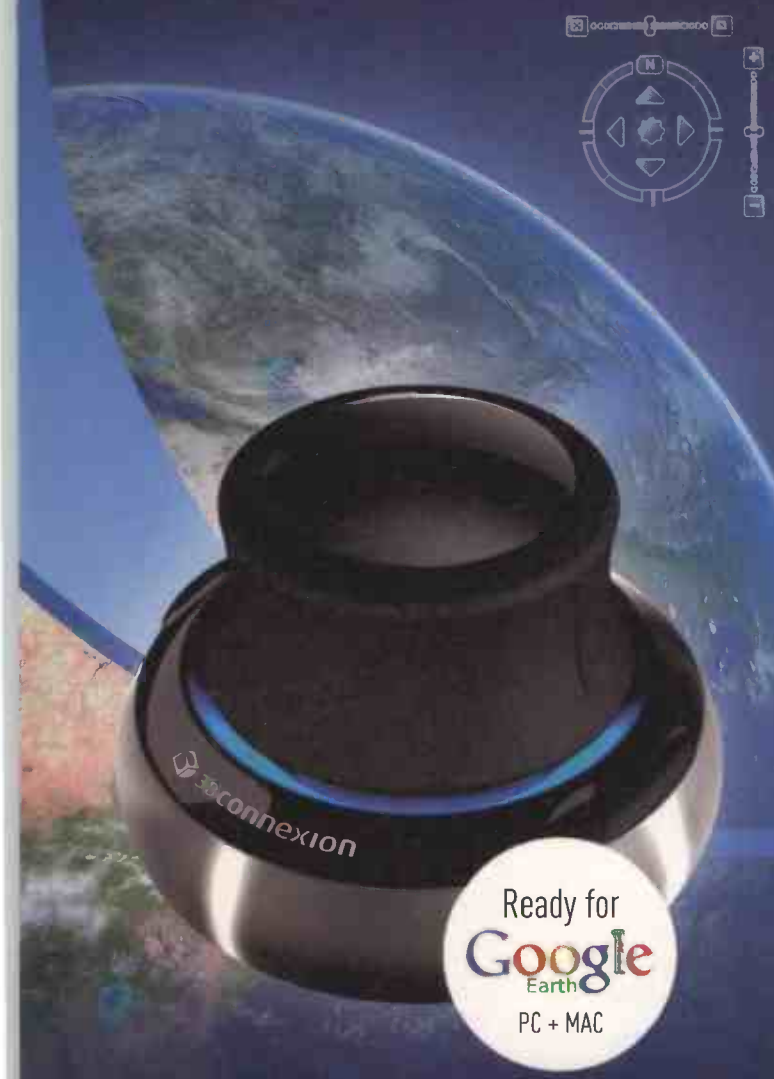

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SKYPE PHONE

Philips VOIP841 phone

Versatile cordless phone for Skype and landlines calls

There are plenty of Skype handsets around at the moment – and most seem rather overpriced, selling for between £100 to £130. Philip's VOIP841 phone is in the same price bracket, but in this case the high price is rather justified.

Neatly designed in glossy black, and more solidly constructed than many of the rival Skype phones we've seen, the VOIP841 works with both Skype and existing landlines.

This means you can make cheap calls using your Skype account and you can also receive incoming calls to your landline number as well.

To install your phone you can use an Ethernet cable to connect its base unit to your broadband router and an ordinary phone cable to connect it to your landline telephone socket. The phone will then ring when it receives an incoming call on your landline.

For outgoing calls, simply use the menu on the phone's small LCD screen to switch between Skype and landline calls.

The phone works perfectly well and should have broad appeal – particularly to small businesses and home workers who can save money on Skype calls during office hours, while also receiving incoming calls on a landline.

The only fly in the ointment is the fact that the VOIP841 doesn't have a built-in answerphone. This means it can't replace your existing landline phone and answerphone setup. Philips includes a voucher that entitles you to a year's use of Skype's voicemail service, but this only works for Skype calls and cannot record calls made to your landline.

To be fair, the VOIP841 is more versatile than comparably priced rivals, such as the Netgear Skype Wifi phone. It's just a shame that the lack of an answerphone prevents it from being the ideal all-in-one phone system that it could be. *Cliff Joseph*

Details

Price £130
Best price www.pcw.co.uk/bestprices
Contact Philips www.philips.co.uk
Specifications DECT cordless telephone with Skype support • Base station with telephone and Ethernet connectors • Hands-free speakerphone • Includes two AA rechargeable batteries • Voucher for 120 minutes free Skype calls • 12 months free Skype voicemail

Verdict

Pros Works with both Skype and landline calls; attractive design; good build quality
Cons Expensive; lacks built-in answerphone

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

Overall The Philips VOIP841 internet phone works well, but the lack of an answerphone is disappointing

★★★★☆

INTERNET SECURITY

Yoggie Gatekeeper Pro

An easy-to-use, pocket-size USB internet security suite

You'll probably regard the firewall as that thing the IT department at work uses to stop you larking around on the likes of Myspace all day. If you had the time or inclination to find out how the firewall is set up, you would probably find either a PC of some kind dedicated to the task, or a rack-mounted appliance standing guard between your precious network and the anarchy of the internet.

On your own PC, the need for firewall software is now a sad fact of life. However, even the most advanced of these packages is not enough to ensure the security of a business. Any software running on your PC can be compromised or disabled.

Software security suites also divert a portion of your PC's computing power away from running your applications or games, and require user intervention when updates and fixes are required.

The Yoggie Gatekeeper Pro is a pocket-size internet security appliance that's small and light enough for you to take with you wherever you take your laptop. It has a self-contained USB connector on a rubberised cable that tucks away neatly into the case and a tidy designer appearance that's in keeping with modern executive style.

It's USB-powered and houses a silent, passively cooled 520MHz CPU running the Hardened Linux operating system. All security functions are performed by the Yoggie Gatekeeper, leaving your PC's CPU free to run the applications for which it was intended.

Installation is very simple, provided you follow the Quick Start guide. If you're running Windows XP, you can use the USB connection either on its own or in conjunction with a wired Ethernet connection.

If you use it as a purely USB device, all network traffic is diverted via the Yoggie Gatekeeper before your PC gets to examine any data packets. When used in this way, it can protect either wired or wireless connections using your PC's built-in network hardware. The use of the driver also means that connection to the internet is immediately disabled if the Yoggie Gatekeeper is unplugged by the user. Alternatively, if you're on a wired network, you can plug a network cable into the internet side of the Yoggie Gatekeeper.

If you're not running Windows XP, you won't be able to use the USB driver (Vista support for this function is on the way), but you can still use the Yoggie Gatekeeper in pass-through mode by connecting it between your PC and the network, using a pair of Ethernet cables. In this configuration it's entirely independent of your host operating system.

At home, if you have a router connected to a broadband modem via Ethernet, you can connect the Yoggie Gatekeeper between the two to protect up to five PCs on your home network.

The Yoggie Gatekeeper system is configured via a simple password-protected, web-based interface.

Personal Computer World RECOMMENDED

A dashboard-style front page displays firewall statistics in terms of threats prevented, while the following pages provide very simple control over the Yoggie Gatekeeper's many security features. The Yoggie Gatekeeper can also generate comprehensive reports for later reading.

The security features include a stateful inspection firewall with port forwarding; a VPN client; intrusion-detection and prevention; transparent proxies for HTTP, FTP, Pop3 and SMTP; anti-virus, anti-spyware, anti-spam and anti-phishing.

These proxies can provide full content filtering for parental control or to enforce internet usage policy in the office. They also ensure that all incoming and outgoing emails are checked by the Yoggie Gatekeeper before they reach your PC. Because they're transparent, no additional configuration is required on your PC, which appears to connect to all internet services as normal.

All of these options are easy to configure and manage, and you don't need to be a security expert to set up any of them.

Included in the price is a one-year subscription to automatic updates for Yoggie Gatekeeper, which will keep you up to date with the latest internet threats.

In a business environment, Yoggie Gatekeeper has the ability to work in corporate mode. In this configuration, it connects to a Yoggie Management Server that can manage a fleet of Yoggie Gatekeepers, centrally enforcing policies and managing logs from a number of users.

Yoggie Gatekeeper makes internet security entirely transparent for users. It manages its own software updates in the background and keeps their PCs free of complicated security suite software.

The system also employs cutting-edge security techniques without being a drain on the PC's performance. And with a throughput of around 20Mbits/sec, only the very fastest internet connections of ADSL2+ and above will be slowed down by the use of Yoggie Gatekeeper.

Paul Monckton

Details

Price £113 (approx)
Best price www.pcw.co.uk/bestprices
Contact Yoggie www.yoggie.com
Specifications Personal firewall • Anti-spam, anti-spyware and anti-virus • USB connection • One-year subscription included in price (annual updates $40) • Requires Windows XP for USB operation (Windows Vista support coming soon)

Verdict

Pros Simple to use; excellent security; centrally manageable
Cons No Vista driver support yet; short USB connection

Features ★★★★★
Performance ★★★★½
Value for money ★★★★½

Overall Yoggie Gatekeeper Pro brings corporate-level internet security right down to the mobile wireless laptop. It's easy to set up and manage, and completely transparent to users while in operation

★★★★½

Asus M2A-VM

Price £52 **Contact** www.asus.com **Overall** ★★★½☆

The Asus M2A-VM motherboard features AMD's first chipset with integrated graphics since the company took over graphics specialist ATI.

The RS690 northbridge is designed for value and mainstream AM2 socket motherboards, which means it's compatible with all AMD's consumer processors except high-end 1,207pin Quad FX chips.

Four DDR2 Ram slots, which can be run in dual-channel mode, are included. While the memory clock frequency can be changed in block chunks (400/533/667/800MHz), it can't be fine-tuned and CAS timings can't be altered at all, so this is not an enthusiast's board. It's an average example of what should be an excellent platform for home theatre PCs. Head to **www.pcw.co.uk/2185071** for a longer review. *Emil Larsen*

Solar Technology Freeloader

Price £29.99 **Contact** www.solartechnology.co.uk **Overall** ★★★★☆

Seeing your mobile phone flash 'battery low' when you're miles away from a power socket is never a pleasant experience. The solar-powered Freeloader aims to help you out by providing a portable power source.

It takes about five hours to charge the internal battery, but you can also charge it over USB. The charge will be held for up to three months and will be good for roughly 44 hours powering a mobile, 22 hours for a PDA and 18 hours for an iPod. A big selection of adapters is included to cover most mobiles, Mp3 players and PDAs, but it's worth checking the Solar Technology website for compatibility before you buy.

Probably not something you'll use all the time, but a great product nevertheless. *Will Stapley*

Shuttle SD39P2

Price £330 **Contact** www.shuttle.com **Overall** ★★★★½

The SD39P2, which includes a motherboard, case and power supply, can take all of Intel's fastest processors, including its latest and greatest quad-core processor, the QX6700.

The SD39P2 has only one PCI Express slot, so can't be used for SLI graphics. The case isn't long enough to accommodate Nvidia's high-end 8800GTX graphics card, but double-width graphics cards will fit.

The motherboard uses Intel's high-end 975X chipset, but enthusiasts would be better off with Nvidia's 680i or 650i motherboards. Five system fans keep the system cool and, overall, it is actually quite quiet.

This is a great small case that can accommodate some of the highest-quality components. Read more online at **www.pcw.co.uk/2185743**. *Emil Larsen*

Octigen 3.5in enclosure

Price £17.99 **Contact** www.octigen.com **Overall** ★★★★☆

Octigen's USB2 drive enclosure accepts any size of parallel ATA (Pata) hard drive. Installation is a bit fiddly, but it's not a difficult job – the badly written instruction sheet is no help, though.

A couple of pieces of adhesive foam rubber are supplied, with no indication of what you're supposed to do with them, but we presume they're to stop the drive from rattling around inside the case when travelling.

It can operate as a bus-powered device or be powered from the supplied mains adapter. The fanless design relies on the case to dissipate heat, and we found it does this pretty well, with the case getting warm but not hot.

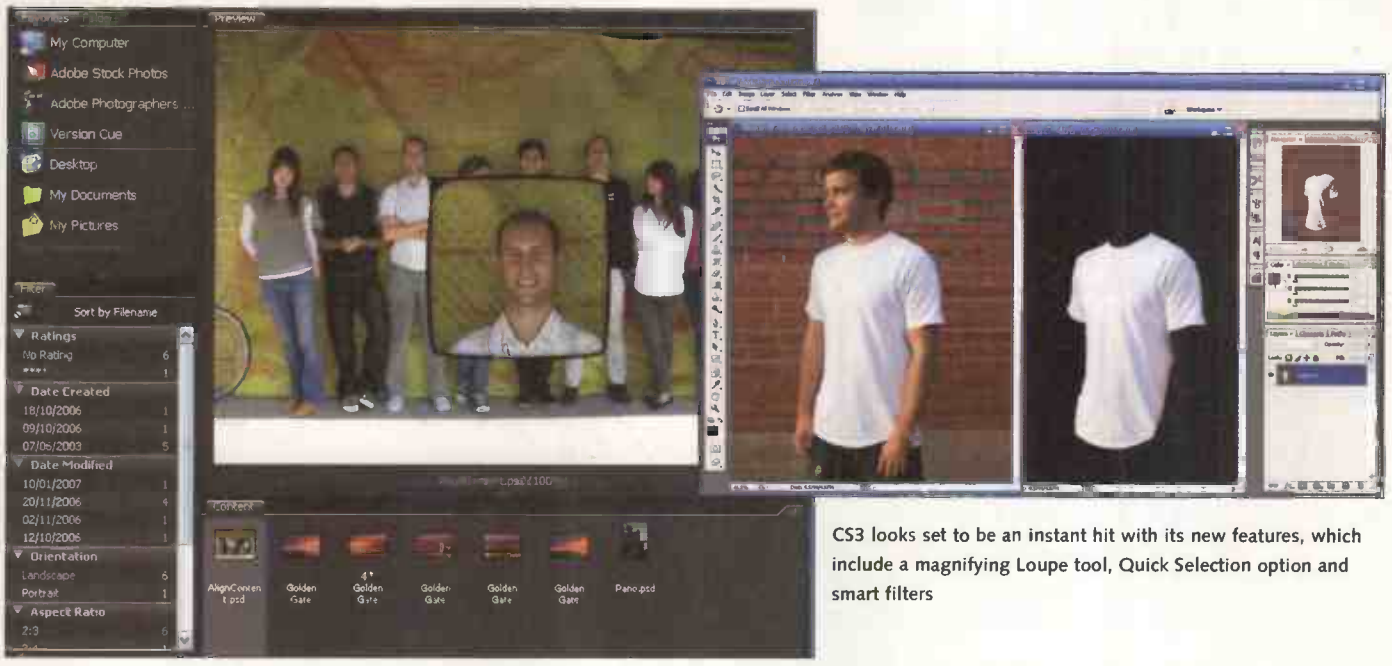
This is a stylish, quiet and inexpensive drive caddy that's let down only by inadequate instructions. *Kelvyn Taylor*

IMAGE EDITING

Adobe Photoshop CS3

Personal Computer World RECOMMENDED

Get your credit card ready for the latest Photoshop upgrade



CS3 looks set to be an instant hit with its new features, which include a magnifying Loupe tool, Quick Selection option and smart filters

The first thing to mention about the new version of Photoshop is that it is actually two versions – Photoshop CS3 and Photoshop CS3 Extended. The 'standard' version of Photoshop CS3 is aimed, as always, at creative users such as photographers and designers, while the new Extended version includes additional features aimed at specialist markets such as medical imaging and engineering.

However, the core improvements and new features are the same in both versions. These kick off with some welcome interface changes, such as the row of tabbed icons on the far right of the screen that enables you to open the program's many tool palettes quickly. Hitting the Tab key instantly hides all the on-screen tools – as it did in previous versions – but if you move the mouse to either side of the workspace, you'll see the hidden tools pop back into sight. You can then select whichever tool you need and the palettes will automatically hide themselves away again. This is a nice way of keeping the workspace tidy, enabling you to work with full-screen images while still being able to select any tool you need quickly.

Another nice interface addition is the Loupe tool in the Bridge – the browser with which you can sort through and locate your image files. A loupe is a magnifying glass used by jewellers, and if you click on any preview image in the Bridge the Loupe tool will display a magnified version of the image immediately beneath the mouse cursor. This will be a real time-saver, as it lets you examine images closely even before you've opened them in Photoshop itself.

Once you're ready to start work, you'll find that some of Photoshop's key editing tools have been drastically overhauled. The Magic Wand selection tool, which Adobe admits is often called the 'tragic wand' due to its lack of flexibility, is joined by the new Quick Selection tool. Select the tool, click on any part of an image you want to select, and then move the mouse over the area (or multiple areas) to be selected, and the Quick Selection tool will automatically detect the edges of that area and select them for you. It works very well and will save time when selecting objects that contain fine detail.

Photoshop's filters work differently as well. You can use smart filters, which apply their effects to a separate layer, leaving the underlying image untouched. To edit the filter settings, double-click on the filter in the Layers palette and the filter's settings dialogue will appear once more. You can apply multiple smart filters, with each one stored in its own layer, which makes it easy to experiment with combinations of filters without losing your original image.

It is also possible to use layers to combine images. Handheld photography often produces several slightly different versions of one image, so this feature enables you to place each version of the image on a separate layer. Photoshop then uses its Auto-Align Layers feature to align them correctly and merge them into a single image.

There are plenty of other new features, including improved colour correction and printing controls, perspective and cloning tools, and the ability to retouch raw files. And that's before you throw in the extra tools in the Extended version.

In short, this is a must-have upgrade for anyone who uses Photoshop regularly.

As with previous versions of Photoshop, CS3 comes with a high price tag. The standard version is £569, while the Extended edition costs almost £900. Read more CS3 reviews online at **www.pcw.co.uk**. *Cliff Joseph*

Details

Price £569.88 (Extended: £887.12)
Best price www.pcw.co.uk/bestprices
Contact Adobe www.adobe.co.uk
System requirements 1GHz processor • 512MB Ram • 650MB hard disk space • Windows XP/Vista Home Premium

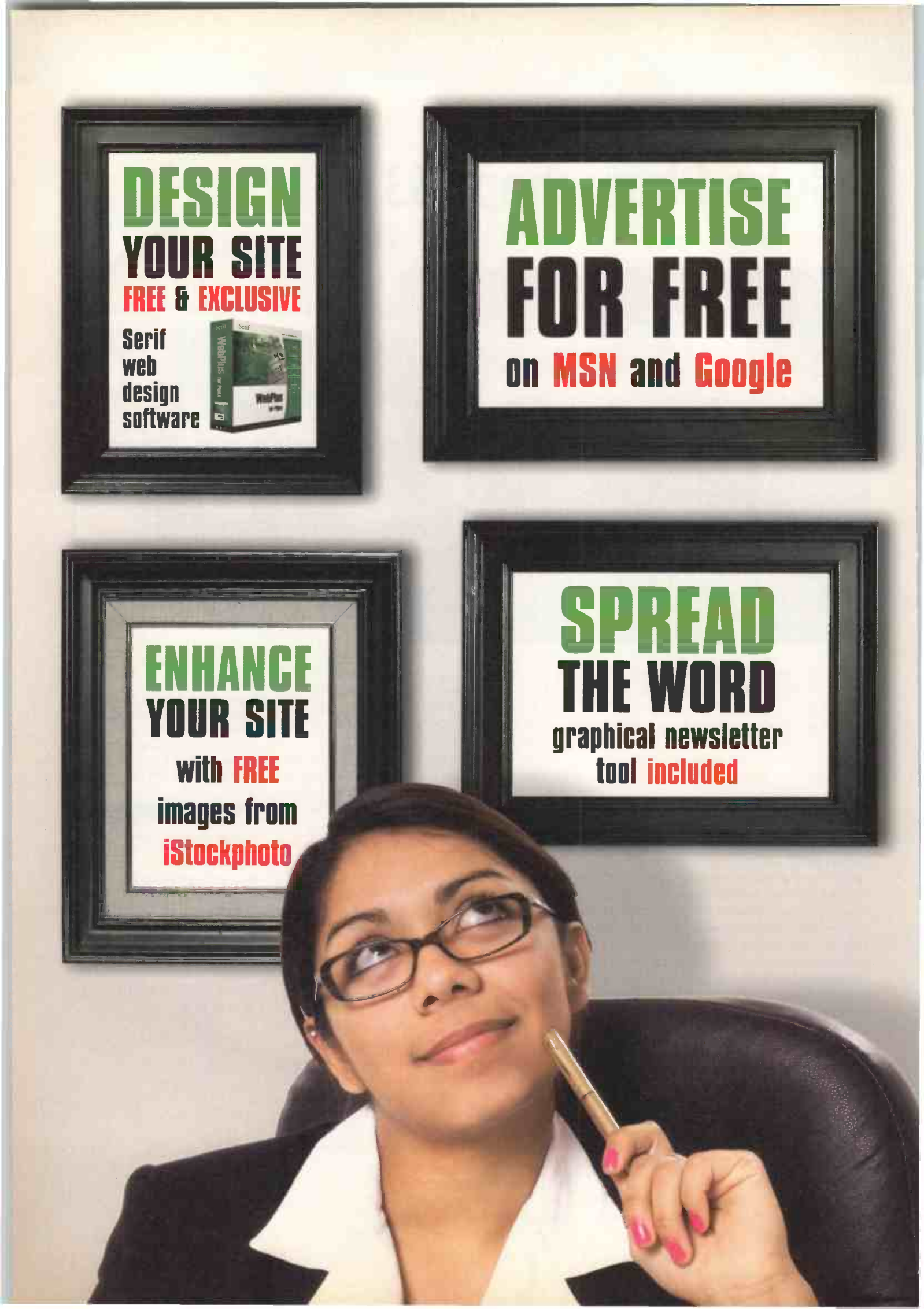
Verdict

Pros More efficient interface; powerful new selection tools; filters; layer controls
Cons Expensive to buy on its own (rather than in CS3 bundle)

Features ★★★★★
Ease of use ★★★★½
Value for money ★★★★★

Overall Sixteen years on, Photoshop is still the undisputed king of the photo editors

★★★★★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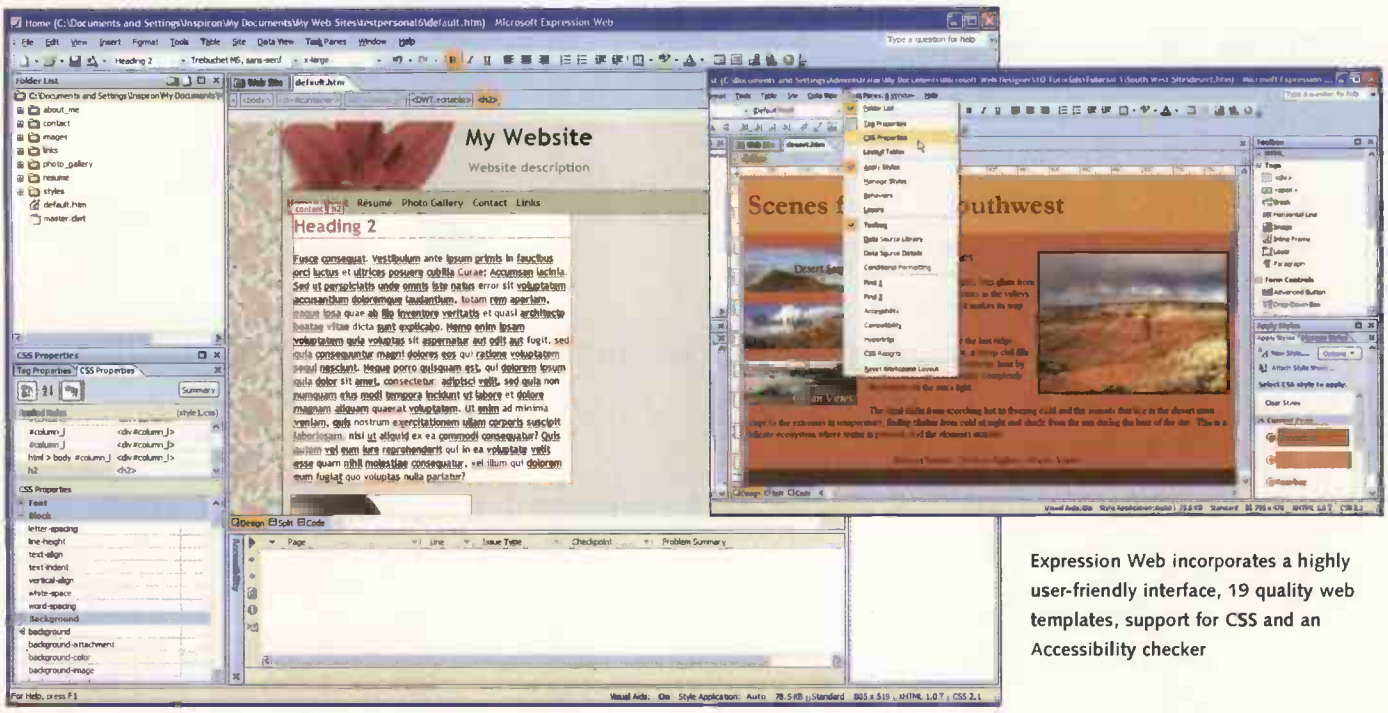


Expression Web incorporates a highly user-friendly interface, 19 quality web templates, support for CSS and an Accessibility checker

Frontpage is dead, long live Expression Web. That may not be the official Microsoft line, but with no new versions of Frontpage in the offing there seems to be some effort to move away from the older days of web design.

According to Microsoft, Expression Web is a standards-based web design package. Before going any further, we should be clear that many of these standards are Microsoft standards. Don't expect to connect to a Mysql database when there are Microsoft alternatives in the form of MSSQL and Access. The same applies with PHP – in Expression Web, Asp.net is the supported language.

However, other, more important non-Microsoft standards are included. CSS is the most notable and this is at the very heart of Expression Web for both formatting and positioning, more on this later.

The collection of templates is a clear case of quality over quantity with a total of 19 templates, which is about the right amount of choice in our opinion.

If it does seem limited, don't forget that with the formatting power of CSS, the possibilities are broader than you might think. The code produced by the templates is very clean, with none of the extraneous code that appeared in Frontpage.

There is sometimes the impression that the proper method of creating websites is with a simple text editor. But the benefit of the Expression Web interface is immediately noticeable. Those wanting to stick with writing code direct will appreciate code completion, but the ability to create an appealing layout using CSS with a Wysiwyg editor is very welcome.

Another notable tool is the Accessibility checker. There are two good reasons for taking the time to run this report and following the advice. The first is that it is actually a legal requirement for commercial sites, but there's also the fact that a site following the accessibility guidelines is also highly visible to search engines. And with the importance of site ranking at an all time high, this tool arrives at the right time.

The other hot topic in web design circles is the rise of dynamic websites. Expression Web provides two approaches to these websites. The first is to use a dynamic template – this sets the top and side panels of the website, so only the main content needs attention.

The second is where sites can be edited online with their own basic content management system (CMS) – ideal for posting digital photos, for example.

Posting sites is simple via a variety of transfer protocols – FTP, Webdav and the local file system. Assuming that there is no Microsoft-specific code, there is no reason why the site shouldn't be hosted on a Linux server. In fact, we did just that with one of the personal templates.

Expression Web is supplied with some video tutorials. They are not going to teach the whole process of web design but are a very useful introduction to the interface and the various CSS layout options.

Microsoft Expression Web is expensive, but it's still cheaper than the likes of Dreamweaver. It is also worth investigating Visual Studio Web Developer Express Edition, which has more of an emphasis on code than design but is available at no cost. *Tim Smith*

Details

Price £260
Best price www.pcw.co.uk/bestprices
Contact Microsoft
System requirements 700MHz processor • 512MB Ram • 1.5GB hard disk space • Internet connection • Windows XP SP2 or higher

Verdict

Pros Powerful interface; CSS support; accessibility tools
Cons Doesn't incorporate all non-Microsoft standards; expensive

Features ★★★★☆
Ease of use ★★★★☆
Value for money ★★★☆☆

Overall Expression Web is a very good web-editing suite if you accept the inevitable Microsoft bias

★★★★½

DATA RECOVERY

Lexar Image Rescue 3

Recover your accidentally deleted photos with ease

Digital camera menus are such that it's common to find Delete Frame sat next to Delete All Frames, or Format Card, hence catastrophic data loss is often a button-press away.

There are lots of data recovery utilities available, many aimed at rescuing the content of scuppered hard drives, but Lexar's Image Rescue specialises in recovering media files from Flash memory.

This latest version not only tracks down deleted Jpeg, Tiff and Raw files, but it also extends to wayward Wav, mp3 and movie files, making it of interest to those with card-loaded portable media players as well as to photographers.

Image Rescue takes about 10 minutes to disgorge the hidden content of a 2GB Compactflash card – a much-abused, formatted and re-formatted Lexar Professional 80x card in our initial tests, the results of which were surprising.

Impressively, some long-forgotten files were discovered for saving to disk, such was their antiquity.

The next step was to format the card in the Advanced Tools section, and then see if Image Recovery could find anything. Which it did – everything from the initial recovery, in fact. Thankfully, there's the means to totally erase the card.

Image Rescue also works with Secure Digital cards. And, should you buy certain Pro and Premium SD/CF cards, including the latest 300x Professional UDMA CF, it's free. Not a bad price for such impressive software.

If it could be pointed at hard drives and other devices, rather than just cards, and be configured to recover any file, Lexar would have something that would appeal to everyone. As it is, Image Rescue 3 is a great buy for anyone relying on Flash-memory storage of photo, audio and movie files. *Karl Foster*

Details

Price £24.99
Best price www.pcw.co.uk/bestprices
Contact Lexar www.lexar.com
System requirements USB or Firewire card reader or card slot • Windows XP/2000/Vista • Mac OS X 10.2

Verdict

Pros Slick interface; powerful recovery facilities; works with movie and audio files; card test and formatting/secure erase functions
Cons Limited number of file types supported; will only read Flash memory cards

Features ★★★☆☆
Ease of use ★★★★★
Value for money ★★★★★

Overall This powerful utility is an excellent buy for photographers. With good media and file support, it would appeal to all computer users

★★★★½

MEDIA CREATION SUITE

Roxio Easy Media Creator 9 Deluxe

An already bustling suite gets an upgrade

As you'll read in our review of Easy Media Creator 9 (**www.pcw.co.uk/2165753**), Roxio's media suite is impressive. This Deluxe version adds another range of tools to an already comprehensive set. Most are based on the supplied Dazzle Video Capture Device from Pinnacle, which enables easy transfer and editing of audio/video content, including VHS tapes and analogue camcorder footage.

You'll find a range of new tools to complement the Dazzle, including a full version of Roxio's Videowave 9 software for advanced video-editing techniques and creating your own home movies.

To help out those with an extensive DVD library, Roxio's Disc Gallery tools lets you index the contents of your discs, including Blu-ray media, on your hard drive, so tracking down files is quick and easy.

Also included is DivX Pro, which lets you quickly encode compressed video. And if you require video conferencing a year's subscription to Sightspeed Pro enables you to conduct multi-party conferencing, video mail, voice calls and text messaging.

If you're more into music, the Soundsoap package will help you remove unwanted crackle, hiss and other redundant noise from audio tracks and recordings.

The potential Easy Media Creator 9 suite has to help you manage, create and distribute all forms of multimedia content is staggering. Considering this Deluxe version is available for just £30 more, you're getting good value for money.

If we have any gripes with the software, they are that media processing can sometimes be a little slow, particularly in the case of video, and with all the features enabled the suite tends to hog system resources. But this is a small price to pay for such a comprehensive package. *Paul Lester*

Details

Price £89.99
Best price www.pcw.co.uk/bestprices
Contact Roxio www.roxio.co.uk
System requirements 2GHz processor • 512MB Ram • 1GB of free hard disk space • DVD-Rom • Windows XP/2000/Vista

Verdict

Pros Staggering array of tools; Dazzle media capture device supplied; excellent value for money
Cons Video processing can be a little slow; full suite can hog system resources

Features ★★★★★
Ease of use ★★★★½
Value for money ★★★★★

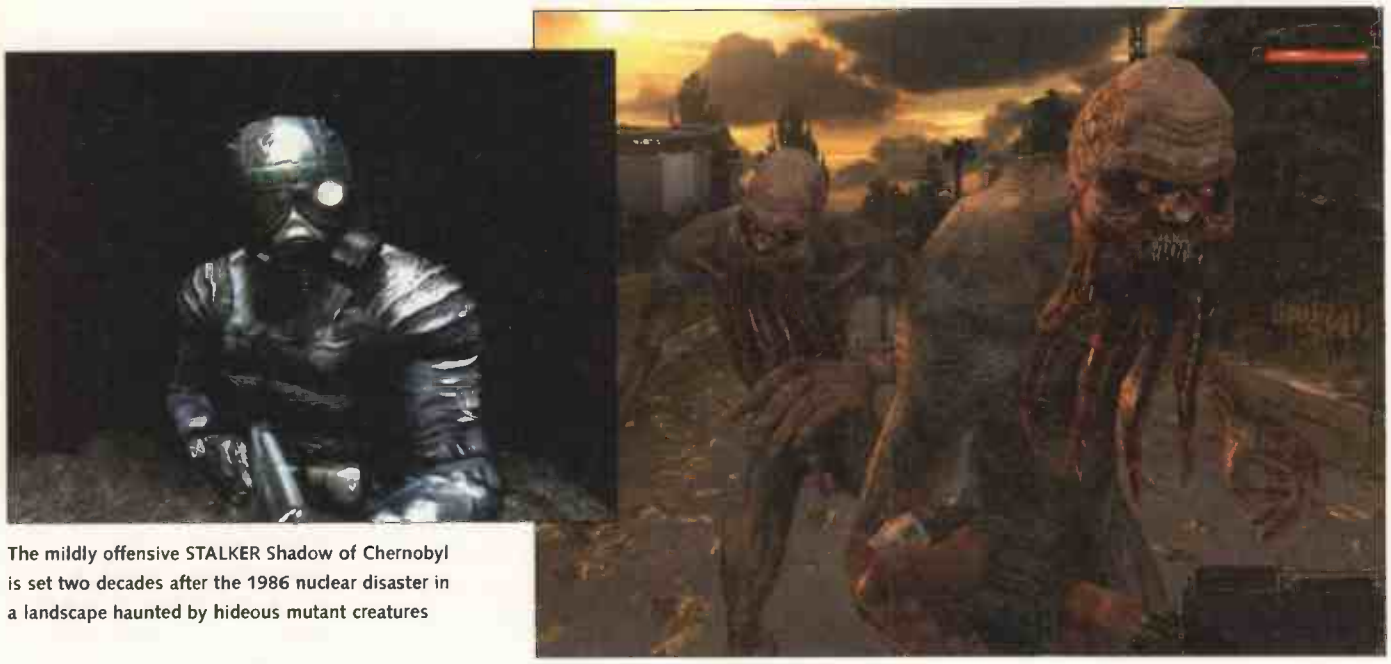
Overall The Deluxe version of the Easy Media Creator suite offers an amazing degree of functionality, and is even better value for money than the basic alternative

★★★★★

FIRST-PERSON ACTION

STALKER Shadow of Chernobyl

Just how much of a Russian revolution is THQ's post-nuclear shooter?



The mildly offensive STALKER Shadow of Chernobyl is set two decades after the 1986 nuclear disaster in a landscape haunted by hideous mutant creatures

Many games stretch the boundaries of taste – from Grand Theft Auto's meaningless acts of wanton violence, to the industry-wide obsession with exploiting the humanitarian disaster of World War II in the name of entertainment. So, perhaps we shouldn't be too shocked by the news that the developers of STALKER Shadow of Chernobyl have taken one of the worst nuclear disasters in history as the basis for a video game.

In fact, STALKER side-steps the issue somewhat by inhabiting an alternative universe; one where a second series of explosions at the ill-fated nuclear plant two decades after the 'real' 1986 tragedy has plunged the countryside into chaos. Now it's 2012 and the entire zone has been cordoned off by the military. The area plays host to a variety of strange anomalies, hideous mutant creatures and generally unfriendly sorts who are out to take advantage of the situation for themselves. You play a stalker – a kind of mercenary, who wakes up after a road accident with a convenient case of amnesia. The only clue to your identity is a PDA with an email commanding you to kill someone you've never heard of.

Much has been made of the realistic artificial intelligence and open-ended structure of the game. In truth, while it's possible to go off on side missions, wander around talking to non-player characters (NPCs) or start random fights with the local wildlife, the main thrust of the single-player campaign is plot led and your interaction with others is fairly scripted.

There's a bit of borrowing from the role-playing genre going on; you can affect the way NPCs respond to you by the way you act, for example, and the game features a large-ish inventory and a stamina bar. But STALKER is much more first-person shooter than role-playing game – and there's no shame in that.

Interestingly, it seems that the better artificial intelligence gets, the easier it is to outwit. Once you get your head around the fact that your enemies can be duped into investigating a distraction you have created, you'll be able to crack many of the game's harder sections.

The inclusion of online multiplayer is pretty much mandatory for a title such as this, so it's good to see that it's present and correct, even if we were unable to test it ourselves at the time of going to press.

There's no doubt that STALKER looks good. Vast expanses of explorable areas are loaded up whenever you launch the game, but size doesn't seem to have had any discernible impact on the visual quality of the environments, which are detailed and realistic, even at moderate graphics settings. Sound, too, is pretty impressive. The overall effect is a game world that's extremely atmospheric, if a little similar to certain other gritty, post-apocalyptic, first-person universes we could mention.

STALKER has been in development for an unnaturally long time, and this has provided plenty of opportunity for hyperbole. When it comes down to it, though, the game is definitely more Half-Life than Oblivion – and that's not necessarily a bad thing.

Given the volume of brainless first-person shoot-em-ups on the shelves these days, it's refreshing to find something that tries to think a little harder. If you're a fan of the first-person shoot-em-ups genre and can forgive the mildly insensitive nature of the game's subject matter, then you're unlikely to be disappointed.

Jonathan Parkyn

Details

Price £34.99
Best price www.pcw.co.uk/bestprices
Contact THQ
www.stalker-game.com
System requirements 2GHz processor • 512MB Ram • 10GB hard disk space • DVD-Rom drive • Windows 2000/XP/Vista

Verdict

Overall STALKER is more thoughtful than you might imagine, but not quite the masterpiece we were promised

★★★★½

THIRD-PERSON ACTION

Resident Evil 4

How does this classic console horror survive its transition to the desktop?

Resident Evil 4 for the PC has taken a long time to arrive. The game was originally released in 2005 for the Nintendo Gamecube and then on the Playstation 2 later in the same year – in both cases to rapturous critical acclaim and massive commercial success. But while it might have been fair to take a bit of extra time over the PC version to ensure that it wasn't just another lazy console port, there's very little evidence to suggest that this has actually been the case.

If there has ever been a perfect candidate for high-quality PC conversion, it's Resident Evil 4. Graphically, it looked fairly good on the Gamecube, so it's not hard to see how a little work on the lighting effects and textures could have helped scrub the game up nicely. Unfortunately, the PC version's visuals look suspiciously rough, and textures are crude enough to make you wonder whether anybody bothered doing anything to the game other than to slap it onto a PC DVD-Rom.

Worse still are the controls. Resident Evil 4's 'revolutionary' over-the-shoulder aiming technique would have translated perfectly to keyboard and mouse use, but, for some unearthly reason, the PC version doesn't come with any support for mouse control at all. The game can be played with a USB gamepad, but if you don't have a compatible device you're stuck with keyboard-only control.

If this is the only version of the game you're able to play, then you're still in for a treat, despite our disparagement. Brace yourself for a lengthy, engrossing campaign with a near-perfect balance of action, puzzle-solving and gore. Resident Evil 4 is about as atmospheric and cinematic as survival horror gets. It's just a shame the PC conversion wasn't treated with the care and attention it deserves. *Jonathan Parkyn*

Details

Price £19.99
Best price www.pcw.co.uk/bestprices
Contact UBI www.ubi.com
System requirements 1.4GHz processor • 256MB Ram • DVD-Rom drive • Windows 2000/XP

Verdict

Overall Resident Evil 4 on the PC is a missed opportunity if ever there was one, but it'll still send a shiver down your spine

★★★☆☆

THIRD-PERSON ACTION

Infernal

Eidos' flame-grilled action game finds itself stuck between heaven and hell

Gamers are used to an unending flow of generic, derivative games – usually in the strategy genre. Unoriginal action games, on the other hand, are something you're much more likely to associate with consoles than computers – and this is probably the most remarkable thing about Infernal.

In the game you play Ryan Lennox, a kind of law enforcer/fallen angel who is trying to rid the world of hell's minions, armed with a variety of weapons and a smattering of supernatural powers.

As premises go it's not the most imaginative starting point. And just about every other aspect of the game shares the same level of cliché. Everything from the identikit environments to the way you build your health and power metres by absorbing your dead opponents' souls has been done to death in dozens of similar titles.

Occasional instances of innovation scream out like beacons. Sporadic use of the game's teleport system to solve puzzles, for example, is a refreshing game mechanic, but even this is something that was done much better in last year's Prey.

That said, the fact that Infernal isn't exactly a shining pillar of originality doesn't stop it from being rather playable, especially if you're already a fan of the third-person action genre.

The only other point perhaps worthy of note is the game's presentation. Infernal is a very handsome game graphically, with a high level of detail and some nice looking flourishes.

In many ways, Infernal is the exact opposite of Resident Evil 4. Where Resident Evil 4 is a brilliantly executed console shooter that has ended up as a half-hearted PC port, Infernal is a big, dumb third-person PC game that would be much happier on the Playstation. *Jonathan Parkyn*

Details

Price £29.99
Best price www.pcw.co.uk/bestprices
Contact Eidos www.infernalgame.com
System requirements 1.7GHz processor • 512MB Ram • 2GB hard disk space • DVD-Rom drive • Windows 2000/XP/Vista

Verdict

Overall This derivative action game is fun, but of the mindless variety

★★★☆☆

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.

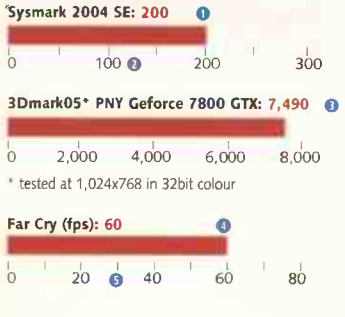
It's true that speed isn't everything, but it's an important part of the buying equation, especially when there are so many components out there. As many of our PC group tests are based on price bands, checking the performance is even more important – if the core system is underperforming, you need to 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.

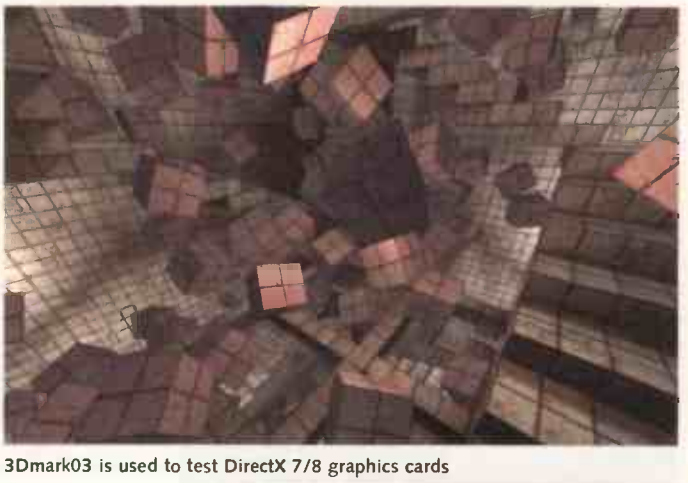
There's more information about our testing procedures and benchmarks on our Labs site at www.reportlabs.com/testbed/bguides/benchmarks.php.

Performance



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

PCmark04 measures memory, processor, graphics and hard drive performance



3Dmark03 is used to test DirectX 7/8 graphics cards

3Dmark05 pushes modern graphics cards to their limits

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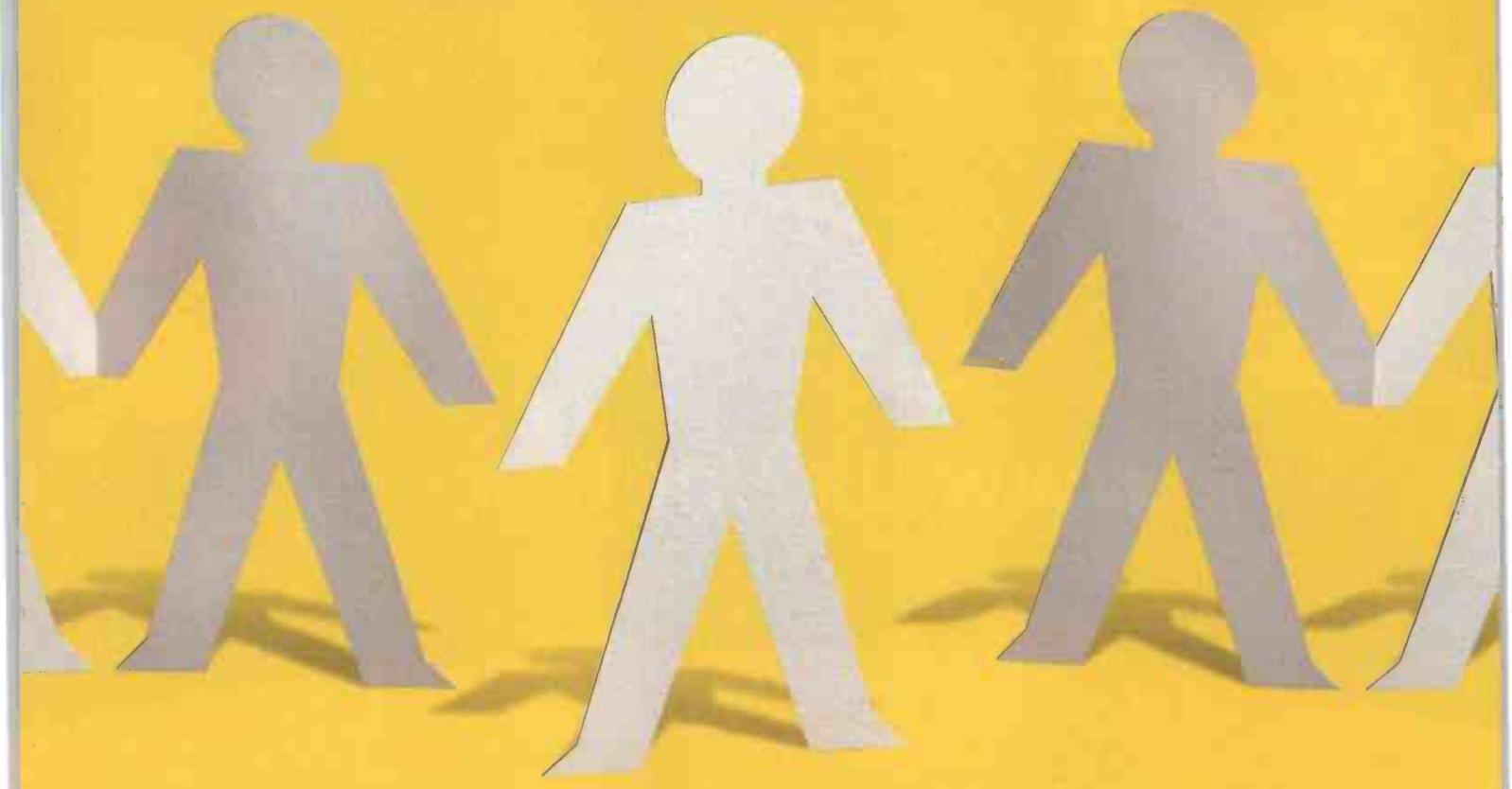

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ON TEST

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Editor's Choice

'In times gone by, only the very rich would own a monitor larger than 20in, but these panels are aimed at the budget conscious'

Seeing the bigger picture

If widescreen is the new must-have shape, then 22in is the new must-have size – and it's not only the professional user who can afford one. We put eight of the latest TFT monitors to the test

Twenty-inch LCD panels have not been around for that long, but already manufacturing efficiencies are seeing them replaced by 22in models, which retain the same 1,680x1,050 resolution of their smaller siblings.

A similar situation occurred when 19in TFTs first appeared on the scene, offering a larger alternative to the 1,280x1,024 pixel 17in models with an increase in the size of the screens' pixels rather than the number of them.

Here we've rounded up eight of the first 22in displays to reach the market. You can be sure that models from other manufacturers will be available soon, and we'll be reviewing those as soon as they become available.

In times gone by, only professional designers or the very rich owned a monitor larger than 20in, but these panels are all aimed at budget-conscious users who want to take a relatively small step up from what entry-level models have to offer.

All of the monitors reviewed here use twisted nematic (TN) panels, which offer quick response times for gaming and good image contrast, but lack the very high-colour fidelity and wide viewing angles required by professionals. Some have bells, some have whistles and some have both, but other than some very different approaches to design, these monitors are all very similar in terms of their basic capabilities.

If budget is your primary concern, you'll find some of these displays are also available in analogue-only configurations at a considerably lower price.

Acer AL2216wsd

Price £220 **Contact** www.acer.co.uk

Basic in form and function, Acer's AL2216wsd concentrates on simplicity and ease of use. Its thin silver bezel fronts a similarly thin and light body, which sits atop a basic, tilt-only stand.

In appearance, it's very similar to Mirai's DML-522W100, although perhaps slightly more conventional. Below the screen sits a small control panel, housing four control buttons and a power switch. This is the one major variation from Mirai's design, which hides the control buttons entirely under the bottom edge of the monitor.

The leftmost switch, marked with an 'e', launches Acer's 'Empowering Technology' menu, which gives you quick access to auto setup and four preset viewing modes. Acer obviously feels these are so easy to use that there's not even any need to mention them in the manual. We conducted all of our quality tests in standard mode, but you can also choose from photo, text, scenery and movie modes.

If you're going to be visiting the 'e' menu frequently, then you won't want to be greeted by something as ugly and complex as a Bios screen. Thankfully, the onscreen menu system is basic but nicely presented.

The AL2216wsd is one of the lower-priced monitors of the group, so we were pleased to discover that the only things lacking were frills you could easily do without if you're on a budget. Its core specification is on a level with most of the competition and it turned in a very creditable performance in our lab tests.

Acer is to be commended for stating honestly that this is a 6-bit panel with a maximum of 16.2 million colours, especially as we found it produced exceedingly smooth gradients – clearly outperforming much of the competition.

Overall performance was very good, making this an excellent entry-level purchase – but check out the Mirai DML522W100 before parting with your cash.

Verdict

Pros Preset brightness modes; small and light; image quality; price
Cons No swivel stand; screen height quite low
Features ★★★½☆
Performance ★★★★½
Value for money ★★★★★

Overall No frills, but very good performance at a low price; image presets are a welcome extra

★★★★½

Asus MW221U

Price £266 **Contact** http://uk.asus.com

Whatever you think of the MW221U's design, it certainly stands out. While the rest of the pack are all fairly similar in design, this display from Asus has an entirely different aesthetic. It's no novelty monitor, but it has a style all of its own, with a sort of American retro feel to it.

A thin silver panel runs along the bottom of the display, with a raised Asus logo in the middle and a row of controls to the right. These are neither buttons nor capacitive touch-switches, but metal tabs cut into the bezel that require gentle pressure to activate.

The first of these tabs piqued our interest immediately – as if a button marked 'Splendid' were not temptation enough, a bright orange sticker marked 'Try me' had been added to it.

So we began our evaluation by entering Asus's Splendid menu of preset viewing modes. The Splendid name is also found on Asus notebooks and graphics cards, so we knew what to expect. In addition to Standard Mode, there are options for better viewing of Games, Scenery and Movies, along with a dimmer mode for working in a darkened room. It also offers HDCP support for playback of protected high-definition content.

The main menu system is clearly laid out, but the left and right control buttons are often used to move the cursor up and down, which is confusing.

Below the bezel, a headphone socket is provided, should you wish to listen to something sounding rather better than the tiny built-in speakers provided.

None of the monitors reviewed here has height or pivot adjustments, but the MW221U's circular base allows it to swivel and tilt.

In our tests, the MW221U delivered occasionally very good, but mostly average performance. While gradients were smooth and colours were well differentiated, the standard mode settings produced rather weaker contrast than we were hoping for.

Verdict

Pros Built-in speakers; headphone socket; image presets; swivel base; HDCP support
Cons Image contrast; price; menu control
Features ★★★★★
Performance ★★★★½
Value for money ★★★½☆

Overall It has looks you'll either love or hate and is solidly built, but the level of performance and features of the MW221U can't justify the price

★★★★½

Belinea 2225 S1W

Price £210 **Contact** www.belinea.com

Belinea's 2225 S1W is a straightforward monitor with no surprises. A classic silver bezel houses a row of normal-looking buttons, placed in the traditional centre position. Below these is a thin speaker grille, housing a pair of tiny and tinny speakers.

There's no huge and over-bright blue LED and there's nothing labelled 'Splendid' or 'Magic'. It's a good, dependable design that'll fit in anywhere.

Going on specification alone, the 2225 S1W is the entry-level option of the bunch. By forgoing the digital DVI connector in favour of a single VGA port, Belinea has not only saved money on parts, but has also avoided the 'DVI tax' levied on all large DVI-capable monitors imported into Europe.

The 2225 S1W's panel specification is similar to most of the others, except that it has a claimed contrast ratio of 1,000:1, compared to the usual 700:1 found on all others, bar the Samsung SM226BW. Unfortunately, our tests revealed only moderate contrast from the 2225 S1W, due to a relative lack of brightness. This is despite having a rather good black level, capable of showing very deep shadows.

Occasionally, smooth gradients were marred by some banding and the very brightest colours were sometimes tricky to distinguish from each other unless we were at precisely the right viewing angle. However, it's capable of displaying a relatively wide range of colours and delivers quite acceptable performance.

Close examination of text revealed a high level of sharpening, which resulted in faint halos around characters. Reducing the sharpness setting alleviated this to some extent but made the overall image look worse. However, readability was very good.

At only £210, you're making a substantial saving. It would have been a definite budget recommendation were it not for Mirai's amazingly priced DML-522W100, which also manages to squeeze a DVI connector into the price.

Verdict

Pros Price; 'classic' looks; ease of use
Cons No DVI connector; undercut by Mirai; mediocre performance
Features ★★★½☆
Performance ★★★½☆
Value for money ★★★★½

Overall If you don't need DVI and you're not hugely demanding when it comes to image quality, then the 2225 S1W is an excellent budget purchase, but take a look at Mirai's DML-522W100 first

★★★★½

BenQ FP222WH

Price £285 **Contact** www.benq.co.uk

In a round-up of monitors with such similar specifications, it's always good to see a product that brings with it something unique. In the case of BenQ's FP222WH, it's the use of not two but three video ports, the third being the new HDMI connection found on high-definition entertainment hardware.

Whether or not you have any HDMI-enabled hardware – some PC graphics cards do, as do plenty of consumer electronics appliances – the FP222WH's three video connections enable you to connect three video devices simultaneously, two digitally.

A 22in monitor is big enough in a small room to be used as a media centre screen or for playback from a standalone DVD player or set-top box. Having three connections lets you plug in more devices and switch between them without swapping plugs.

HDMI, unlike DVI and VGA, supports audio as well as video, but unfortunately the FP222WH has no speakers and so doesn't support the audio function. Monitor-based speakers are usually good for not much more than system sounds and alerts, but it would have been nice to have been able to use the monitor for this purpose via a single HDMI cable.

In our laboratory tests, the FP222WH displayed mediocre contrast and a tiny amount of banding in gradients, but a wide range of colours and good brightness. Externally, it has very clean looks, with all control buttons hidden from view. But with no legends visible from the front, it's necessary to crane your neck round to see which buttons you're pressing.

The menus themselves are easy to read and navigate, thanks to large type and colourful icons. A Dedicated 'i-key' provides access to image presets and a split-screen demo mode enables you see at a glance the effects of the mode selected.

If you want to pay less, look for BenQ's variant models with one or two inputs removed.

Verdict

Pros Three input ports, including HDMI; clean looks; image presets; HDCP support
Cons Price; awkward control button positioning
Features ★★★★½
Performance ★★★★½
Value for money ★★★½☆

Overall The unique HDMI feature may appeal to those with new HDMI-capable PCs and enables more equipment to be connected simultaneously

★★★★½

FUTURE DISPLAY INTERFACES
See page 42

Lenovo D221

Price £282 **Contact** www.lenovo.co.uk

Lenovo's 'business black' housing and functional, almost rugged looks exude the air of a serious piece of equipment. Where Asus and Benq strive to appeal to gamers and home entertainment fans, the D221 comes across as subtly sensible and corporate, perhaps even military.

The control buttons are placed unashamedly on the front and labelled with less-than-obvious symbols. A narrow lip at the top and bottom of the panel gives it the appearance of being held in place by a giant metal clip supported by a simple tilt-only stand.

Our review model was spoiled by the somewhat careless application to the stand of a large, metalised Lenovo logo, which was both off-centre and crooked.

The slightly cryptic feel of the controls is in stark contrast to the onscreen menu itself, which is a plain blue background with plenty of white text and a few white icons on it. Thankfully, it's very basic and you won't need to use it much. There are no image presets or oddly-named options to try out.

Lenovo's own online spec sheet omits such details as viewing angles, brightness and contrast data, leaving us with the impression that this is a monitor for people who simply don't care about such things. The emphasis is instead on reliability and build quality, and the D221 feels by far the most solidly built of the eight monitors reviewed here. It's also the heaviest of the bunch, despite lacking speakers or a swivel stand.

The D221's performance was generally lacklustre, with some very slight banding effects creeping into smooth gradients and colour response that, like the Asus MW221U, benefited greatly from calibration, after which it produced a far better picture.

You may love the design, simplicity and build quality, but the sticking point here is the price, which is at a premium level, despite not offering anything in the way of premium features.

Verdict

Pros Excellent build quality; easy to use
Cons Price; lack of features; performance
Features ★★★☆☆
Performance ★★★★☆
Value for money ★★★☆☆

Overall Built for strength rather than looks, the Lenovo D221 has a solid and corporate design, but is low on features and rather pricey

★★★☆☆

Mirai DML-522W100

Price £204 **Contact** www.mirai.eu/uk

The price alone has to put Mirai's DML-522W100 close to the top of anyone's monitor wish list. Fitted with both DVI and VGA ports, it undercuts even Belinea's VGA-only 2225 S1W.

It's physically very similar to Acer's slightly more expensive AL2216wsd; a different bezel design and button layout is all that sets the two monitors apart from the outside. Both screens are incredibly thin and light, making them highly portable.

Unlike the AL2216wsd, however, Mirai's monitor hides the control buttons away under the lower right-hand side of the bezel. They're clearly but discreetly labelled on the front, and the buttons themselves, which are very easy to find by touch although clearly not meant to be seen, are tiny cylindrical bumps.

The bezel looks like it could have been formed from a single piece of aluminium (it's actually plastic) and its rounded corners give it a simple yet attractive appearance that's understated and almost 'cool' – certainly better than we would have expected from a monitor of this price. The onscreen menus are also well designed, both in terms of ease of use and aesthetic appeal – there's certainly nothing that looks cheap to be found at all.

As you would expect, the DML-522W100 has only a basic feature set; there's no swivel stand, for example, and it lacks the easy image presets found on the Acer product. However, in our lab tests, the Mirai display was a strong performer. Colour was good straight out of the box, there was very little banding in evidence and both bright and dark colours were displayed with good clarity and differentiation. Contrast and colour gamut were very similar to that of the Acer monitor and in the middle of the field.

If you're in the market for a low-cost monitor, then this is one case where you needn't be scared of buying the least expensive product – the DML-522W100 is not bad at all.

Personal Computer World RECOMMENDED

Verdict

Pros Price; design; performance
Cons Basic features; no presets
Features ★★★☆☆
Performance ★★★★½
Value for money ★★★★★

Overall An excellent budget choice with good looks and solid performance

★★★★★

Samsung SM226BW

Price £260 **Contact** www.samsung.co.uk

In a line-up of very similar displays, the Syncmaster 226BW from Samsung is a standout product, both in the way it looks and the way it performs. Great care has been taken over its appearance, from the glossy piano-black bezel to the large metallic power button, with cool blue LED illumination.

A host of features is provided, including a swivelling stand, image presets and picture enhancements and a claimed 3,000:1 dynamic contrast mode.

The 3,000:1 contrast ratio is misleading, however. The SM226BW is not capable of displaying an image with a 3,000:1 difference in brightness from black to white. Instead this figure is based on the range of difference available from one image to the next, thanks to a dynamic backlight system which is able to vary the total brightness in response to image content.

Nevertheless, even in the rather unforgiving measurements recorded by our calibrator, the Samsung 222BW delivered by far the best contrast ratio of the bunch. This showed up visually as very punchy, sharp images – text was especially clear, although unnecessarily oversharpened by the default settings. But turning down the sharpness a notch rectified this.

The SM226BW isn't advertised as a wide gamut monitor. Samsung has other monitors, such as the similar-looking SM931C, which are. But in our tests, it had a measurably larger colour gamut than any of the competition, achieving over 90 per cent of the NTSC gamut compared to an average for this group in the mid-80 per cent range.

A full selection of software is provided to help with monitor setup and basic calibration, something which is particularly beneficial considering the enhanced colour reproduction capabilities of the panel. Samsung's Magicolor function intelligently boosts colour saturation, while Magicbright provides useful brightness presets easily accessible from the front panel, one of which activates the dynamic contrast function.

Personal Computer World EDITOR'S CHOICE

Verdict

Pros Design; performance; high contrast; HDCP support
Cons Not a true 3,000:1 contrast ratio

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

Overall An excellent monitor that clearly outperforms the competition and, although pricey, is worth every penny

★★★★★

Viewsonic VX2235

Price £299.99 **Contact** www.viewsonic.com

The Viewsonic VX2235 is an impressive-looking monitor. Finished in black with a distinctive silver trim, the casing is embellished with subtle curves and crafted with outstanding build quality. Its panel is no larger than any other reviewed here, yet it feels much bigger. This is partly due to the bezel, which is somewhat extended at the bottom to accommodate a relatively large speaker grille.

Like all of the monitors in this round-up, the VX2235 has no height adjustment, but in this case the screen sits much higher on the stand at, what is for us, a comfortable viewing level. Control switches are kept conveniently at the front of the display, but are very small and black, making them a little difficult to see. Arranged in a gentle arc around a blue illuminated power button, they follow Viewsonic's usual system of using buttons marked 1 and 2 whose functions are described onscreen in the context of the currently selected menu. This avoids confusing situations where you might have to press a button marked 'Auto' to exit a menu.

When specifications are as similar from product to product as they are in this case, small differences stand out. The brightness of the VX2235 is rated at 280cd/m^2 which is 20cd/m^2 less than the rest. However, in our lab tests it was brighter out of the box than any of the others. In fact, it was the only display to come close to 300cd/m^2.

High brightness can sometimes cause problems with black level, but the VX2235 managed to keep control over the dark tones to deliver a very impressive level of contrast and clarity. The range of displayable colours was no match for the Samsung SM 226BW however.

The VX2235 feels luxurious and expensive, which at £299.99 it certainly is. Like most of its peers, it boasts a Windows Vista certification logo, and the dead pixel warranty exceeds the Class II ISO specification by insisting that no full-pixel defects will be present.

Verdict

Pros Stylish design; high build quality; Vista logo; viewing height; pixel policy; image presets
Cons No HDCP; poor colour gamut; price

Features	★★★½☆
Performance	★★★★½
Value for money	★★★★★

Overall A pricey, but very high-quality display with a good set of features, but beaten by Samsung's SM226BW on image quality

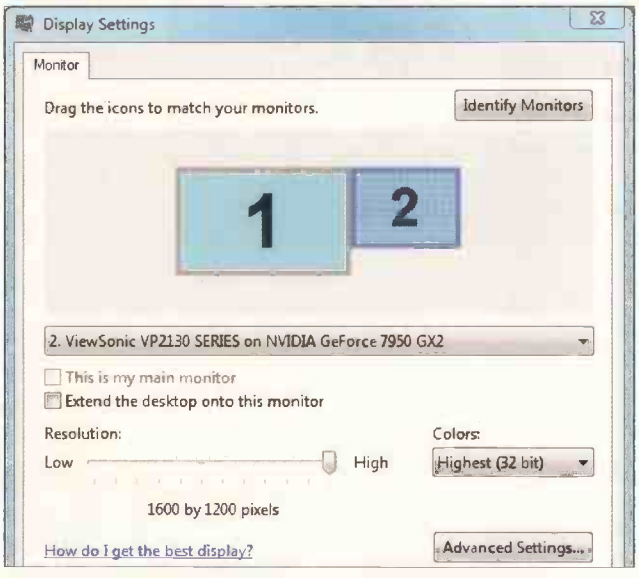
★★★★½

Using multiple monitors on Windows

If you're considering buying one of the 22in monitors we've reviewed, then there's a fair chance you're upgrading from an existing model. But, assuming it's not broken, what are you going to do with your old one? You could sell it or give it away, but have you considered keeping it right where it is? There are very few productivity enhancements you can bring to your PC that compare to a twin monitor setup. The extra screen space alone is an obvious advantage, but having two separate monitors brings other benefits you may not have considered.

If you're a gamer and you also like to chat to your friends via instant messaging, you can run your game in full-screen on your main monitor while all your contacts and desktop gadgets remain visible on the other. Of course, the same is true for watching full-screen movies, working on big spreadsheets or anything else where maximising your window would cause useful information to be hidden beneath it.

Perhaps your budget won't stretch to a new widescreen monitor, yet you still lust after all that extra desktop space. Adding a smaller, lower cost model to your existing display could give you the screen



If your PC supports dual monitors, the second one will usually be disabled in your Display Properties tab. Once the second monitor has been connected, click on the greyed-out icon and select 'Extend the desktop onto this monitor'

space you need without such a major outlay. Even an old CRT monitor can be useful as a secondary device.

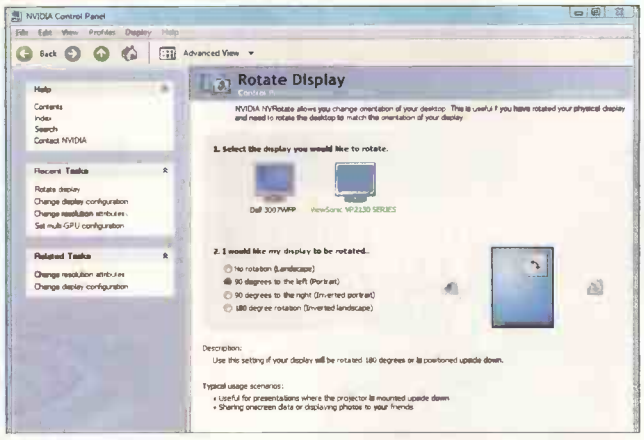
Today, relatively few of us opt for more than one monitor on the desk. However, 'dual-head' graphics cards are now commonplace – even in the lower price ranges.

Extend the desktop

After connecting your monitor, select Control Panel/Display/Settings, where you should see a diagram showing all the available monitor connections to your system. Your secondary monitor will initially be greyed out, but selecting the option 'Extend the desktop onto this monitor' will activate it and enable you to set up the resolution parameters as normal.

Dragging the monitor icons around enables you to set them up on screen in the same order and position they appear on your desktop.

If you're running low on desk space, consider using your monitor's pivot function (if available) to reduce its desktop footprint. ATI and



If your graphics card and monitor support screen rotation, you may wish to enable it if using a 4:3 monitor alongside a widescreen 16:10 model

Nvidia drivers enable you to rotate your monitors independently of each other.

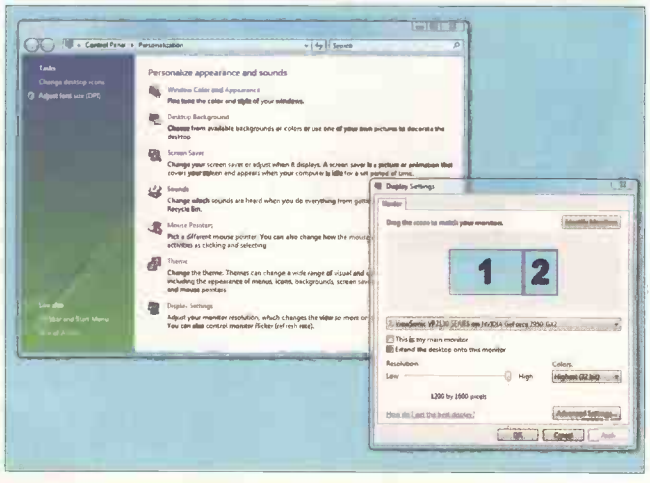
If your main monitor is in widescreen format, you may also find that the horizontal resolution of your old monitor is a closer match for the vertical resolution of your new one. This will make it seem more like an extension of your widescreen display than a discreet monitor.

TH2Go

One caveat for gamers is that if you're using dual graphics cards in SLI or Crossfire mode, you won't be able to take advantage of both monitors at the same time.

One way round the problem is to use the TH2Go device from Matrox (see review at **www.pcw.co.uk/2160597**). This external device uses a single connection to your PC to drive up to three monitors which appear to your system as a single virtual display. You can also use the TH2Go to connect multiple monitors to a system fitted with only one DVI or VGA socket.

If you want to go still further, upcoming technologies such as Displaylink (known as Ubisync in Samsung's recently announced Syncmaster 940UX), will use a software-powered 'virtual graphics card' to enable up to six monitors to be connected to a single PC via USB, wireless USB or even Wifi connections.



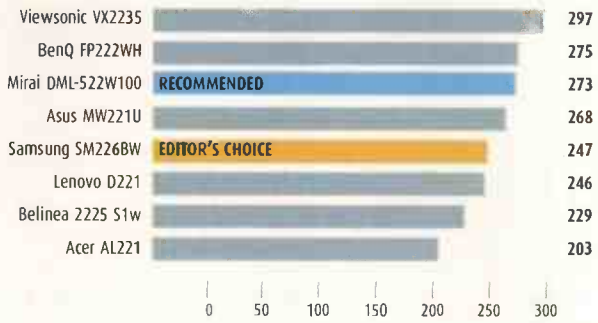
Here we have enabled both monitors and rotated the second into portrait mode to fit snugly alongside the first, both in Windows and on our physical desktop

Lab results

For the price, the Mirai DML-522W100 put in an admirably consistent performance, but the outright champion was the Samsung SM226BW

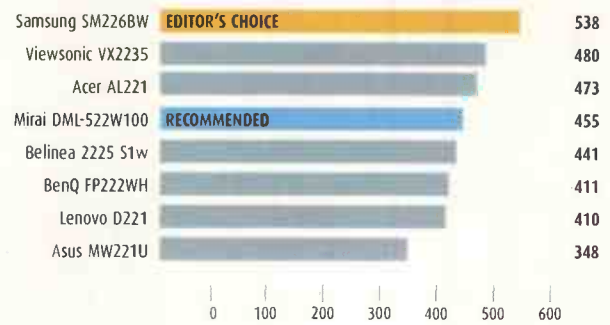
Measured brightness (cd/m²)

Bigger is better



Measured contrast ratio

Bigger is better



Percentage of NTSC gamut

Bigger is better

Subjective quality score (marks out of 10)

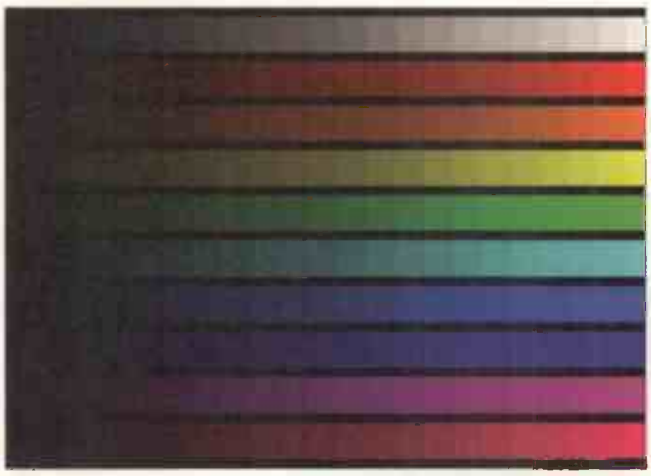
Bigger is better

How we tested

For our computer graphics-based tests, we set each panel to its native colour temperature and calibrated it using a Spyder 2 Pro calibrator. Using this device ensures that the displays are set up with optimum brightness and contrast settings and gives us a number of objective measurements.

The results from the Spyder 2 Pro provide us with a direct measurement of brightness and also enable us to calculate the static contrast ratio and the range of displayable colours compared to the standard NTSC gamut and expressed as a percentage.

We then ran a number of subjective tests, including high-definition video, text, test photographs and images. We also ran Displaymate (**www.displaymate.com**) to evaluate the monitors without calibration. A variety of useful test patterns is displayed, but we found that the most important differences were revealed by the coloured bars test (pictured). In each test, we ranked the displays from best to worst and then awarded a score out of ten. We've combined these scores, factoring in any anomalies, such as over-sharpened characters, to produce an overall subjective quality result.



Displaymate's coloured bar test proved the most useful pattern in evaluating these screens

22in TFT monitors

MANUFACTURER	ACER	ASUS	BELINEA	BENQ
Model	AL2216wsd	MW221U	2225 S1W	FP222WH
Price	£220	£266	£210	£285
URL	www.acer.co.uk	uk.asus.com	www.belinea.com	www.benq.co.uk
Screen size (diagonal inches)	22	22	22	22
Aspect Ratio	16:10	16:10	16:10	16:10
HDCP support	✘	✔	✘	✔
Tilt/Swivel/Height/Pivot Adjustment	✔/✘/✘/✘	✔/✔/n/n	✔/✘/✘/✘	✔/✘/✘/✘
Native Resolution	1,680 x 1,050	1,680 x 1,050	1,680 x 1,050	1,680 x 1,050
Panel technology	TN	TN	TN	TN
Panel bit depth (bits)	6	6	6	6
Claimed number of colours (millions)	16.2	16.7	16.7	16.7
Pixel response time (ms)	5	2	5	5
sRGB mode	✘	✔	✔	✘
Contrast ratio	700:1	700:1	1000:1	700:1
Typical brightness (cd/m2)	300	300	300	300
Image presets	✔	✔	✘	✔
Viewing angle (H/V)	170/160	170/160	170/160	170/160
Vesa 100 mount	✔	✔	✔	✔
Speakers	✘	✔	✔	✘
Headphone Socket	n/a	✔	✔	n/a
VGA connector	✔	✔	✔	✔
DVI connector	✔	✔	✘	✔
Component video	n/a	n/a	n/a	n/a
Composite video	n/a	n/a	n/a	n/a
S-video	n/a	n/a	n/a	n/a
Other connectors	none	none	none	HDMI
USB hub	✘	✘	✘	✘
No. of ports	n/a	n/a	n/a	n/a
Memory card slots	✘	✘	✘	✘
Picture in Picture	✘	✘	✘	✘
Internal power supply	✔	✔	✔	✔
Pixel guarantee	Class II	Class II	Class II	Class II
Windows Vista logo	✔	✔	✔	✔
Warranty	3yrs	3yrs	3yrs	3yrs
Power consumption (max)	55	65	60	49
Power consumption (standby)	<2 (<1 active off)	2	<2	<2
Weight (kg)	4.8	6.1	5.8	5.8
SCORES				
Features	★★★☆☆	★★★★★	★★★☆☆	★★★★☆
Performance	★★★★☆	★★★★☆	★★★☆☆	★★★★☆
Value for Money	★★★★★	★★★☆☆	★★★★☆	★★★☆☆
Overall	★★★★☆	★★★★☆	★★★★☆	★★★★☆

LENOVO	MIRAI	SAMSUNG	VIEWSONIC
D221	DML-522W100	SM226BW	VX2235
£282	£204	£260	£299.99
www.lenovo.co.uk	www.mirai.eu/Uk	www.samsung.co.uk	www.viewsonic.com
22	22	22	22
16:10	16:10	16:10	16:10
✘	✘	✔	✘
✔/✘/✘/✘	✔/✘/✘/✘	✔/✔/✘/✘	✔/✘/✘/✘
1,680 x 1,050	1,680 x 1,050	1,680 x 1,050	1,680 x 1,050
TN	TN	TN	TN
6	6	6	6
16.7	16.7	16.7	16.2
5	5	2	5
✘	✔	✘	✔
700:1	700:1	1,000:1 (3,000:1 Dynamic)	700:1
300	300	300	280
✘	✘	✔	✔
170/160	170/160	160/160	170/160
✔	✔	✔	✔
✘	✔	✘	✔
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
none	none	none	none
✘	✘	✘	✘
n/a	n/a	n/a	n/a
✘	✘	✘	✘
✘	✘	✘	✘
✔	✔	✔	✔
Class II	Class II	Class II	Class II + Viewsonic zero full-pixel defect guarantee
✔	✘	✔	✔
3yrs	3yrs	3yrs	2yrs
45	48	55	48
<2	<2 (<1 active off)	<1	<1
6.2	4.6	4.9	6
★★★☆☆	★★★☆☆	★★★★★	★★★★☆
★★★★☆	★★★★☆	★★★★★	★★★★☆
★★★☆☆	★★★★★	★★★★★	★★★☆☆
★★★★☆	★★★★★	★★★★★	★★★★☆

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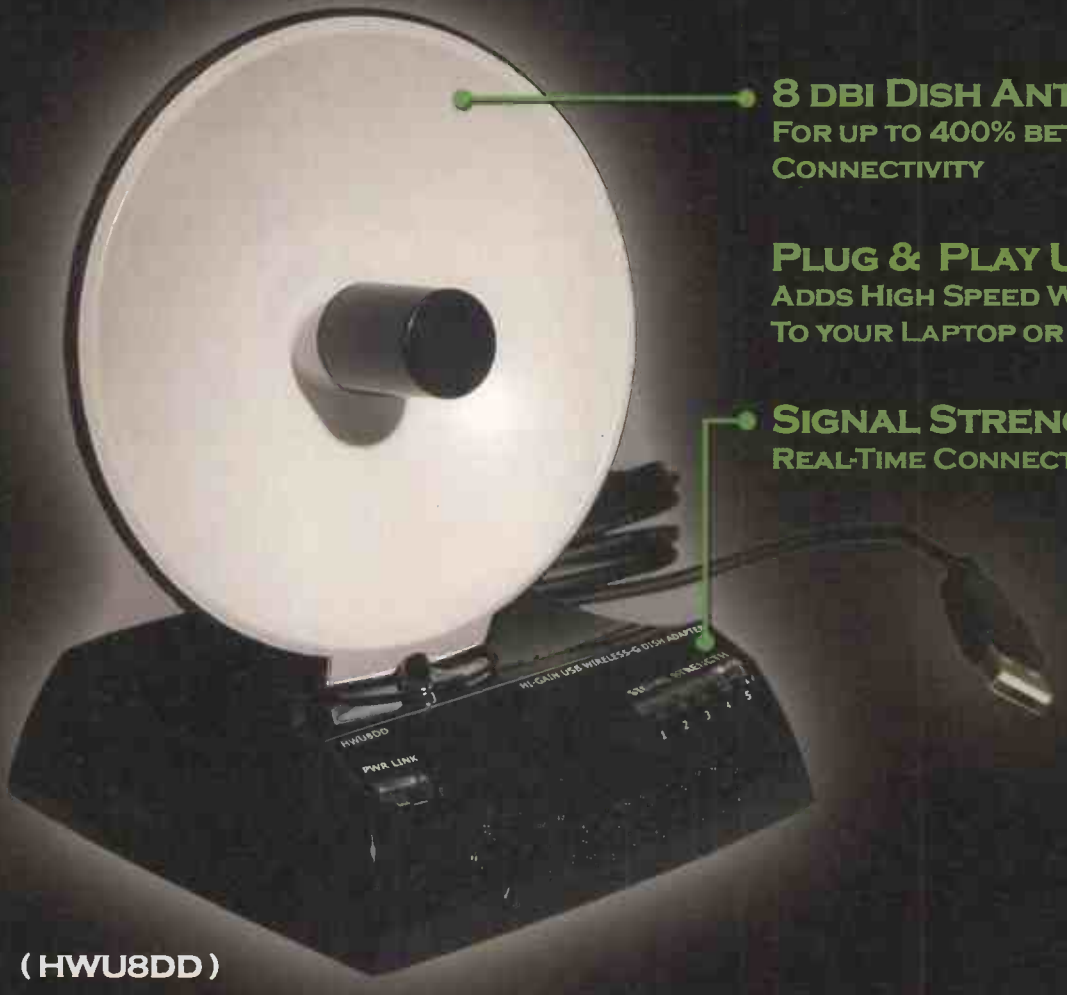

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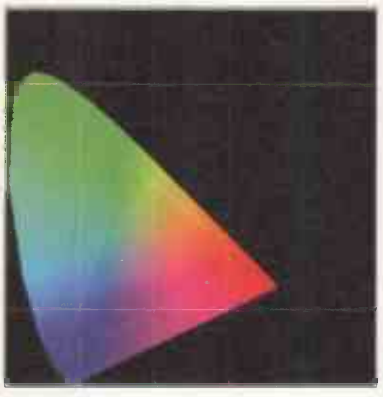
Colour gamut explained

The range of displayable colours, known as the colour gamut, of a modern TFT monitor is good, yet falls far short of the colours we can actually see in the natural world. In 1931 (with a later revision in 1976) the CIE (Commission Internationale de L'Eclairage) defined a colour space that incorporates all the colours visible to humans. It is usually drawn as an inverted horseshoe shape with green at the top left, blue at the bottom left and red towards the right (see diagram).

Monitors combine red, green and blue light to create all the colours they are able to reproduce. However, these 'primaries' are not the reddest, greenest and bluest colours the human visual system is able to perceive. For any given monitor, these red, green and blue colours can be plotted on the CIE diagram. The triangle they form contains all of the colours the monitor can display. Colours outside the area of the triangle are not available.

The default sRGB system used by Windows defines a standard monitor gamut that most monitors should be able to reproduce. The sRGB system helps maintain colours from one monitor to the next, but it is a very conservative estimate of what a monitor can display.



The CIE chromaticity diagram describes all humanly visibly colours. The area within the smaller triangle describes all colours displayable by a standard sRGB monitor. The larger triangle represents the colours of the NTSC gamut

The range of colours your monitor can actually display is known as its gamut and is often expressed by manufacturers as a percentage of the NTSC (National Television Standards Committee) gamut. The NTSC gamut defines a wider range of colours than sRGB and a larger range of colours than most monitors can display. A similar colour space, Adobe RGB, is often used by digital cameras and image processing software.

Most of the monitors in this group test deliver a gamut of around 85 per cent of the NTSC colour space. Samsung's SM226BW manages 90.6 per cent, but to fully experience all of the colours a high-end digital camera can produce, we need to extend this closer to, and ideally beyond 100 per cent.

In an LCD monitor, it is the wavelengths of light in the backlighting that determine the gamut. Displays such as Samsung's SM931C have an enhanced backlight and are able to deliver 97 per cent of the NTSC gamut.

By switching from fluorescent to LED-based lighting, specialist monitors like the Samsung SM XL30 can now achieve 123 per cent of the NTSC gamut and are able to exceed the colour range of any images you're likely to want to display.

Editor's Choice

Editor's Choice Samsung SM226BW
Recommended Mirai DML-522W100

Samsung SM226BW

Mirai DML-522W100

In this group test we have a selection of monitors based on very similar technologies. Each of them is aimed at the same type of user, with a relatively small variation in price. They all use 22in TN-based panels, so viewing angles are pretty much the same across the board. None of these displays has the level of quality required by graphics professionals, but mainstream users get a lot for their money.

With just two exceptions, they come with a rated contrast ratio of 700:1 and a brightness of 300cd/m^2. None of them has a height-adjustable stand or pivot capability, and all but one come with both VGA and DVI connections.

Variations in image quality are noticeable in our side-by-side lab comparisons and perhaps the most discerning of upgraders would be able to tell the difference, but to most users, price, style, features and build quality are the factors that set one monitor apart from another.

When it comes to price, we have a very clear winner. With an RRP of £204, Mirai's DML-522W100 undercuts everything. It's basic, but performs well and no important features are missing. It even costs less than Belinea's 225 S1W, which omits the DVI port found on the Mirai. Although the built-in speakers are really small and tinny, there are plenty of monitors with no audio capability at all that are more expensive, so they should simply be considered a free extra, albeit of limited use.

For these reasons, the Mirai DML-522W100 is our Recommended choice. It's an ideal monitor for anyone on a budget who has lusted after a larger screen for more immersive gaming, or simply for that extra Windows desktop space.

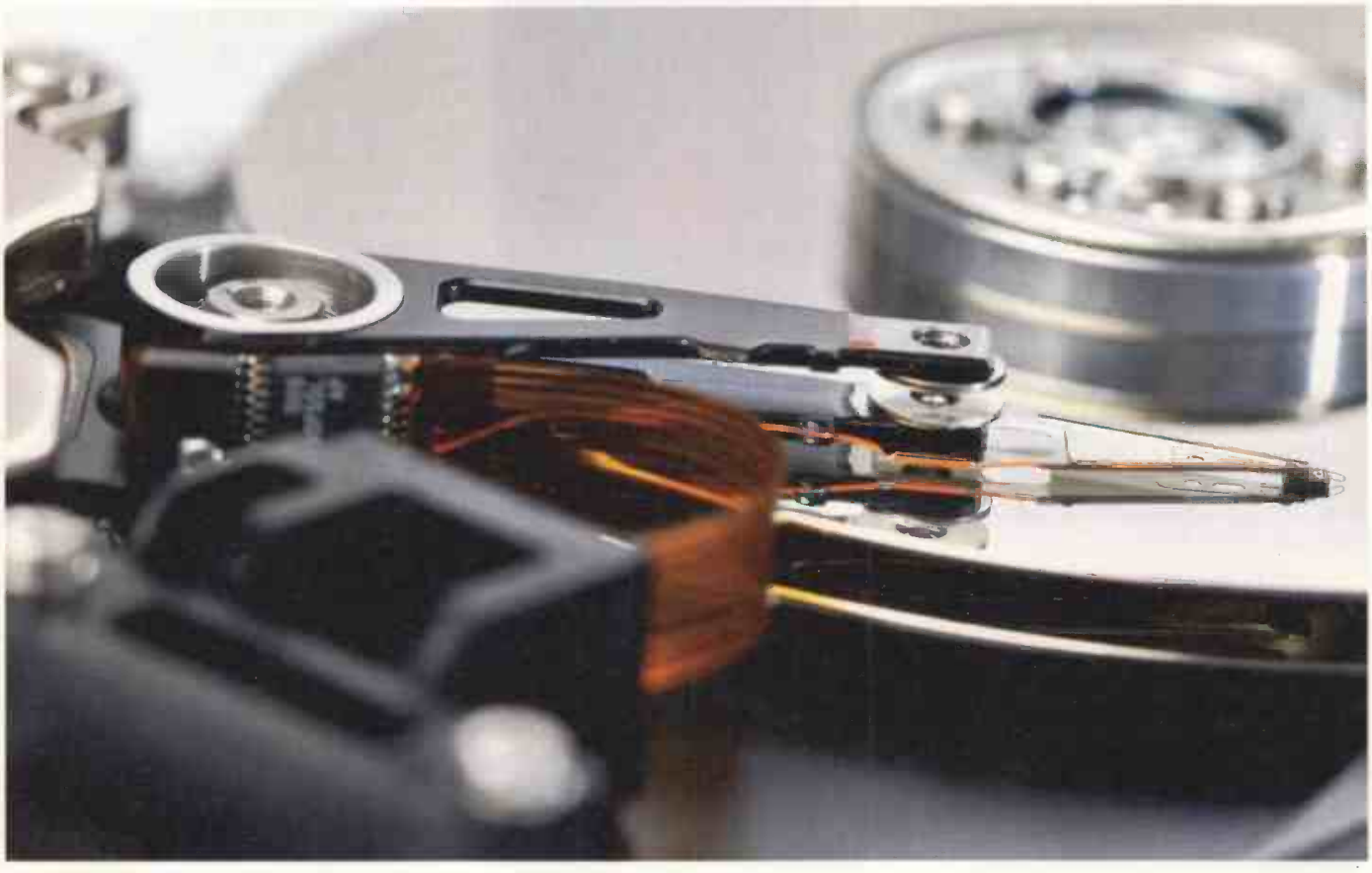
With street prices fluctuating in the way they always do, you can make a good selection from these eight displays based solely on price. There isn't one among them that stands out as a poor product.

On the other hand, one product does stand out above the rest when it comes to performance. Our Editor's Choice, the Samsung SM226BW, offers very high contrast, a wide colour gamut, brightness presets, HDCP support and a useful software bundle. It also looks great and comes with a swivel stand.

The claimed 3,000:1 dynamic contrast ratio is misleading and shouldn't be compared directly to other manufacturers' quoted figures, but in real-world tests, the SM226BW did deliver measurably higher contrast than any other. It costs a little more than the true budget models here, but is the least expensive of all the premium models and is, therefore, superb value for money. **PCW**

A matter of spin

Storage capacity has never been more affordable and the improvement in performance is enormous. René Grau tests 236 models and points out some future trends



With solid-state disks, hybrid hard disks, integrated real-time encryption and terabyte capacity, 2007 marks a great leap forward for hard disk manufacturers. Even the sceptics out there ought to treat themselves to some new digital storage this year.

As we have shown in our home networking feature (see page 36), the new world of multimedia needs a lot of storage capacity: digital photos and web videos quickly gobble up gigabytes of disk space, and before you know it Windows is complaining that you have less than 10 per cent hard disk space free. And quite often, hard disks simply wear out.

A look at the best-seller lists at various online stores, or simply a visit to PC World, will confirm people's interest in hard disks. Quieter hard disks make for a more pleasant working environment, and the performance of up-to-date models compared with their predecessors is vastly better. There are only a few PC components that can make such an impact on performance and at such a bargain price.

Hard disk prices are in freefall at the moment, but if you want the latest and greatest models from any manufacturer, then – as before – you'll have to shell out a couple of hundred pounds. Nevertheless, at the moment, mid-range models with capacities of between 300 and 320GB are unbeatable bargains. A 250GB hard disk can cost as little as £50. In the tables on the following pages – we've put guide prices only – you'll probably be able to pick up drives for less if you go to **www.pcw.co.uk/bestprices** or other price comparison sites.

How to choose your perfect drive

Some people have difficulty in selecting the right drive to meet their requirements from the huge number of models on offer. There are small models, fast models, quiet models, value models – all very confusing.

As a rule, if the computer is in an office environment, it shouldn't be too noisy. A 30dBA noise level from drives like the Samsung Spinpoint T133 300JI is exemplary. And for office use, as Excel and Word files usually only take up 50 to 200KB of space and the time taken up with file saving is only a secondary consideration, you can get away with a smaller and slower (5,400rpm) disk.

On the other hand, short read and write times do count if you are working on large graphics or on video sequences. The 10,000rpm Western Digital Raptor family delivers class-leading 75MB per second transfer rates in our tests.

If you're looking for a good compromise between performance and noise, you're more likely to find something suitable among the 2.5in drives. These are already used to good effect in many media PCs. Since December 2006, models with capacities of up to 300GB

have been announced – unthinkable a couple of years ago.

The terabyte barrier

The equivalent, in storage terms, of breaking the sound barrier has been achieved by 3.5in hard disks. At the January 2007 CES in Las Vegas, Hitachi exhibited the first terabyte hard disk, which it launched in the first quarter of 2007. This high capacity is made possible by using perpendicular recording (see box below). In off-the-shelf systems, capacities of 300 to 500GB are currently the norm.

Interface considerations

When it comes to interfaces, the decision is easy in the consumer sector. SCSI hardly matters anymore because its role has been taken over by Sata 2, and parallel ATA (Pata) interfaces are almost a thing of the past, becoming less and less common on new motherboards.

Sata has been successful because of features like Native Command Queuing (NCQ), which queues incoming commands, sorts them and executes them in an optimised order. This increases performance as the hard disk write heads do not have to be moved backwards and forwards unnecessarily. And thanks to hot plug capabilities, Sata 2 hard disks can be swapped without rebooting, plus swappable hard disk caddies make it easy to simultaneously connect or disconnect drives. If you don't have any hot-swap caddies, in an emergency you can add a drive by connecting first the Sata data cable then the power cable. To remove a drive, reverse this and disconnect the power cable first.

Theoretically, Sata 2 permits a data transfer rate of up to 300MB/sec. At present, however, even the fastest hard drives – the WD Raptor family – can only manage 75MB/sec in real-world tests.

Buy a new controller

Sata 2 is making inroads on notebooks as well. Be aware though that, as yet, only very few models are equipped with a Sata disk interface. Be sure to check the specs before you buy a new hard disk.

For older desktop systems without a Sata interface onboard, you can buy PCI expansion cards from around £20. However, if you do this, bear in mind that if you attach several hard disks, for example in a Raid array, you can saturate the PCI bus's maximum transfer rate of 133MB/sec, cancelling out any desired improvement in performance.

How we tested

In the tables that follow, you'll find the measured figures for average transfer rate, access times and noise level. Performance figures were measured using the utility HD Tune (**www.hdtune.com**), and maximum noise levels (during full-stroke disk access) measured in a portable anechoic chamber.

To make the tables a useful reference, we've sorted them into alphabetical order for each category of drive, and added a column with the disk's category ranking in terms our overall assessment of each drive's combination of performance, noise, warranty, price and size.

Editor's Choice

Our Editor's Choice drives are highlighted in the table and are as follows.

3.5in Pata disk:
Seagate Barracuda 7200.10 ST3750640A
3.5in Sata disk:
Samsung Spinpoint T166 HD501LJ
2.5in Pata disk:
Samsung Spinpoint M80 HM160JC
2.5in Sata disk:
Seagate Momentus 5400.3 ST9160821AS

Hard disks for Vista

One of the latest developments in mass storage is the hybrid hard disk. To give extra performance and reduce power consumption in laptops, an extra non-volatile cache memory is mounted on the drive. This serves as a read buffer for data and is supposed to reduce the number of accesses to the disk platters, saving both energy and time.

In addition, the non-volatile cache is used to store copies of Vista's start-up files to help reduce the time Vista takes to boot. Support for this is already integrated into Vista under the name Ready Drive.

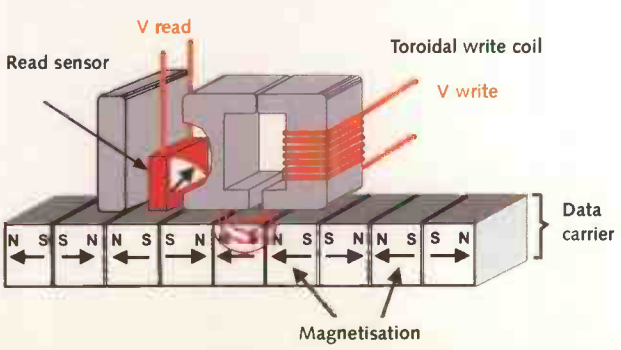
Last bit standing

At 500GB you reach the limit for traditional magnetic recording technology on hard disks – you just can't physically cram more data horizontally onto the disk. For this reason, hard disk manufacturers are now turning to what's called Perpendicular Recording (PR).

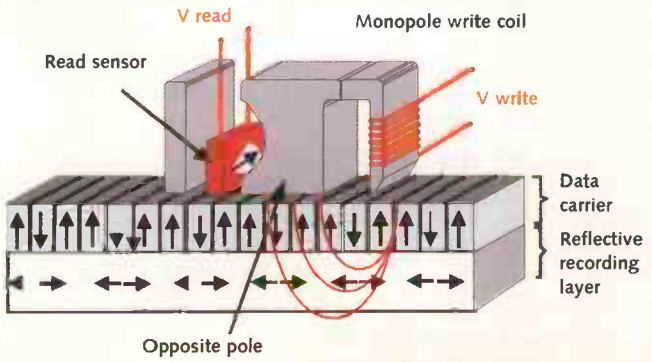
Using this recording process, the data bits are lined up vertically in relation to the platter's surface – rather like dominoes stood on end. On the other hand, the dominoes are laid flat in conventional (longitudinal) recording. The vertical bit alignment means that more data can be stored on the media surface; using PR, it's currently possible to achieve a data density of 132Gbits per square inch, whereas with longitudinal recording the figure is only around 103Gbits.

PR does require special hard disks as the method makes use of its own design of write and read heads. Obviously, this cannot be achieved with software or a firmware upgrade.

Longitudinal recording



Perpendicular recording



MANUFACTURER AND MODEL	RANKING	GUIDE PRICE £	INTERFACE	CAPACITY (GB)	CACHE (KB)	SPIN SPEED (RPM)	WARRANTY MONTHS	TRANSFER RATE (MB/SEC)	ACCESS TIME (MS)	NOISE DB(A)
2.5IN PATA DRIVES										
Fujitsu MHT-AT MHT2040AT	46	£48	UltraDMA100	40	8	4,200	36	19.6	19.1	26
Fujitsu MHV-AH MHV2040AH	37	£34	UltraDMA100	40	8	5,400	36	30.8	18.2	26.7
Fujitsu MHV-AH MHV2060AH	30	£37	UltraDMA100	60	8	5,400	36	30.8	18.2	26.7
Fujitsu MHV-AH MHV2080AH	25	£41	UltraDMA100	80	8	5,400	36	30.8	18.2	26.7
Fujitsu MHV-AH MHV2100AH	20	£51	UltraDMA100	100	8	5,400	36	30.8	18.2	26.7
Fujitsu MHV-AH MHV2120AH	15	£58	UltraDMA100	120	8	5,400	36	30.8	18.2	26.7
Fujitsu MHV-AT MHV2040AT	44	£31	UltraDMA100	40	8	4,200	36	22.4	19.8	25
Fujitsu MHV-AT MHV2060AT	42	£34	UltraDMA100	60	8	4,200	36	22.4	19.8	25
Fujitsu MHV-AT MHV2080AT	37	£41	UltraDMA100	80	8	4,200	36	22.4	19.8	25
Fujitsu MHV-AT MHV2100AT	31	£51	UltraDMA100	100	8	4,200	36	22.4	19.8	25
Fujitsu MHV-AT MHV2120AT	24	£58	UltraDMA100	120	8	4,200	36	22.4	19.8	25
Hitachi Travelstar 4K40 HTS424020M9AT00	48	£31	UltraDMA100	20	2	4,200	36	22.5	19.4	24
Hitachi Travelstar 4K40 HTS424040M9AT00	47	£37	UltraDMA100	40	2	4,200	36	22.5	19.4	24
Hitachi Travelstar 5K100 HTS541010G9AT00	34	£61	UltraDMA100	100	8	5,400	36	28.1	17.9	28
Hitachi Travelstar 5K100 HTS541040G9AT00	45	£34	UltraDMA100	40	8	5,400	36	28.1	17.9	28
Hitachi Travelstar 5K100 HTS541060G9AT00	43	£41	UltraDMA100	60	8	5,400	36	28.1	17.9	28
Hitachi Travelstar 5K100 HTS541080G9AT00	39	£48	UltraDMA100	80	8	5,400	36	28.1	17.9	28
Hitachi Travelstar 7K100 HTS721010G9AT00	27	£78	UltraDMA100	100	8	7,200	36	35.8	15.5	30.8
Hitachi Travelstar 7K100 HTS721060G9AT00	39	£54	UltraDMA100	60	8	7,200	36	35.8	15.5	30.8
Hitachi Travelstar 7K100 HTS721080G9AT00	32	£68	UltraDMA100	80	8	7,200	36	35.8	15.5	30.8
Hitachi Travelstar 7K60 HTS726060M9AT00	36	£68	UltraDMA100	60	8	7,200	36	29.7	15.6	29.1
Hitachi Travelstar E5K100 HTE541040G9AT00	29	£34	UltraDMA100	40	8	5,400	36	29.3	17.8	25.3
Hitachi Travelstar E7K100 HTE721010G9AT00	27	£78	UltraDMA100	100	8	7,200	36	35.8	15.5	30.8
Hitachi Travelstar E7K100 HTE721060G9AT00	39	£54	UltraDMA100	60	8	7,200	36	35.8	15.5	30.8
Hitachi Travelstar E7K100 HTE721080G9AT00	32	£64	UltraDMA100	80	8	7,200	36	35.8	15.5	30.8
Samsung Spinpoint M40 MP0402H	33	£31	UltraDMA100	40	8	5,400	36	25.6	17.1	25
Samsung Spinpoint M40 MP0603H	26	£41	UltraDMA100	60	8	5,400	36	25.6	17.1	25
Samsung Spinpoint M40 MP0804H	22	£48	UltraDMA100	80	8	5,400	36	25.6	17.1	25
Samsung Spinpoint M80 HM080HC	2	£41	UltraDMA100	80	8	5,400	36	35.7	17.7	23.2
Samsung Spinpoint M80 HM160JC	1	£88	UltraDMA100	160	8	5,400	36	35.7	17.7	23.2
Seagate Momentus 5400.2 ST9100823A	7	£68	UltraDMA100	100	8	5,400	60	29.5	16.9	26
Seagate Momentus 5400.2 ST9120821A	3	£75	UltraDMA100	120	8	5,400	60	32.1	16.3	26
Seagate Momentus 5400.2 ST960822A	13	£41	UltraDMA100	60	8	5,400	60	29.5	16.9	26
Seagate Momentus 5400.2 ST9808211A	9	£61	UltraDMA100	80	8	5,400	60	29.5	16.9	26
Seagate Momentus 5400.3 ST9100828A	8	£64	UltraDMA100	100	8	5,400	60	34.1	18.2	27.9
Seagate Momentus 5400.3 ST9120822A	6	£75	UltraDMA100	120	8	5,400	60	34.1	18.2	27.9
Seagate Momentus 5400.3 ST9160821A	3	£98	UltraDMA100	160	8	5,400	60	34.1	18.2	27.9
Seagate Momentus 5400.3 ST940815A	21	£34	UltraDMA100	40	8	5,400	60	34.1	18.2	27.9
Seagate Momentus 5400.3 ST960815A	17	£54	UltraDMA100	60	8	5,400	60	34.1	18.2	27.9
Seagate Momentus 5400.3 ST980815A	11	£44	UltraDMA100	80	8	5,400	60	34.1	18.2	27.9
Seagate Momentus 7200.1 ST910021A	10	£92	UltraDMA100	100	8	7,200	60	37.1	15.5	30.4
Seagate Momentus 7200.1 ST96023A	19	£61	UltraDMA100	60	8	7,200	60	37.1	15.5	30.4
Seagate Momentus 7200.1 ST980825A	15	£75	UltraDMA100	80	8	7,200	60	37.1	15.5	30.4
Toshiba GAS MK1031GAS	11	£61	UltraDMA100	100	8	4,200	36	22.3	18.7	23.8
Toshiba GAX MK1032GAX	5	£54	UltraDMA100	100	16	5,400	36	27.8	17.4	27.9
WD Scorpio WD400VE	23	£37	UltraDMA100	40	8	5,400	36	27.7	17.9	23.4
WD Scorpio WD600VE	18	£44	UltraDMA100	60	8	5,400	36	27.7	17.9	23.4
WD Scorpio WD800VE	14	£51	UltraDMA100	80	8	5,400	36	27.7	17.9	23.4
2.5IN SATA DRIVES										
Fujitsu MHT-BH MHT2040BH	36	£48	Sata	40	8	5,400	36	27.5	18.4	27.5
Fujitsu MHT-BH MHT2060BH	34	£61	Sata	60	8	5,400	36	27.5	18.4	27.5
Fujitsu MHV-BH MHV2040BH	35	£34	Sata	40	8	5,400	36	30.1	18.2	28.5
Fujitsu MHV-BH MHV2060BH	32	£37	Sata	60	8	5,400	36	30.1	18.2	28.5
Fujitsu MHV-BH MHV2080BH	29	£44	Sata	80	8	5,400	36	30.1	18.2	28.5
Fujitsu MHV-BH MHV2100BH	25	£51	Sata	100	8	5,400	36	30.1	18.2	28.5
Fujitsu MHV-BH MHV2120BH	22	£61	Sata	120	8	5,400	36	30.1	18.2	28.5
Fujitsu MHV-BT MHV2160BT	21	£81	Sata	160	8	4,200	36	24.9	19.8	26.8
Fujitsu MHV-BT MHV2200BT	7	£112	Sata	200	8	4,200	36	28.3	19.9	26
Hitachi Travelstar 5K160 HTS541616J9SA00	19	£95	Sata	160	8	5,400	36	34.6	17.5	30
Hitachi Travelstar 7K100 HTS721010G9SA00	23	£81	Sata	100	8	7,200	36	35.8	15.5	30.8

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MANUFACTURER AND MODEL	RANKING	GUIDE PRICE	INTERFACE	CAPACITY (GB)	CACHE (MB)	SPIN SPEED (RPM)	WARRANTY MONTHS	TRANSFER RATE (MB/SEC)	ACCESS TIME (MS)	NOISE DB(A)
Hitachi Travelstar 7K100 HTS721060G9SA00	31	£54	Sata	60	8	7,200	36	35.8	15.5	30.8
Hitachi Travelstar 7K100 HTS721080G9SA00	28	£68	Sata	80	8	7,200	36	35.8	15.5	30.8
Hitachi Travelstar E5K100 HTE541040G9SA00	25	£34	Sata	40	8	5,400	36	29.3	17.8	25.3
Hitachi Travelstar E7K100 HTE721010G9SA00	23	£81	Sata	100	8	7,200	36	35.8	15.5	30.8
Samsung Spinpoint M40S HM040HI	33	£34	Sata	40	8	5,400	36	27.1	18.3	27.5
Samsung Spinpoint M40S HM060II	30	£41	Sata	60	8	5,400	36	27.1	18.3	27.5
Samsung Spinpoint M40S HM080JI	27	£44	Sata	80	8	5,400	36	27.1	18.3	27.5
Samsung Spinpoint M80 HM080JI	16	£41	Sata	80	8	5,400	36	35.2	17.9	26.9
Samsung Spinpoint M80 HM100JI	13	£54	Sata	100	8	5,400	36	35.2	17.9	26.9
Samsung Spinpoint M80 HM120II	11	£68	Sata	120	8	5,400	36	35.2	17.9	26.9
Samsung Spinpoint M80 HM160JI	5	£98	Sata	160	8	5,400	36	35.2	17.9	26.9
Seagate Momentus 5400.2 ST9100823AS	12	£61	Sata	100	8	5,400	60	29.5	16.9	26
Seagate Momentus 5400.2 ST9120821AS	8	£71	Sata	120	8	5,400	60	29.5	16.9	26
Seagate Momentus 5400.2 ST9808211AS	14	£48	Sata	80	8	5,400	60	29.5	16.9	26
Seagate Momentus 5400.3 ST9100828AS	3	£71	Sata	100	8	5,400	60	34.4	17.4	25
Seagate Momentus 5400.3 ST9120822AS	2	£75	Sata	120	8	5,400	60	34.4	17.4	25
Seagate Momentus 5400.3 ST9160821AS	1	£98	Sata	160	8	5,400	60	34.4	17.4	25
Seagate Momentus 5400.3 ST940815AS	8	£48	Sata	40	8	5,400	60	34.4	17.4	25
Seagate Momentus 5400.3 ST960815AS	6	£58	Sata	60	8	5,400	60	34.4	17.4	25
Seagate Momentus 5400.3 ST980815AS	4	£64	Sata	80	8	5,400	60	34.4	17.4	25
Seagate Momentus 7200.1 ST910021AS	15	£92	Sata	100	8	7,200	60	37.1	15.5	30.4
Seagate Momentus 7200.1 ST96023AS	20	£64	Sata	60	8	7,200	60	37.1	15.5	30.4
Seagate Momentus 7200.1 ST980825AS	18	£71	Sata	80	8	7,200	60	37.1	15.5	30.4
Toshiba GSX MK1234GSX	10	£58	Sata	120	8	5,400	36	29.5	16.4	25.7
Toshiba GSX MK6034GSX	17	£41	Sata	60	8	5,400	36	29.5	16.4	25.7
3.5IN PATA DRIVES										
Excelstor Callisto ESJ840C	63	£27	UltraDMA133	40	2	7,200	36	46.7	14.5	33
Excelstor Callisto ESJ860C	61	£31	UltraDMA133	60	2	7,200	36	46.7	14.5	33
Excelstor Callisto ESJ880C	57	£34	UltraDMA133	80	2	7,200	36	46.7	14.5	33
Excelstor GStor Plus GP1080	69	£75	UltraDMA133	80	2	7,200	36	46.7	13.4	34.9
Hitachi Deskstar 7K250 HDS722512VLAT80	36	£31	UltraDMA100	120	8	7,200	36	44.8	13.1	32.2
Hitachi Deskstar 7K250 HDS722516VLAT80	31	£37	UltraDMA100	160	8	7,200	36	44.8	13.1	32.2
Hitachi Deskstar 7K250 HDS722525VLAT80	28	£41	UltraDMA100	200	8	7,200	36	44.8	13.1	32.2
Hitachi Deskstar 7K250 HDS722525VLAT80	24	£48	UltraDMA100	250	8	7,200	36	44.8	13.1	32.2
Hitachi Deskstar 7K400 HDS724040KLAT80	32	£102	UltraDMA133	400	8	7,200	36	45.9	12.6	37.8
Hitachi Deskstar 7K500 HDS725050KLAT80	22	£146	UltraDMA133	500	8	7,200	36	49	12.9	36.4
Hitachi Deskstar 7K80 HDS728040PLAT20	57	£24	UltraDMA133	40	2	7,200	36	46.7	13.5	32.2
Hitachi Deskstar 7K80 HDS728080PLAT20	53	£27	UltraDMA133	80	2	7,200	36	46.7	13.5	32.2
Hitachi Deskstar T7K250 HDT722516DLAT80	32	£37	UltraDMA133	160	8	7,200	36	53.4	12.7	34.1
Hitachi Deskstar T7K250 HDT722525DLAT80	25	£54	UltraDMA133	250	8	7,200	36	53.4	12.7	34.1
Maxtor Diamondmax 10 6B160P0	29	£41	UltraDMA133	160	8	7,200	36	50.7	14.2	33.6
Maxtor Diamondmax 10 6B200P0	27	£51	UltraDMA133	200	8	7,200	36	50.7	14.2	33.6
Maxtor Diamondmax 10 6B250R0	19	£78	UltraDMA133	250	16	7,200	36	50.9	13.9	34.8
Maxtor Diamondmax 10 6B300R0	16	£92	UltraDMA133	300	16	7,200	36	50.9	13.9	34.8
Maxtor Diamondmax Plus 9 6Y060L0	76	£34	UltraDMA133	60	2	7,200	36	46.5	13.4	37.2
Maxtor Diamondmax Plus 9 6Y080L0	75	£41	UltraDMA133	80	2	7,200	36	46.5	13.4	37.2
Maxtor Diamondmax Plus 9 6Y080P0	72	£44	UltraDMA133	80	8	7,200	36	46.7	13.5	38.4
Maxtor Diamondmax Plus 9 6Y120L0	71	£48	UltraDMA133	120	2	7,200	36	46.5	13.4	37.2
Maxtor Diamondmax Plus 9 6Y120P0	68	£51	UltraDMA133	120	8	7,200	36	46.7	13.5	38.4
Maxtor Diamondmax Plus 9 6Y160L0	67	£61	UltraDMA133	160	2	7,200	36	46.5	13.4	37.2
Maxtor Maxline II 4A250J0	77	£92	UltraDMA133	250	2	5,400	60	31.4	15.3	38.9
Maxtor Maxline II 5A300J0	73	£129	UltraDMA133	300	2	5,400	60	31.4	15.3	38.9
Maxtor Maxline II Plus 7Y250P0	42	£88	UltraDMA133	250	8	7,200	60	47.7	13.6	37.4
Maxtor Maxline III 7B250R0	18	£61	UltraDMA133	250	16	7,200	60	46.3	14	35.2
Maxtor Maxline III 7B300R0	15	£85	UltraDMA133	300	16	7,200	60	46.3	14	35.2
Samsung Spinpoint P120 SP2014N	16	£41	UltraDMA133	200	8	7,200	36	58.2	14.3	29.5
Samsung Spinpoint P120 SP2514N	12	£51	UltraDMA133	250	8	7,200	36	58.2	14.3	29.5
Samsung Spinpoint P80 SP0802N	65	£31	UltraDMA133	80	2	7,200	36	49	13.9	35.5
Samsung Spinpoint P80 SP0812N	25	£31	UltraDMA133	80	8	7,200	36	48.6	13.3	29.5
Samsung Spinpoint P80 SP1203N	61	£54	UltraDMA133	120	2	7,200	36	49	13.9	35.5
Samsung Spinpoint P80 SP1213N	23	£54	UltraDMA133	120	8	7,200	36	48.6	13.3	29.5
Samsung Spinpoint P80 SP1604N	56	£58	UltraDMA133	160	2	7,200	36	49	13.9	35.5
Samsung Spinpoint P80 SP1614N	21	£58	UltraDMA133	160	8	7,200	36	48.6	13.3	29.5
Samsung Spinpoint PL40 SP0411N	41	£27	UltraDMA133	40	2	7,200	36	46.7	14.3	28.9

MANUFACTURER AND MODEL	RANKING	GUIDE PRICE	INTERFACE	CAPACITY (GB)	CACHE (MB)	SPIN SPEED (RPM)	WARRANTY MONTHS	TRANSFER RATE (MB/SEC)	ACCESS TIME (MS)	NOISE DB(A)
Seagate Barracuda 7200.10 ST3080640A	20	£31	UltraDMA100	80	16	7,200	60	62.9	14.7	34.9
Seagate Barracuda 7200.10 ST3160640A	14	£37	UltraDMA100	160	16	7,200	60	62.9	14.7	34.9
Seagate Barracuda 7200.10 ST3200640A	11	£48	UltraDMA100	200	16	7,200	60	62.9	14.7	34.9
Seagate Barracuda 7200.10 ST3250640A	9	£51	UltraDMA100	250	16	7,200	60	62.9	14.7	34.9
Seagate Barracuda 7200.10 ST3320640A	6	£71	UltraDMA100	320	16	7,200	60	62.9	14.7	34.9
Seagate Barracuda 7200.10 ST3400640A	4	£88	UltraDMA100	400	16	7,200	60	62.9	14.7	34.9
Seagate Barracuda 7200.10 ST3500640A	2	£156	UltraDMA100	500	16	7,200	60	62.9	14.7	34.9
Seagate Barracuda 7200.10 ST3750640A	1	£271	UltraDMA100	750	16	7,200	60	62.9	14.7	34.9
Seagate Barracuda 7200.7 Plus ST3120026A	42	£51	UltraDMA100	120	8	7,200	60	44.9	14.5	35.6
Seagate Barracuda 7200.7 Plus ST3160023A	39	£58	UltraDMA100	160	8	7,200	60	44.9	14.5	35.6
Seagate Barracuda 7200.7 Plus ST3200822A	34	£54	UltraDMA100	200	8	7,200	60	46.7	15	35.6
Seagate Barracuda 7200.7 ST3120022A	50	£54	UltraDMA100	120	2	7,200	60	44.8	14.7	35.6
Seagate Barracuda 7200.7 ST3160021A	47	£58	UltraDMA100	160	2	7,200	60	44.8	14.7	35.6
Seagate Barracuda 7200.7 ST340014A	60	£27	UltraDMA100	40	2	7,200	60	44.8	14.7	35.6
Seagate Barracuda 7200.7 ST380011A	54	£41	UltraDMA100	80	2	7,200	60	44.8	14.7	35.6
Seagate Barracuda 7200.7 ST380013A	54	£41	UltraDMA100	80	2	7,200	60	44.8	14.7	35.6
Seagate Barracuda 7200.8 ST3250823A	13	£64	UltraDMA100	250	8	7,200	60	55.5	15.5	31.5
Seagate Barracuda 7200.8 ST3300831A	10	£78	UltraDMA100	300	8	7,200	60	55.5	15.5	31.5
Seagate Barracuda 7200.8 ST3400832A	6	£112	UltraDMA100	400	8	7,200	60	55.5	15.5	31.5
Seagate Barracuda 7200.9 ST3300622A	8	£81	UltraDMA100	300	16	7,200	60	60.8	15.1	34.9
Seagate Barracuda 7200.9 ST3400633A	5	£105	UltraDMA100	400	16	7,200	60	60.8	15.1	34.9
Seagate Barracuda 7200.9 ST3500651A	3	£156	UltraDMA100	500	16	7,200	60	60.8	15.1	34.9
WD Caviar RE WD1200S	48	£61	UltraDMA133	120	8	7,200	60	50	13.3	37.8
WD Caviar RE WD1600SB	45	£68	UltraDMA133	160	8	7,200	60	50	13.3	37.8
WD Caviar RE WD2500SB	38	£88	UltraDMA133	250	8	7,200	60	50	13.3	37.8
WD Caviar RE WD3200SB	34	£105	UltraDMA133	320	8	7,200	60	50	13.3	37.8
WD Caviar SE WD1200JB	46	£58	UltraDMA100	120	8	7,200	36	52.5	13.2	36
WD Caviar SE WD1600JB	46	£58	UltraDMA100	120	8	7,200	36	52.5	13.2	36
WD Caviar SE WD2000JB	39	£75	UltraDMA100	200	8	7,200	36	52.5	13.2	36
WD Caviar SE WD2500JB	37	£92	UltraDMA100	250	8	7,200	36	52.5	13.2	36
WD Caviar SE WD3200JB	30	£71	UltraDMA100	320	8	7,200	36	54.5	13.5	36
WD Caviar SE WD400JB	51	£31	UltraDMA100	40	8	7,200	36	52.5	13.2	36
WD Caviar SE WD800JB	49	£44	UltraDMA100	80	8	7,200	36	52.5	13.2	36
WD Caviar WD1200BB	66	£41	UltraDMA100	120	2	7,200	36	52.1	13.4	36.5
WD Caviar WD1600BB	64	£44	UltraDMA100	160	2	7,200	36	52.1	13.4	36.5
WD Caviar WD2000BB	59	£58	UltraDMA100	200	2	7,200	36	52.1	13.4	36.5
WD Caviar WD2500BB	52	£61	UltraDMA100	250	2	7,200	36	52.1	13.4	36.5
WD Caviar WD400BB	73	£31	UltraDMA100	40	2	7,200	36	52.1	13.4	36.5
WD Caviar WD800BB	70	£34	UltraDMA100	80	2	7,200	36	52.1	13.4	36.5
3.5IN SATA DRIVES										
Excelstor Callisto ESJ880S	73	£34	Sata 2	80	8	7,200	36	46.7	14.5	33
Hitachi Deskstar 7K250 HDS722512VLSA80	53	£48	Sata	120	8	7,200	36	46.9	12.6	32.2
Hitachi Deskstar 7K250 HDS722516VLSA80	46	£37	Sata	160	8	7,200	36	46.9	12.6	32.2
Hitachi Deskstar 7K250 HDS722525VLSA80	41	£48	Sata	250	8	7,200	36	46.9	12.6	32.2
Hitachi Deskstar 7K250 HDS722580VLSA80	55	£31	Sata	80	8	7,200	36	46.9	12.6	32.2
Hitachi Deskstar 7K400 HDS724040KLSA80	54	£122	Sata	400	8	7,200	36	45.9	12.8	37.8
Hitachi Deskstar 7K500 HDS725050KLA360	34	£136	Sata 2	500	16	7,200	36	48.8	13	36.4
Hitachi Deskstar 7K80 HDS728080PLA380	60	£27	Sata 2	80	8	7,200	36	46.6	13	32.2
Hitachi Deskstar T7K250 HDT722516DLA380	58	£37	Sata 2	160	8	7,200	36	49.4	12.6	34.1
Hitachi Deskstar T7K250 HDT722525DLA380	50	£51	Sata 2	250	8	7,200	36	49.4	12.6	34.1
Hitachi Deskstar T7K500 HDT725025VLA380	36	£58	Sata 2	250	16	7,200	36	61	13.9	35.8
Hitachi Deskstar T7K500 HDT725032VLA380	30	£68	Sata 2	320	16	7,200	36	61	13.9	35.8
Hitachi Deskstar T7K500 HDT725040VLA380	26	£95	Sata 2	400	16	7,200	36	61	13.9	35.8
Hitachi Deskstar T7K500 HDT725050VLA380	21	£129	Sata 2	500	16	7,200	36	61	13.9	35.8
Maxtor Diamondmax 10 6B080M0	59	£34	Sata	80	8	7,200	36	50.7	14.2	33.6
Maxtor Diamondmax 10 6B160M0	52	£44	Sata	160	8	7,200	36	50.7	14.2	33.6

MANUFACTURER AND MODEL	RANKING	GUIDE PRICE	INTERFACE	CAPACITY (GB)	CACHE (KB)	SPIN SPEED (RPM)	WARRANTY MONTHS	TRANSFER RATE (MB/SEC)	ACCESS TIME (MS)	NOISE DB(A)
Maxtor Diamondmax 10 6B200M0	45	£51	Sata	200	8	7,200	36	50.7	14.2	33.6
Maxtor Diamondmax 10 6B250S0	38	£68	Sata	250	16	7,200	36	50.9	13.9	34.8
Maxtor Diamondmax 10 6B300S0	34	£95	Sata	300	16	7,200	36	50.9	13.9	34.8
Maxtor Maxline II Plus 7Y250M0	68	£81	Sata	250	8	7,200	60	46.9	14.1	37.4
Maxtor Maxline III 7B250S0	37	£61	Sata	250	16	7,200	60	46.3	14	35.2
Maxtor Maxline III 7B300S0	33	£81	Sata	300	16	7,200	60	46.3	14	35.2
Samsung Spinpoint P120 SP2004C	31	£41	Sata 2	200	8	7,200	36	56.8	14.1	29.5
Samsung Spinpoint P120 SP2504C	29	£51	Sata 2	250	8	7,200	36	56.8	14.1	29.5
Samsung Spinpoint P80 HD080HJ	75	£27	Sata 2	80	8	7,200	36	49.1	13.7	40.1
Samsung Spinpoint P80 HD160JJ	74	£54	Sata 2	160	8	7,200	36	49.1	13.7	40.1
Samsung Spinpoint P80 SP0812C	43	£27	Sata	80	8	7,200	36	48.6	13.3	29.5
Samsung Spinpoint P80 SP1213C	42	£48	Sata	120	8	7,200	36	48.6	13.3	29.5
Samsung Spinpoint P80 SP1614C	40	£54	Sata	160	8	7,200	36	48.6	13.3	29.5
Samsung Spinpoint PL40 SP0411C	66	£27	Sata	40	2	7,200	36	46.7	14.3	28.9
Samsung Spinpoint T133 HD301LJ	13	£61	Sata 2	300	8	7,200	36	58.7	15.4	28.1
Samsung Spinpoint T133 HL401LJ	6	£75	Sata 2	400	16	7,200	36	58.7	15.4	28.1
Samsung Spinpoint T166 HD252KJ	7	£61	Sata 2	250	16	7,200	36	63.6	14.2	28.1
Samsung Spinpoint T166 HD321KJ	5	£64	Sata 2	320	16	7,200	36	63.6	14.2	28.1
Samsung Spinpoint T166 HD401LJ	4	£75	Sata 2	400	16	7,200	36	63.6	14.2	28.1
Samsung Spinpoint T166 HD501LJ	1	£95	Sata 2	500	16	7,200	36	[illegible]	14.2	28.1
Seagate Barracuda 7200.10 ST3250620AS	19	£51	Sata 2	250	16	7,200	60	63.9	14	33.4
Seagate Barracuda 7200.10 ST3300620AS	17	£61	Sata 2	300	16	7,200	60	63.9	14	33.4
Seagate Barracuda 7200.10 ST3320620AS	14	£68	Sata 2	320	16	7,200	60	63.9	14	33.4
Seagate Barracuda 7200.10 ST3400620AS	10	£88	Sata 2	400	16	7,200	60	63.9	14	33.4
Seagate Barracuda 7200.10 ST3500630AS	8	£156	Sata 2	500	16	7,200	60	63.9	14	33.4
Seagate Barracuda 7200.10 ST3750640AS	3	£272	Sata 2	750	16	7,200	60	63.9	14	33.4
Seagate Barracuda 7200.7 ST3160023AS	48	£54	Sata	160	8	7,200	60	46.7	12.7	35.6
Seagate Barracuda 7200.7 ST3160827AS	46	£54	Sata	160	8	7,200	60	46	12.8	35.6
Seagate Barracuda 7200.7 ST380013AS	57	£41	Sata	80	8	7,200	60	46.7	12.7	35.6
Seagate Barracuda 7200.7 ST380817AS	55	£41	Sata	80	8	7,200	60	46	12.8	35.6
Seagate Barracuda 7200.8 ST3250823AS	28	£64	Sata	250	8	7,200	60	57.6	16.1	31.5
Seagate Barracuda 7200.8 ST3300831AS	25	£75	Sata	300	8	7,200	60	57.6	16.1	31.5
Seagate Barracuda 7200.8 ST3400832AS	18	£109	Sata	400	8	7,200	60	57.6	16.1	31.5
Seagate Barracuda 7200.9 ST3300622AS	27	£81	Sata 2	300	16	7,200	60	60.8	15.1	34.9
Seagate Barracuda 7200.9 ST3400633AS	23	£105	Sata 2	400	16	7,200	60	60.8	15.1	34.9
Seagate Barracuda 7200.9 ST3500641AS	12	£149	Sata 2	500	16	7,200	60	60.8	15.1	34.9
Seagate Barracuda ES ST3250640NS	19	£61	Sata 2	250	16	7,200	60	63.9	14	33.4
Seagate Barracuda ES ST3320640NS	14	£75	Sata 2	320	16	7,200	60	63.9	14	33.4
Seagate Barracuda ES ST3400820NS	10	£98	Sata 2	400	16	7,200	60	63.9	14	33.4
Seagate Barracuda ES ST3500830NS	8	£156	Sata 2	500	16	7,200	60	63.9	14	33.4
Seagate Barracuda ES ST3750640NS	2	£272	Sata 2	750	16	7,200	60	63.9	14	33.4
WD Caviar RE WD1200SD	71	£64	Sata	120	8	7,200	60	50	13.3	37.8
WD Caviar RE WD1600SD	68	£68	Sata	160	8	7,200	60	50	13.3	37.8
WD Caviar RE WD2500SD	62	£88	Sata	250	8	7,200	60	50	13.3	37.8
WD Caviar SE WD1200JD	67	£58	Sata	120	8	7,200	36	52.4	13.2	36
WD Caviar SE WD1600JD	64	£54	Sata	160	8	7,200	36	52.4	13.2	36
WD Caviar SE WD2000JD	61	£75	Sata	200	8	7,200	36	52.4	13.2	36
WD Caviar SE WD3200JD	48	£88	Sata	320	8	7,200	36	54.5	13.3	36
WD Caviar SE WD400JD	72	£27	Sata	40	8	7,200	36	52.4	13.2	36
WD Caviar SE WD800JD	70	£31	Sata	80	8	7,200	36	52.4	13.2	36
WD Caviar SE16 WD2500KS	51	£58	Sata 2	250	16	7,200	36	50.6	13.6	35.7
WD Caviar SE16 WD3200KS	39	£64	Sata 2	320	16	7,200	36	54.3	12.9	35.7
WD Caviar SE16 WD4000KS	31	£109	Sata 2	400	16	7,200	36	54.3	12.9	35.7
WD Raptor WD1500ADFD	16	£183	Sata	150	16	10,000	60	74.5	7.9	32.6
WD Raptor WD360ADFD	24	£85	Sata	37	16	10,000	60	74.5	7.9	32.6
WD Raptor WD360GD	65	£71	Sata	36,7	8	10,000	60	62.1	7.9	37
WD Raptor WD740ADFD	21	£102	Sata	74	16	10,000	60	74.5	7.9	32.6
WD Raptor WD740GD	63	£112	Sata	74	8	10,000	60	62.1	7.9	37

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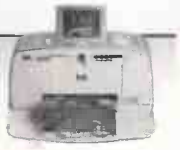

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COMPILED BY ALAN STEVENS

BUSINESS

TAKE ME TO THE SERVER

When it comes to managing servers it's hard to beat sitting down, right there in front of the console, but it's not always convenient. In this month's Business Section, therefore, we look at the next best thing – remote control software and KVM (keyboard, video and mouse) switches – and how they can be deployed simply and cheaply to benefit a small business network.

Plus, we've a full complement of product reviews including, inevitably, a KVM switch and a highly scalable new Network Attached Storage (Nas) server from Adaptec. We also try out some interesting new management software designed for use with the free VMWare Server platform we reviewed at the end of last year, and the latest release of the MYOB small business accounting package.

Then, to finish off, we look at a seriously quick colour laser from Lexmark and a remarkably affordable network camera that uses the mains to keep you in touch with what's going on in your server room.

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The C534dn is a heavy-duty device designed to be shared on a small business Lan

Read the review on page 116

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.

Personal Computer World BUSINESS EDITOR'S CHOICE

Editor's Choice Business

Personal Computer World BUSINESS RECOMMENDED

Recommended Business

Personal Computer World BUSINESS GREAT VALUE

Great Value Business

The business awards are used for products that are more suited to home offices or small businesses.

Cut yourself loose

Remote management systems can make it much easier to keep your network running. Alan Stevens explains how

Whether you have one server to look after or a whole rackful, day-to-day management and administration can still be a problem. One of the biggest headaches is the need for frequent trips to the machine room to add or edit users, or make sure the previous night's backup worked properly, or perhaps to troubleshoot file-sharing issues. It all takes time and costs money. Fortunately, there are plenty of ways to ease this burden. In this month's Business feature, we're going to take a practical look at remote management tools that effectively put you in front of the server without actually having to be anywhere near it.

Don't go there

The need to sit in front of a server to manage it is fine when it's under your desk, but a bit inconvenient if you lock it away in a secure room. It can be downright frustrating if you have several to look after, scattered in offices across the country. Some form of remote control becomes essential and, on Windows servers, you'll find tools to provide this facility are included free of charge.

The software in question is Windows Terminal Server, also referred to as Terminal Services, and it's included in every server implementation from Windows 2000 onwards. Its main purpose is to enable a Windows server to host multiple user sessions, with applications and desktops run on the server itself rather than locally on a desktop PC. An ordinary PC can still be used at the user end, or you can choose a low-cost thin-client terminal.

If you want Terminal Services to host remote applications as part of a server-based or thin-client solution, then additional licences are required. However, it's worth knowing that the software can be used free for server administration. Moreover, it's quick and easy to deploy.

Remote with Windows

The first requirement is to make sure the necessary Terminal Server/Services software is installed on the servers you want to manage. On older Windows 2000 systems you'll probably find it configured already, but on the later Windows Server 2003 you'll need to log on as an administrator and install it using add/remove programs in the Control Panel.

The Windows Terminal Server/Services technology used to support thin clients can be used for remote server administration with no licensing problems

A wizard is provided to guide you through this process; just make sure you choose the remote administration mode, which allows for two simultaneous remote sessions without extra licences.

You will need a suitable client. A custom thin-client terminal can be used if you want (look for hardware that supports the Microsoft Remote Desktop Protocol, RDP) but don't run away with the idea that you have to go down this route. If you're using a Windows XP PC you'll find you've got a suitable client already, in the form of the Remote Desktop Connection, normally to be found on the Start/All Programs/Accessories/Communications menu.

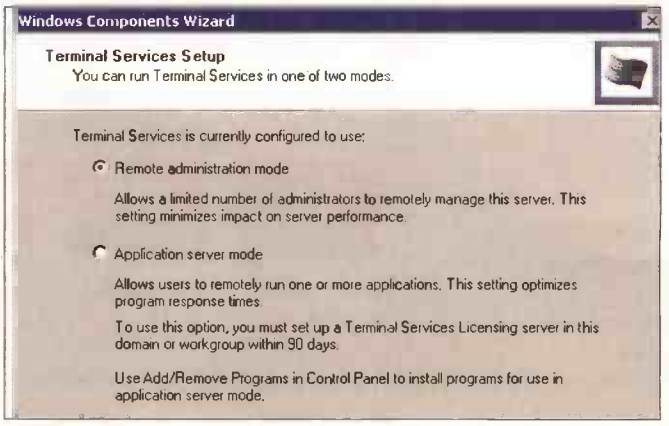
What the client sees

Start up a Remote Desktop session and you'll be asked for the name or IP address of the host server, after which you're presented with an XP-like server desktop, from which you can log into the server in the usual way.

From then on it's almost as if you were sitting in front of the server console, with the desktop, and any applications started from it, hosted on the server itself. The local client software just handles the keyboard/mouse input and refreshes the display, communicating with the Terminal Server session via RDP.

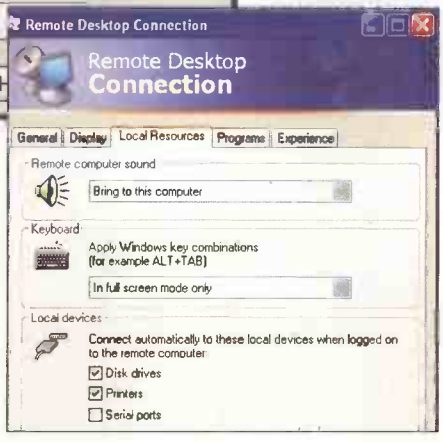
Performance will depend on the speed of the link between client and server, with a direct Lan connection likely to give the best results. Broadband can be used to manage servers from anywhere that have access to an internet connection, in which case you may have to open up TCP port 3389 on any intervening firewalls to allow the RDP traffic through.

The server software version also plays a part in what you can do. The original Windows 2000 implementation is a little basic, but there are big enhancements in Windows Server 2003. You're limited to relatively small 256 colour displays on Windows 2000 servers, but the latest RDP release (RDP 5.1) in Windows Server 2003

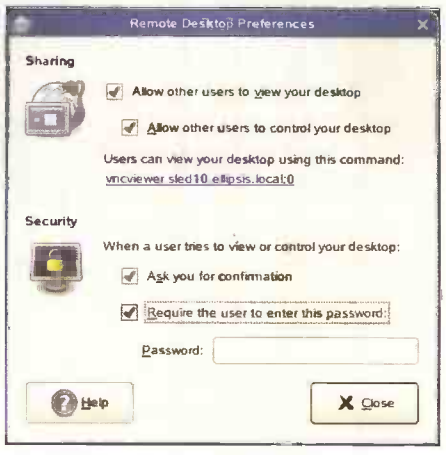


When installing Terminal Server/Services, make sure you choose the Remote Administration mode, rather than the full Application Server mode, to avoid licensing issues

Left: If you have Windows XP you can use the Remote Desktop Connection to manage Windows servers using RDP



Using the latest RDP 5.1 software, it's possible to map local resources, such as storage and printers, to the remote server desktop



Above: VNC software is included with most Linux distributions, including SuSE Linux Enterprise, as in this screenshot

can handle up to 24-bit colour and resolutions of 1,600x1,200. It also enables local client resources to be made available to a server session, so you can open files on local storage devices from the Remote Desktop and print to local printers.

Local serial devices can also be accessed. In fact, just about anything you can do from the server console can be done remotely.

Remote alternatives

You don't need an XP PC to remotely manage a Windows server using Terminal Server/Services. Remote Desktop client software for use with other versions of Windows is readily available on the Microsoft website. There's even an ActiveX implementation for use in a browser, and you can also find Linux-based clients on the web. You can only manage Windows servers this way, although there are many other remote control solutions for both Windows and other platforms besides.

There are lots of commercial remote control applications, for example, that are able to manage Windows, Linux, Apple and other server hosts.

One such is Netop Remote Control (**www.netop.com**), a very popular remote control application that can be used to manage both servers and desktop PCs. Others include Radmin (**www.radmin.com**), Carbon Copy from Altiris (**www.altiris.com**) and Netopia's Timbuktu Pro (**www.netopia.com**).

Many are also available as part of larger network management suites, such as those from Landesk (**www.landesk.com**) and Netsupport Manager (**www.netsupportmanager.com**), often with integrated helpdesk, inventory and other management tools.

You don't have to go down the commercial route to get remote control for multiple platforms. In fact, one of the most popular tools – VNC – is, like Windows Remote Desktop, available free of charge.

The VNC experience

VNC, short for Virtual Network Computer, is an open-source application developed to remotely manage not just Windows servers, but those running Linux and other operating systems.

A number of implementations are available, the most popular of which is Real VNC (**www.realvnc.com**), which comes in a basic free format and chargeable commercial versions with additional functionality. Another is Ultra VNC (**www.ultravnc.com**), where the software is totally free under the GNU general public licence, and VNC also bundled with most open-source Linux distributions.

Like Windows Remote Desktop, VNC is made of two parts – a server and a viewer – with the VNC server software installed on the

Lights out

The leading computer vendors understand the need for server remote control and other remote management facilities and increasingly offer such options as standard.

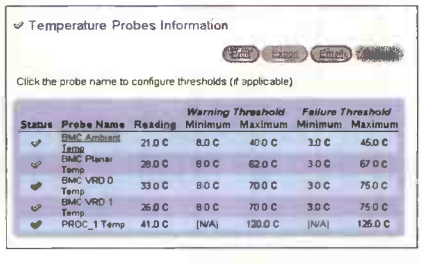
Dell includes several management tools as part of its Openmanage solution, while HP has similar offerings based on its Systems Insight Manager (SIM) platform. Both also build management circuitry into their latest server motherboards (Dell refers to this as a Baseboard Management Controller) to monitor server health and provide limited remote console access. What you get as standard is pretty basic and you may want to consider adding extra options.

Look particularly for so-called 'Lights out' management options, a phrase that reflects the ability to put servers into a secure data centre, but with the lights off because you can do everything needed to keep them running remotely.

Most servers now come with management software as standard, such as Openmanage on this Dell Poweredge, to which you can add Lights-out hardware for full remote access

Lights-out solutions normally consist of an adapter or, in some instances, integrated circuitry with a dedicated processor, memory and communications interfaces. The Lights-out adapter provides access to the host server in much the same way as a KVM switch. Lights-out tools enable the power to be cycled, and can normally be accessed over a separate management Lan connection with additional facilities to dial into the server for access even when the network infrastructure is down.

A good example here is the HP Lights-out 100c management card, which can be added to a number of the company's small-business



Proliant ML products. Costing less than £100 ex Vat, this adds web-based KVM access over a separate Lan interface. It also supports the Intelligent Platform Management Interface (IPMI), an industry-standard management protocol that enables the HP hardware to work with management tools from other vendors. Dell also supports IPMI and offers a number of DRAC (Dell Remote Access Controllers) to extend the management functionality provided on its servers as standard.

KVM switches are connected to the physical user interfaces on the servers to be managed. They can be used with any operating system and provide low-level access down to the Bios level

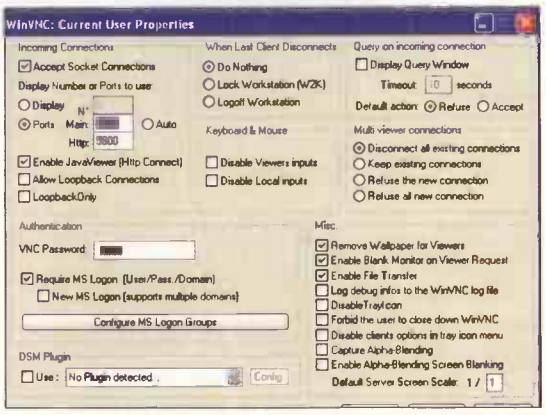
PC to be managed and the viewer on machines that will be used as management stations.

The server software can be started manually or run as a background task. Either way, it listens for viewer connections on TCP port 5900, which needs to be open in any intervening firewalls for the application to work; that's not normally an issue on a Lan. Java-based access via an HTTP browser is also supported, using port 5800, without the need for host web server software. You can also choose your own ports for both conventional and Java access.

The level of security available depends on the implementation. All versions offer basic password protection, with optional Windows domain authentication and data encryption in some versions, although if you choose Real VNC these facilities are only available in the commercial versions.

As with XP Remote Desktop, the VNC software can be used to gain remote access to desktop PCs as well as servers. Unlike the built-in Windows tools, however, VNC enables local and remote users to share the same screen and see what's happening. You can have several clients attached to one server, which may be useful for teaching and demonstrations. You can also choose whether to prompt the local user before allowing access. File transfer and chat facilities are another standard facility in most implementations.

VNC is widely used by companies of all sizes, but as with all software-based remote



The VNC Server is highly configurable, with facilities to tweak performance, appearance and security

control packages it can only work once the host operating system is up and running and the remote control application is itself loaded. If either crashes, or if the server hangs, you won't be able to connect. Neither can you change Bios settings during boot-up or access any memory-resident utility until the server is up and running. For managing those tasks, you might prefer to employ some kind of KVM (keyboard, video and mouse) solution.

More expensive than a conventional switch, IP-based KVM products can overcome distance and other limits that often apply to such tools

And so to KVM

KVM switches are more robust and flexible than software-based remote control solutions, and can provide access to each of the attached servers no matter what the state of the resident operating system – down to the Bios level.

That's because they're physically cabled to the user interfaces, so they don't depend on any of the software running on those systems, and it doesn't matter what operating system is being used.

With KVM, the server you want to connect to is selected by pressing a button on the switch, or by typing in a special hot key sequence, or via an on-screen display (OSD). Whatever the method, it is like sitting in front of a directly attached console. Some KVM systems can even turn the power on and off and remotely manage devices, such as Ethernet switches and routers, via serial interfaces.

Hardware-based KVM enables much faster switching between servers than software solutions and, in most cases, you get the usual console experience with no delay while data is processed, unlike the case with many software solutions. Most also allow for customisation, typically letting you assign user-friendly names to ports rather than numbers.

Look also for security features, with password-protected user accounts to manage access, both to the switch as a whole and, in some cases, individual ports and attached servers. The box on this page shows some of the leading vendors you may like to consider.

On the downside, traditional KVM switches often need a lot of bulky cabling to connect the switch to each of the servers in the rack. Still, this only has to be installed once and there are ways of minimising both cable bulk and complexity including, with some products, the use of standard Cat5 network cabling – as with the Aten Altusen reviewed on page 115.

Cable length is another issue, with strict limits on how far away the console can be from the servers it manages. Cheaper devices are usually designed to connect to a console in the same machine room or perhaps down the corridor or a nearby office. Those limits can be overcome if you pay more, with most KVM vendors now offering IP-based products able to digitise and encapsulate the GUI data for transmission on a TCP/IP network.

A lot more expensive than a simple KVM switch, IP-based products make it possible to remotely connect to the managed servers from any network PC, even over the internet. That's why they're particularly useful in unmanned data centres, or wherever servers are remote from the staff managing them. **PCW**

Vendors of small-business KVM solutions

Adder Technology (**www.adder.com**) – affordable small-business KVM products, including Adderlink-IP using VNC software.

Aten (**www.aten.co.uk**) – full range of small-business KVM switches.

Avocent (**www.avocent.com**) – wide range of KVM products for everything from small businesses to large corporate enterprises. Pioneer of IP-based solutions.

Belkin (**www.belkin.com**) – supplier of affordable and expandable KVM switches with optional IP-based extender.

D-Link (**www.dlink.co.uk**) – basic but affordable small-business KVM products.

Raritan (**www.raritan.com**) – specialises in Cat 5 and IP-based KVM solutions.

Rose Electronics (**www.rose.com**) – UK-based vendor with good range of small-business KVM products.

Fujitsu (**www.fel.fujitsu.com**) – KVM switches for rack-mounted servers.

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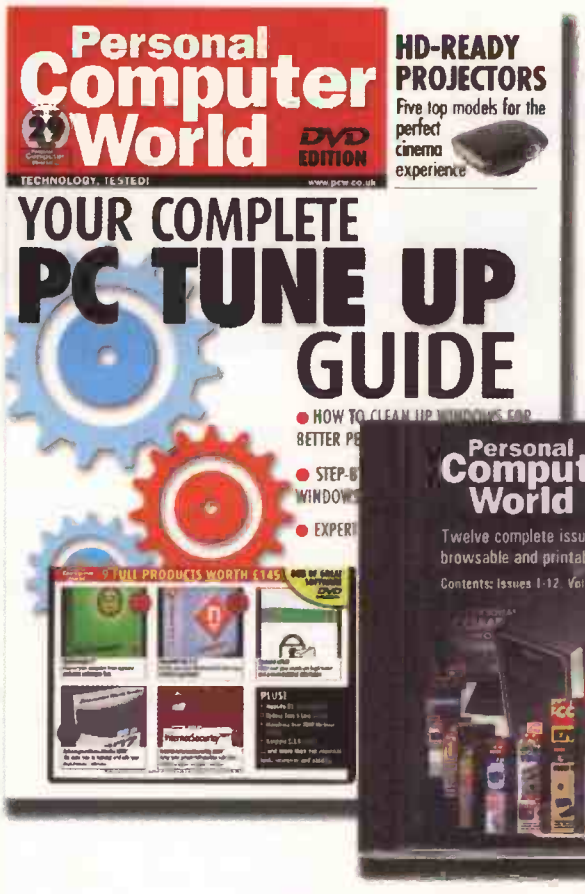

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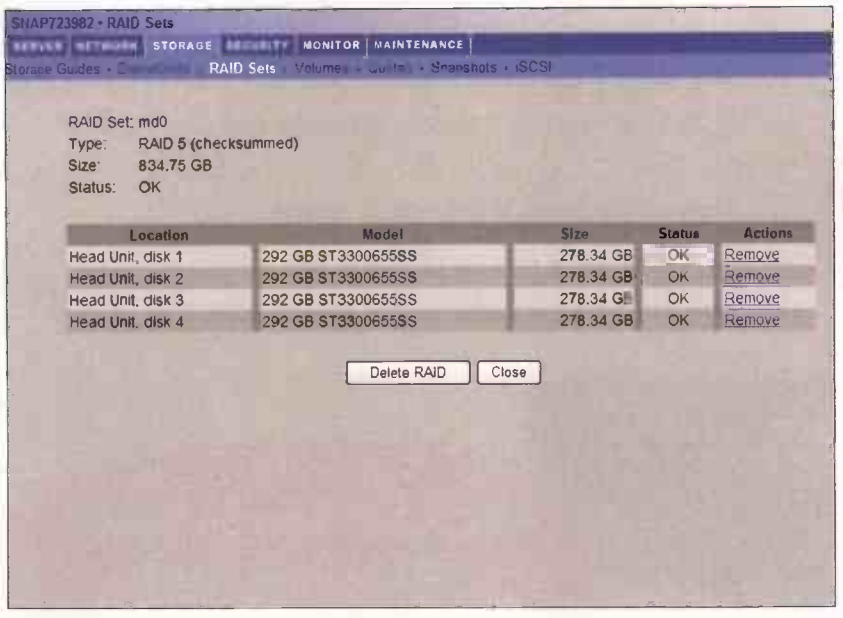
Source Code: V256

NETWORK ATTACHED STORAGE

Adaptec Snap Server 650

A Nas appliance with power and capacity to burn

Personal Computer World BUSINESS RECOMMENDED



By default the Snap Server 650 comes with a Raid 5 array, but others can be configured using the simple web-based GUI

The Snap Server 650 Nas appliance can be expanded to support up to 64.2TB using hot plug SAS disks

The Snap Server 650 from Adaptec is more powerful and scalable than most of the other network attached storage (Nas) appliances we've looked at. Indeed, it is more server than a regular appliance, but with the ease-of-use features we've come to expect of the Snap Server range.

Aimed at larger companies looking for storage that can grow as they do, the Snap Server 650 is a rack-mountable device powered by two 64-bit dual-core AMD Opteron processors, in effect making it a four-way platform. These are accompanied by 2GB of memory (expandable up to 4GB altogether) plus dual Gigabit Ethernet interfaces with automatic failover and load-balancing support.

A Serial Attached SCSI (SAS) host bus adapter looks after the storage, in the guise of four hot-swappable Seagate Cheetah 15K disks – a remarkable feat on a 1U device. These 300GB disks give the server a base capacity of 1.2TB, although the amount of space available will depend on how it's configured. The default Raid 5 implementation, for example, leaves just 843GB free, with the rest used to store the parity data needed to keep the array working in the event of disk failure.

Other Raid levels can also be configured and yet more disks added using Adaptec Sanbloc S50 Jbod (just a bunch of disks) storage arrays, each of which can accommodate another 12 disks. Up to seven of these arrays can be added altogether to give a total capacity of 64.2TB. Hot sparing is another option, together with instant capacity expansion (ICE), allowing Raid volumes to be dynamically re-sized as disks are added.

Unlike most other high-end Nas appliances, Adaptec doesn't use Windows Server 2003 to power the Snap Server. Instead, it employs its own 64-bit Linux-based GuardianOS, optimised for file sharing across a combination of Windows, Apple and Unix/Linux clients. This can be booted from any disk in the array, is managed through a straightforward web interface and, in addition to basic sharing, features a number of file-protection options.

Most of these options are built in as standard, but some are chargeable extras. The ability to take instant volume snapshots for backup purposes, for example, is included in the price along with CA eTrust anti-virus support. You also get an implementation of Bakbone's Netvault backup software, with support for a 500GB virtual tape library. However, if you want to archive data to an external tape drive, extra licensing is required.

Snap EDR (Enterprise Data Replicator) is, similarly, an extra on which to replicate the data held on the Snap Server to another appliance. This adds £650 ex Vat to the price, while for £1,300 ex Vat one-to-many and many-to-one replications are also possible, plus you can include ordinary Windows and Linux servers in the replication process.

We were very impressed with the Snap Server 650, which offers high-end server performance without the associated complexity. It can also be configured as an iSCSI target to provide block-level access on a storage area network (San).

On the downside, we found the disk carriers difficult to swap in and out, and the front bezel awkward to remove. It's also quite expensive. However, compared with other solutions in this performance and capacity bracket, it's very competitive and, unlike most general-purpose file servers, it's very easy for the small business to live with.

Alan Stevens

Details

Price From £9,400
Best price www.pcw.co.uk/bestprices
Contact Adaptec 01276 854528 www.snapserver.com
Specifications 1U rack-mount chassis • Redundant power • Dual 1.8GHz dual-core AMD Opteron processors • 2GB 533MHz ECC memory • SAS controller • Four hot-swap 300GB Seagate Cheetah 15K SAS disks • Dual integrated Gigabit Ethernet interfaces • GuardianOS software • CA Etrust anti-virus scanner • Integrated Bakbone Netvault backup

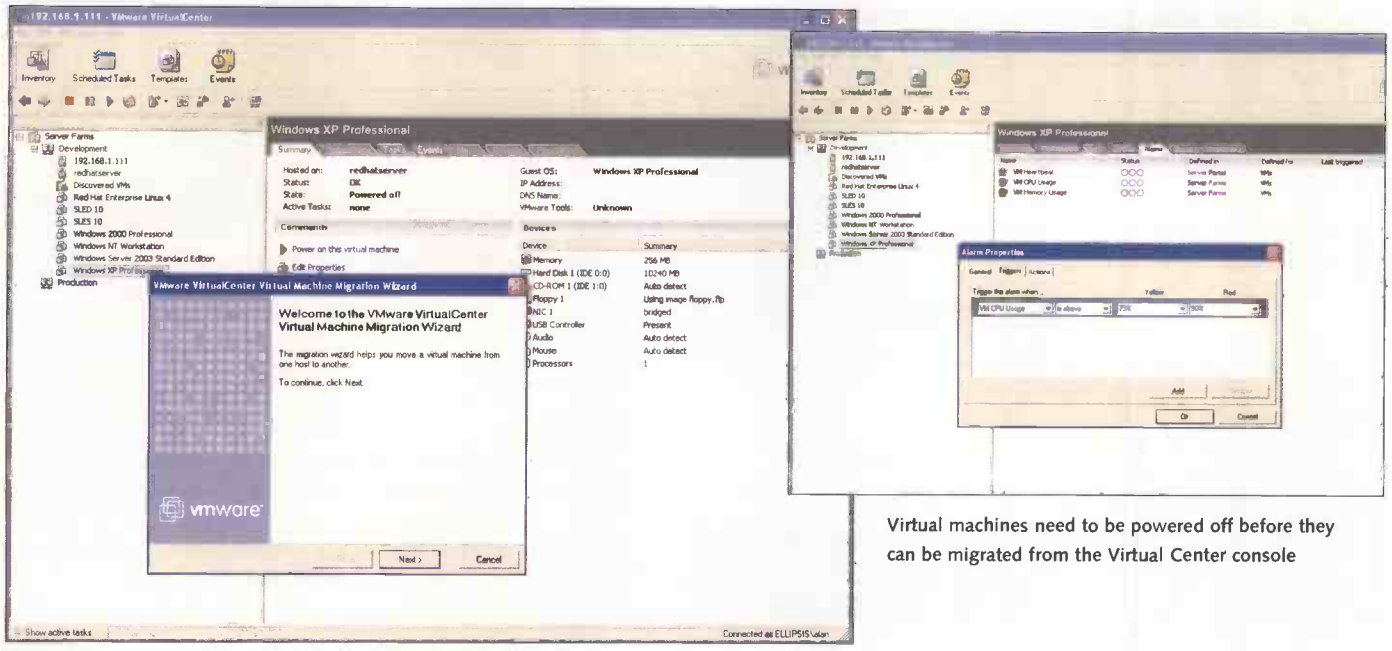
Verdict

Pros Dual-core AMD processors; fast SAS storage; add-on expansion arrays; flexible Raid options; easy web-based management; file-protection options
Cons The disk carriers are tricky to swap in and out
Features ★★★★☆
Performance ★★★★★
Value for money ★★★★☆
Overall An easy-to-manage storage solution for small businesses looking for enterprise-class performance
★★★★☆

SERVER VIRTUALISATION

Virtual Center for VMware Server

Manage your VMware servers from a single console



Virtual machines need to be powered off before they can be migrated from the Virtual Center console

Winning a *PCW* Business Recommended award in our June 2006 issue, the free VMware Server product we reviewed lacked only one major tool – a centralised management console. This omission is addressed by a recent update to VMware's Virtual Center application, although this revamped product won't necessarily be of interest to everyone using the VMware Server platform.

To begin with, unlike the server virtualisation software itself, Virtual Center for VMware Server is a commercial application and far from cheap. We also found it quite complicated to get to grips with and were surprised at the resources needed to run it.

The main server component, for example, requires a Windows host with a fast processor and at least 2GB of Ram, with a multi-processor server and additional memory recommended for larger setups (more than 50 servers). A database is also needed. This can be a simple Access-based affair for testing and evaluation, but for production use a full SQL Server or Oracle database is recommended.

Installation proved relatively easy, but only after thorough preparation and reading of all the supported documentation – something we strongly recommend to anyone contemplating deploying this application. The Virtual Center server then runs as a background process on the host server, managed by either a local or remote Windows-based Virtual Center Client.

A familiar hierarchical tree interface is the order of the day here, with VMware hosts organised into farms and virtual machines grouped/managed independently. However, you have to configure server farms manually.

A wizard helped us locate and add VMware Servers running on our test Windows Server 2003 and Linux systems. Any existing virtual machines were also discovered and added during the process, after which we were able to create, start and stop VMs from the Virtual Center client, as well as edit their setup and connect to the virtual machines via an integrated remote console.

We could do all of this already from the console that comes with VMware server. Virtual Center adds the ability to manage multiple servers from the one interface. You also get tools to clone virtual machines, and create templates that can be used for rapid deployment of new VMs. Plus, it's possible to migrate virtual machines from one server to another for load balancing or when a server needs maintenance.

Unfortunately, there's no live migration, as on VMware's enterprise-class Virtual Infrastructure 3 (VI3) platform. That means VMs have to be stopped before they can be migrated – not good where production servers are concerned. Neither is it possible to allocate processor or other VM resources, or dynamically balance loads as in VI3. The lack of any tools to take snapshots – provided by the built-in management console – was also something of a disappointment.

On the plus side, Virtual Center does add tools to monitor virtual machines and set alarms when, for example, a VM stops responding or CPU/memory usage exceed pre-set thresholds. However, you will need a critical mass of servers to make these and the other tools worth paying for. On small deployments of less than 10 servers, it's unlikely to save much time and money, with the free tools provided with each server just as effective and easy to use. Plus you still need to resort to the individual server consoles in order to take snapshots.

Alan Stevens

Details

Price From £910.63 for small business management bundle (server plus three 2-CPU agents, 30-day installation support and two support incidents)
Best price www.pcw.co.uk/bestprices
Contact VMware 01276 804 500 www.vmware.com
System requirements Host Windows (Windows XP or Windows Server 2000 or later) • 2GHz Pentium 4 processor or faster • 2GB Ram (3GB for 50-100 servers, 4GB for 100+) • Gigabit Ethernet interface recommended • SQL Server 2000 or Oracle 8i database server or later recommended • Virtual Center client requires Windows NT (SP6a) or later

Verdict

Pros Centralised VMware server management; VM cloning, templates and migration; monitoring facility
Cons Expensive for small numbers of servers; lacks live migration and load balancing; no snapshots

Features ★★☆☆☆
Ease of use ★★★☆☆
Value for money ★★☆☆☆

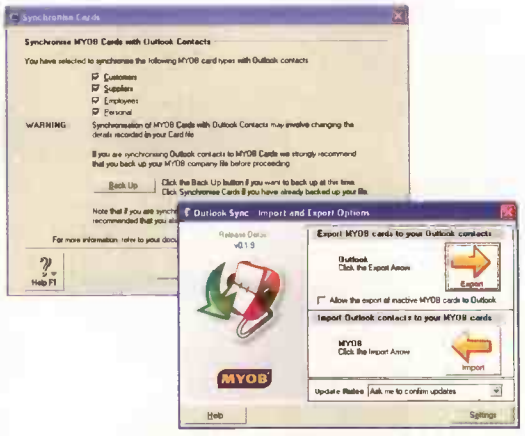
Overall Lets you manage VMware servers from a single console, but not cheap and adds little else in terms of functionality
★★☆☆☆

BUSINESS ACCOUNTING SOFTWARE

MYOB Accounting Plus v16

Personal Computer World BUSINESS RECOMMENDED

A worthwhile update to a long-established package



Above: With v16 of MYOB it's possible to synchronise contact information with Microsoft Outlook and Mac Address Book entries

Left: MYOB Accounting and Accounting Plus feature the same intuitive graphical interface, although a knowledge of accounting practices and jargon is assumed

The well-respected and popular small business accounting package MYOB (short for Mind Your Own Business) is available for both Windows PCs and Apple Macs. Some knowledge of accounting practices and terminology is assumed, but the software is easy to learn and use. The latest v16 release includes several useful information-sharing and productivity features.

Most notable among the new features is the ability to synchronise MYOB contacts with those held in Microsoft Outlook or Apple Address Book. The much-needed enhancement means the same customer information will always be available, no matter which interface you use.

The ability to produce Electronic Remittance Advices and email them to suppliers when payments are made is another useful new option, as is the ability to create corresponding purchase orders when a sales invoice or quote is produced.

You can now undo bank reconciliations and associated transactions applied during that period, making it easier to fix errors. You even have the option of undoing multiple reconciliations if the error has gone uncorrected for some time.

Import and export of payroll data has been enhanced and a new payroll verification facility added to preview payments before they're recorded. You can now predate and search for recurring transactions, print credit application forms from a customisable template and automatically adjust invoices that cause negative stock levels.

These changes apply to the basic MYOB Accounting package (£249) and the Accounting Plus package we looked at. This is an implementation that adds multi-currency, professional time billing and advanced stock control facilities on top of the sales and purchase ledgers, Vat and payroll tools in the base application. Support for multiple users is also available in the Plus version, which is recommended for big companies.

Whichever version you use, a colourful interface makes MYOB easy to use. However, the package is clearly aimed at professional bookkeepers, so novices may find the jargon and some of the procedures a little baffling, especially when first installing the software. Having said that, sample profiles for various businesses are provided, along with some good documentation and setup wizards to help explain what's required.

You can also import existing customer, supplier, stock and other lists, integrate the software with Word and Excel and customise the forms used by MYOB. For an extra £99 excluding Vat, you can add an ODBC driver to enable MYOB data to be used by other applications.

Popular with small businesses looking to manage their own accounts, MYOB can also be used by accountancy practices. A cut-down Business Basics implementation (£79 ex Vat) and an extensive list of professional advisors, fluent in the MYOB software and accounting practices, can be found on the MYOB website.

It's also worth noting that the Vat accounting tools can be used no matter what scheme is involved and that the payroll option has been accredited by HM Revenue and Customs, which means you can use it for electronic filing of PAYE and other returns to qualify for tax incentives. But unlike some of its rivals, MYOB offers less add-on third party products and services.

That aside, MYOB is a comprehensive accounting and business management solution that is competitively priced and equipped to appeal to the small business.

Alan Stevens

Details

Price £349 (£297 ex Vat)
Best price www.pcw.co.uk/bestprices
Contact MYOB 0845 130 3975 www.myob.co.uk
System requirements 200MHz Pentium class processor or better (Apple Mac version also available) • 64MB Ram • 50MB free disk space for installation plus 35MB per company file • Windows NT 4 (SP6) or greater • Microsoft Outlook 2000 or later and other Office applications required for some integration features

Verdict

Pros Microsoft Outlook and Apple Address Book synchronisation; automatic creation of remittance advices and purchase orders; undo option for bank reconciliations
Cons Accounting jargon can be baffling for novices

Features ★★★★☆
Ease of use ★★★★★
Value for money ★★★★☆

Overall A worthwhile update to this already popular small business accounting package that adds useful data sharing and productivity features

★★★★½

KVM SWITCH

Aten Altusen KH1508

Server remote control over Cat 5 cabling

A custom adapter is employed at the host end to connect to local keyboard, mouse and video ports

Ordinary Cat 5 cabling is used to connect servers to the 8-port Aten KH1508 KVM switch

When it comes to managing rack-mounted or blade servers, KVM (keyboard, video and mouse) switches are a popular alternative to software remote control, but they can be expensive and often require a lot of bulky cabling. The new Altusen KH1508 from Aten, however, is priced to appeal to growing small businesses and uses ordinary Cat 5 wiring to link remote servers to the central switch.

As the name implies, the KH1508 is an 8-port KVM switch. A 16-port model (the KH1516) also available at a cost of £353 ex Vat. Both come in compact 1U housings complete with the necessary mounting brackets. Power is supplied by a built-in AC adapter and installation is very straightforward.

Most of the ports are to be found on the rear panel with support for a single local console using standard PS/2 keyboard and mouse connectors plus the usual 15-way D-Sub VGA socket. The RJ45 ports to connect the servers are located alongside. Above them, a pair of dedicated daisy chain connectors allows additional KVM switches to be attached. Up to 31 switches can be daisy chained together, which means you can manage up to 256 remote servers from the one console, or 512 if using KH1516 switches.

Daisy chain cables, however, aren't included with the switch. Neither do you get the UTP patch cables used to connect the remote servers, although these are cheap and readily available.

At the server end, a custom adapter (CPU module, pictured) is required to provide the necessary KVM connections. These come in variations including PS/2 and USB modules (£37.52 each ex Vat) for use with industry standard servers, plus adapters for Sun servers (legacy and USB ports) and to connect to serial-based devices.

Maximum cable length is 40 metres with a video resolution of up to 1,280x1,024 and a 60Hz refresh at this length, with 1,600x1,200 possible on cables of cables of 30 metres or less.

We found the switch very easy to set up and manage. The cables, adapters and additional switches can all be hot plugged without affecting other attached devices and the switch starts working as soon as it's powered up with no initial configuration required. LED-equipped buttons are provided for manual port selection with a separate display to show the station ID when several switches are daisy chained together. This ID is worked out automatically so you don't have to set manual DIP switches as on some other low-end KVM products.

As well as selecting the stations manually, you can also use keyboard hot-keys and/or a menu-driven on-screen display (OSD).

The OSD menus are very straightforward, with the computer to be controlled simply chosen from a list. A degree of customisation is also possible. For example, we were able to give each port a user-friendly name and configure up to four users and an administrator, each with their own profile specifying which ports they were allowed to manage.

Performance is good, too. The switch takes just over a second to reset when a new port is selected. An audible beep sounds when this happens.

A port on the front of the switch is provided to enable the firmware to be updated, using a special cable supplied in the box.

Documentation is basic but adequate and we encountered no real problems either installing or using the Aten switch.

Alan Stevens

Details

Price £276.13
Best price www.pcw.co.uk/bestprices
Contact Aten 01753 539121 www.aten.co.uk
Specifications 8-port KVM switch • 1U rack-mount format • Cat 5 cabling up to 40 metres • 8xRJ45 ports • single local console • local PS/2 keyboard and mouse ports • max 1600x1200 video resolution at 60Hz • DB-25 daisy chain ports for expansion (up to 31 switches)

Verdict

Pros Uses standard Cat 5 patch leads to connect to servers; up to 31 switches can be daisy chained together; built-in security
Cons Adapters bump up overall price; single console; maximum 40 metre cable length

Features ★★★½☆
Performance ★★★½☆
Value for money ★★★½☆

Overall The use of Cat 5 UTP cabling makes for simpler deployment of the Aten switch compared with conventional KVM solutions

★★★½☆

NETWORK COLOUR LASER

Lexmark C534dn

Fast monochrome and colour printing in one compact device

The Lexmark C534dn can print documents at up to 21ppm in colour and 22ppm in black and white

Colour lasers for small businesses spend most of their time churning out monochrome business documents. But they also need to be able to add colour and, on occasion, produce professional-looking colour presentations and photographs. The Lexmark C534dn can do all this with speed and ease – and at a price that won't break the bank.

With a 100,000-page duty cycle, the C534dn is a heavy-duty device designed to be shared on a small business Lan, despite being light enough (just) to be lifted by one person. It also comes with the toners already fitted so installation is just a matter of sliding it out of the box, removing the packaging and connecting it to power and Lan outlets.

USB and Ethernet interfaces come as standard on this model, along with an integrated multi-protocol print server, with the usual web-based interface for remote management.

A duplexer, for double-sided printing, also comes as standard and works well. However, the built-in, 250-sheet paper tray isn't up to scratch on a laser designed for shared network use, and we'd strongly recommend the optional extra 550 sheet tray designed to fit underneath. Note though, that when configured to take A4, the paper trays protrude out of the back increasing the footprint by a good three inches.

On the positive side, the front of the main tray folds down to reveal the 100-sheet multi-purpose feeder, which is a very neat feature.

The four toners are readily accessible from the front. Those shipped with it are rated for up to 6,000 pages, with a choice of yield on replacements of up to 7,000 pages for colour (£111.14 ex Vat) and 8,000 pages for the black toner (£95.27 ex Vat). Photoconductor units for the black and colour cartridges are also required every 20,000 pages. These only cost £70.47 (ex Vat) for a full set.

We calculate running costs at about 6.2p per page in general use (excluding paper and power), which is competitive with other colour lasers. And while the cartridges are easy to replace, the process can be quite messy.

When it comes to quality, it's important to stress that, like most business laser printers, you shouldn't buy the Lexmark C534dn solely for professional graphics printing. For day-to-day business documents, however, it's excellent and, when needed, it can also produce impressive colour presentations, with lots of controls to help tweak output. Having said that, however, we found it best to leave these alone rather than waste time and paper trying to improve on the defaults.

Another feature of the C534dn is its intuitive user interface, with a large colour display and associated keypad. Using these, it's possible to hold documents on the printer securely, then have them print by typing in a suitable Pin code. There's also a USB port for walk-up printing of Pdf documents from a memory stick.

On the performance front, the Lexmark laser acquitted itself well. The first page took about 11 seconds to appear, after which monochrome A4 pages are ejected at up to 22ppm and only slightly more slowly (21ppm) where colour is involved. On the downside, printed pages are all dumped into a well on top, with no finishing options available. Nor is it possible to add a custom envelope feeder, which could be an issue for some buyers. *Alan Stevens*

Details

Price £680.33
Best price www.pcw.co.uk/bestprices
Contact Lexmark 08704 440 044 www.lexmark.co.uk
Specifications 21ppm single-pass colour laser (22ppm mono) • Optional extra 550-sheet paper tray • 100,000 pages/month duty cycle • 625MHz processor • 128MB Ram (upgradable to 640MB) • 1,200x1,200 dpi • PCL5c, PCL6 and Postscript Level 3-compatible • USB 2.0 and 10/100Mbits/sec network interfaces • Duplexer • Print Pdf from USB memory key

Verdict

Pros Fast printing of colour and monochrome documents; Pin-controlled secure printing; neat built-in, multi-purpose tray; duplexer; USB memory key interface
Cons Standard paper tray limited to 250 sheets; toner messy to change

Features ★★★½☆
Performance ★★★★½
Value for money ★★★★½

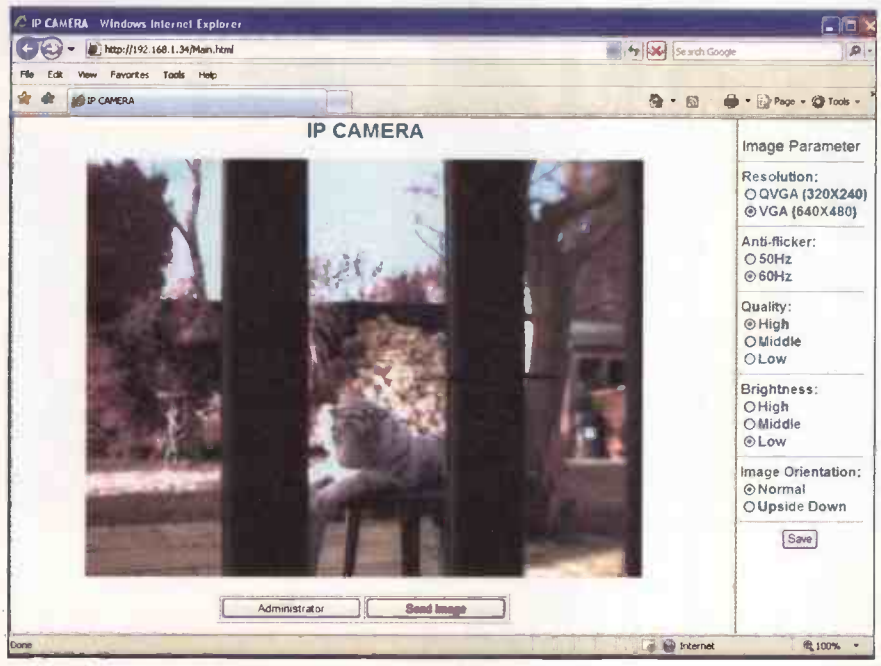
Overall Not perfect, but well up to the task of printing business documents with more than a splash of colour where needed
★★★½☆

SURVEILLANCE CAMERA

Solwise Vesenet Homeplug Camera

Network surveillance for next to nothing... almost

Personal Computer World BUSINESS GREAT VALUE



The Vesenet Homeplug Camera streams video over AC mains wiring

Although not up to professional standards, pictures from the Vesenet are good enough for general surveillance and can be viewed from an ordinary web browser

Network cameras have fallen in price considerably but they can still be expensive, especially wireless products. So at little more than £50 ex Vat, the Vesenet Homeplug Camera appears to be remarkably good value and, although not wireless in the conventional sense, doesn't need a network cable because it sends its pictures over the AC mains.

To be fair, you will need to buy more than just the camera. Another Homeplug compatible adapter is also required to pick up the pictures being transmitted and deposit them onto the Lan. But such adapters are not expensive. A single-port 14Mbits/sec Vesenet adapter, for example, can be had for just £19.20 ex Vat, with a three-port switch available for £34.21 ex Vat. We were also pleased to find that we could use the camera with one of the Netgear Wall Plugged Ethernet switches that we reviewed in the November 2006 issue.

Installation is simple; the camera is simply plugged into a nearby AC socket using the 1.8m mains cable supplied and the second adapter into another socket close to either a network switch or router. That does mean finding suitable sockets and you're not really supposed to use extension leads, but we did and it didn't cause any problems.

A UTP Ethernet lead is then run from the second Homeplug adapter to the switch/router and that's everything set up. The camera and remote adapter simply find each other over the mains wiring and you're ready to start monitoring.

The whole procedure took just a few minutes on our test network and, once installed, we were able to scan for and configure the camera using the Java-based management utility provided. A separate tool is also provided to manage the Homeplug interfaces, and from this we were able to set the passwords used to encrypt the data being transmitted.

Other than that, however, it was simply a matter of pointing a browser at the integrated web server in the camera to see the video images being streamed across the Lan.

On the downside, the VGA resolution image is far from professional CCTV quality, with poor colour and jerky movement. In fact, people walking briskly in front of the camera could hardly be seen at all. However, it's good enough for general purpose surveillance, for example to check on callers in an unmanned reception or keep an eye on a car park.

Another drawback is that the camera itself is quite bulky and is neither water- nor vandal-proof, so it is best located indoors. A useful swivel mount and screws are provided in the box. There's no remote focusing, which meant sending someone equipped with a mobile phone to get it set up correctly.

We would also have liked to see a built-in microphone and speaker, but at this price we can't really complain that they're not included. Similarly, we were disappointed to find that the digital video recorder (DVR) utility detailed in the manual isn't available yet and is likely to be a chargeable extra when it is eventually released.

In its favour, the camera is very easy to configure and can be set up to send images to a preset email address whenever motion is detected.

Overall, although the Vesenet Homeplug is no match for a professional surveillance solution, it does a remarkably good job for very little money, time or effort at all.

Alan Stevens

Details

Price £62.46
Best price www.pcw.co.uk/bestprices
Contact Solwise 0845 458 4558 www.solwise.co.uk
Specifications 14Mbits/sec Homeplug network camera • maximum VGA resolution • manual focus • Homeplug Powerline 1.0 compatible networking • 56-bit data encryption with key management • integrated web server • motion detection and email notification • Java-based management utility

Verdict

Pros Very low cost; uses AC mains wiring to transmit data; accessible from most web browsers
Cons Manual focusing; not waterproof; video recorder utility not currently available; second Homeplug adapter also required

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

Overall Not the greatest network camera we've seen but it does the job, is easy to use and is excellent value

★★★★½

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EDITED BY NIGEL WHITFIELD

HANDS ON

MAKE THE MOST OF YOUR PC

Welcome to another month's Hands On. We have our usual pick of useful information and tips for you this month, including a look at some curious side effects in CSS for web developers, how to make Word do your sums in Word Processing, and how to turn your PC into a Blu-ray player in Performance.

Spreadsheet users can find out all about conditional formatting this month and marvel at some of its many and varied applications. And, in the world of databases, we have a look at Cartesian joins.

There are plenty of tips for Windows and Linux users, too, covering everything from Windows Update to managing your NTFS drives in Linux, plus our Networking column takes a look at Nas solutions. Also this month, both Hardware and Digital Imaging examine some new software.

So read on; whether it's through our columns or Question Time, you'll find something here to help you make the most of your PC.

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Advice from our experts

Take care of your computer problems and discover new ways to use your PC

Some film scanners can handle multiple negatives in one go

DIGITAL IMAGING

Computer age

Q I have a large archive of 35mm black and white negatives, which has built up over the past 40 or so years. There are approximately 800 and, at the moment, they are stored in folders along with some contact sheets.

Can I somehow scan them in batches, store them on disc and print A4 contact sheets?

It's the scanning that's the problem. Once the negatives are loaded the storing and printing is quite straightforward, but there doesn't seem to be a scanner that can handle more than one negative at a time.

Or am I missing something?
Ian Cook

A A film scanner is what you need. The Nikon Coolscan V ED is one we've used in the past. It produces superb quality results, is reasonably priced at less than £450 and, with the optional FH-3 film holder, you can scan a strip of negs.

Generally, flatbed scanners do a passable job of scanning slides and negatives, but because they use a small backlight unit in the lid you can normally only scan one image at a time. They also usually have insufficient resolution to make a decent-size enlargement from a 35mm negative.

One exception to this is the Canon 9950F, which was designed with transparencies and negatives in mind. It has sufficient resolution to make good-quality enlargements from 35mm originals, and its large film adapter unit can scan up to 30 35mm negs in one go. It incorporates FARE level 3 dust and scratch removal – a must for scanning negs and slides – and, as a final plus, you can use it to scan prints and other reflective material, too. The 9950F retails at about £300.

HARDWARE

Set up

Q Here's a hardware challenge for you. I no longer want the complexity of managing a separate desktop and a laptop. So what arrangement should I aim for with the laptop as my main machine, but which has adequate video oomph to drive twin monitors for MS Flight Simulator?
Gary Moore

A Most laptops are happy to drive an external monitor in addition to their main display, but if you want to drive matching twin monitors in addition to, or instead of, your laptop's main screen, you'll need additional hardware. *PCW* Deputy Editor Kelvyn Taylor suggests a Matrox Dualhead2go, a palm-size box that costs about £100 and equips laptops (or desktops) with the ability to drive a pair of external monitors. The Triplehead2go version supports three monitors, although both models can only support analogue VGA connections to your external displays.

'Most laptops are happy to drive an external monitor'

Both devices also only handle the connectivity side of things, so the actual desktop generation and 3D work remains entirely down to your existing graphics chipset. Most desktop graphics cards are more than capable of the job, but laptops may struggle a little when stretching their traditionally lower power 3D capabilities across twice as many pixels. If Flight Simulator runs smoothly on your laptop's screen, it's worth a shot, but if it already runs slowly, the Matrox devices just mean any frustrations will be expanded across two screens rather than one. For the greatest gaming power and flexibility, you still can't beat the potential of a desktop.

Slave to the Sata

Q I am contemplating building a new PC with a Sata hard disk and I understand these drives don't use Master and Slave settings. Are there any special Sata drivers required during the installation of Windows XP and, if so, what is the procedure for setting one up on a clean machine? Also, if there's more than one Sata drive attached, how does the system know which one has the operating system installed on it?
Neville Haneef

A You're right that Sata drives don't employ Master and Slave settings like older parallel ATA drives. Instead, you'll just have one cable between each Sata drive and the controller card or motherboard; the cables are much slimmer, though.

Most Sata ports on a controller card or motherboard are labelled as Sata0, Sata1 and so on, and the disk connected to port 0 normally contains the operating system. However, some motherboard Bios settings will let you choose which Sata disk to boot from.

As for setting up a clean system, you have two options. If you set the Sata mode to IDE in your motherboard's Bios, Windows XP should treat the drive as a standard IDE hard disk and will install without the need for drivers. This may be the easiest approach, but in IDE

mode you won't get the full performance benefit of a Sata hard disk. For this you need to set the Sata mode in your motherboard Bios to AHCI, although Windows XP will then need to be provided with a driver for the disk controller during its initial installation. This driver will be included with the motherboard or controller card, although you should be able to download it from the manufacturer or chipset websites. If the motherboard uses an Intel chipset, visit Intel's support section to download the latest version.

Annoyingly, Windows XP and previous versions will only accept this driver on a floppy disk, so you'll need a floppy drive on your new PC and a floppy disk with the drivers already on it. If you wish to pursue this route, you'll need to press F6 during the initial Windows setup, and you'll later be prompted for the floppy disc.

Sky's the limit

Q I'd like to build a media server that records TV, but living as I do, tucked away in the Welsh hills, terrestrial signals don't get through. Is there a TV card that can record two satellite channels at once but requires no Sky subscription?
Barrie Potter

A Since Sky restricts its encryption systems to proprietary set-top boxes, the only satellite TV you'll be able to receive and record using a PC in the UK will be free-to-air channels, so at least you won't need that subscription.

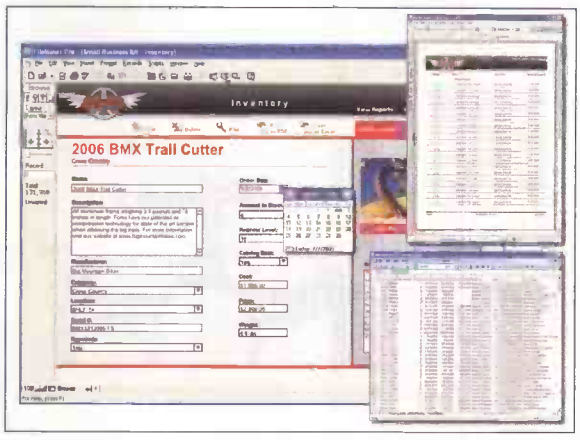
There are a handful of satellite tuner cards that can receive and record free-to-air satellite channels using an existing dish, but the best-known of these is the Hauppauge WinTV Nova S Plus. This PCI card works under Windows XP Media Center Edition 2005 and the Hauppauge website says a pair could be used in one system, although we haven't verified this ourselves – see **www.hauppauge.co.uk/pages/products/data_novasplus.html**. Black Gold and GTA are also working on a Quad Tuner Satellite S2 PCI Express card, but we have no further details at the time of writing (see **www.gta-ltd.co.uk**).

Without an official Sky box, you won't be able to receive anything other than free-to-air satellite, so there's no Channel 4 or five

Database makes no sense

DATABASES

Q I have a serious need for a simple database on which to recreate my telephone list. Ideally, it will have about four or five fields, sortable by surname and printable on A5 by first letter of surname per sheet. At the moment, the contacts area of Outlook is more like a filing system for commercial spooks than one to suit my requirements. Also I do not need to deal with the complexity of "getting inside a relational database". All I want is something as straightforward as Reflex used to be. I have also tried Excel, but it proved very complex and limiting. Help!
Dr Henry Changler



For a simple address database, there are plenty of alternatives to Outlook

A Recommending a database package is always a problem; people's requirements differ so. The answer I would normally suggest is Excel, but you've already tried that. Most (even simple) database packages are more complex, but should prove less limiting. You might want to look at products such as Cardbox, Filemaker and the database part of Microsoft Works as possible alternatives.

LINUX

Bug in me system

Q I am running Ubuntu (Edgy Eft) on an AMD64 PC with an Nvidia 6600 graphics card. I've tried installing from the desktop CD, and all of my hardware is recognised and working. Occasionally, after a few minutes, especially when moving windows about, things freeze up. The mouse pointer still works, but I can't do anything else. I tried reinstalling but have the same problem. What can I do?
Robin Stephens

A Since your mouse pointer is still working, this problem is almost certainly to do with the graphics drivers. You should install the Nvidia binary drivers, which are not installed by default for licence reasons. Open a terminal and run `sudo apt-get install nvidia-glx` to download and install these drivers. The easiest way to configure them is a quick hack – run `sudo gedit/etc/X11/xorg.conf` and replace 'Driver "nv"' with 'Driver "nvidia"' and save and exit. Next log out and reboot to ensure the new drivers are in use. Not only do you get stability, you also get better performance and accelerated 3D support.

SPREADSHEETS

Ready let's go

Q I want to be able to insert into Excel the actual time a competing cyclist passes the finish line. I tried the NOW( ) function, but that just constantly updates. I can insert the time using Ctrl & Shift & :. Having formatted the cells to show hh:mm:ss I assumed that would work, but it only gives me hh:mm and I need to record seconds and fractions of seconds. There must be a way of doing this, surely?
Susan Walker

A The keyboard shortcut for time is a macro that only displays the hour and minutes. However, you can record seconds, and fractions of seconds, if you create the Custom Format, h:mm:ss.000 and then enter the time taken. If a cyclist takes one hour, 20 minutes and 15 point one two five seconds, enter ↘

1:20:15.125 and a correctly formatted cell will display 1:20:15.125 in the time format, although the Formula Bar will only show 1:20:15. You can look at the recorded time number using Tools/Options/View/Formulas. This example will show 0.0557306134259259. Excel records time as a fraction of a day to 16 decimal places. This means you can enter fractions of seconds to three decimal places.

The price is right

Q I need to make an Excel worksheet that calculates motor insurance premiums.

Different percentage rates apply according to the value of the car. I have a range of minimum and maximum price points in columns A and B. The equivalent percentage to use for each price band is shown in column C. If a car is valued at £19,000 and that value is entered in cell D1, what formula should I use in cell E1 to tell me that the correct premium percentage in this case is 2.90%?

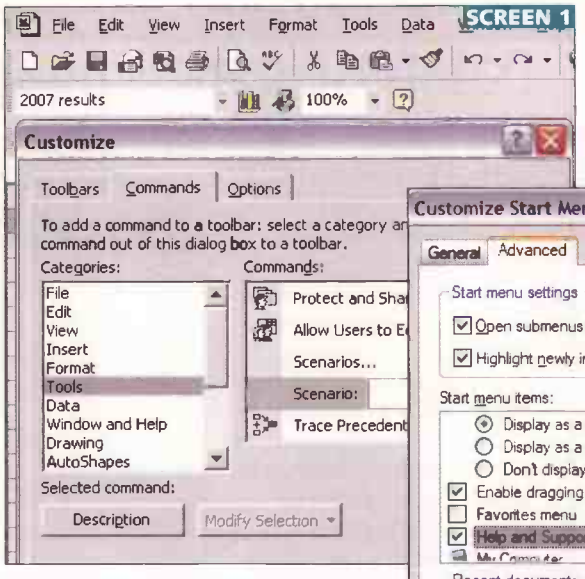
Michael Makriyiannis

A If you use the VLOOKUP function, you don't need two columns showing the maximum and minimum values of each price band. You can just enter the thresholds in column A as shown in the illustration. If **VLOOKUP** can't find the value you enter in cell D1 within column A it will use the largest value that is less than that value.

Leave column C blank. Enter **=VLOOKUP(D1,A1:B5,2)** in cell E1. Enter 19000 in cell D1. You'll find you'll see the same answers as indicated in the example you have provided to me

Quick access

Q I use Scenarios in Excel but would like to be able to access my Scenarios quickly.



Create a drop-down box of your Scenarios

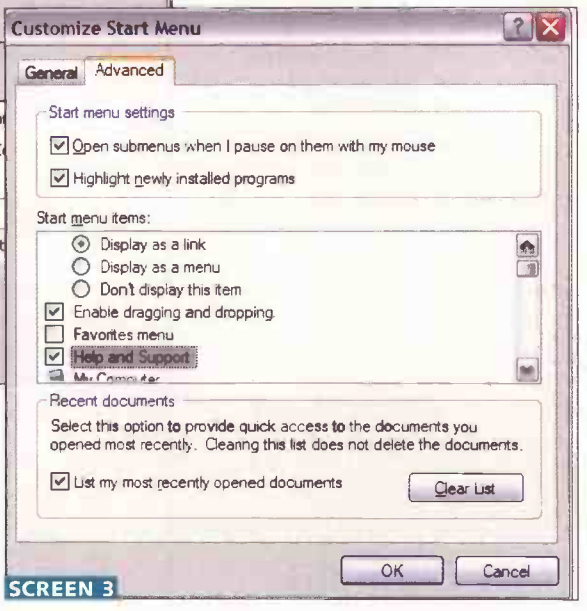
Is it possible to create a dropdown list of all the Scenarios in a workbook? I'm using Excel 2002.

Nina Beck

A Very easily. Choose Customize on the Tools menu. In the dialogue box, under Categories: in the left-hand area choose Tools.

In the right-hand area, choose the listing for a Scenario dropdown box and drag this up to the Standard toolbar.

Close the dialogue box. To use the new tool, click the arrow on the right-hand side of it. A list of your Scenarios will be offered in the box from which you can choose.



Restoring 'Help & Support' to the XP Start menu

WINDOWS

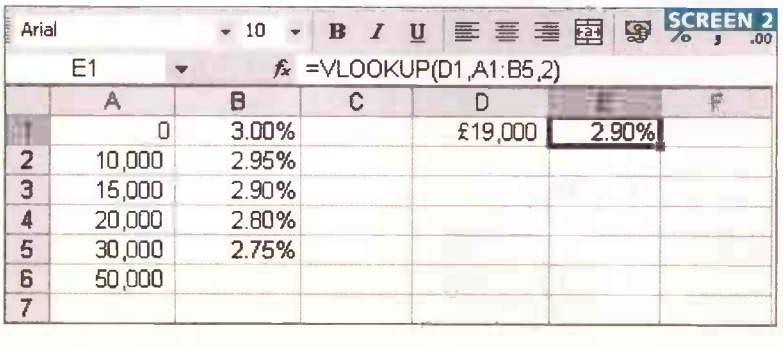
Up the junction

Q I have a Windows XP problem, which is that my 'Help and Support' in the Start menu has vanished. Please tell me how I can get it back?

Peter Benda

A Right-click on the Start button and choose Properties. You should have the Start menu rather than Classic Start menu enabled, as 'Help and Support' is always present in the latter.

Click the Customise button, then go to the Advanced Tab. Scroll through the list of Start menu items and put a tick in the box next to 'Help & Support', then OK back through the two dialogues.



	A	B	C	D	E	F
1	0	3.00%		£19,000	2.90%	
2	10,000	2.95%				
3	15,000	2.90%				
4	20,000	2.80%				
5	30,000	2.75%				
6	50,000					
7						

Finding an insurance premium percentage

Vision of division

Q I am running XP Pro with three normal users. Is it possible to set up each user so they can each have different applications loaded at startup?

Also is it possible to configure the system so that user A can access, say, iTunes and Openoffice, while user B can access, say, Family Tree Maker and Openoffice, but not iTunes and user C can access all three applications?

Peter Voice

A Yes – all of this is possible. Each user has their own Start menu folder in Documents and Settings \username \Start Menu \ Programs, which can contain shortcuts to just the programs required without showing any others.

The Startup subfolder of this can likewise contain shortcuts to different applications. Any shortcuts in the 'All Users' Start menu folder and subfolders will be accessible to everyone.

WORD PROCESSING

Say anything

Q Does Openoffice have an equivalent to Word's '=rand(x,y)' to produce some dummy text?
John Clarke

A For those unfamiliar with the Word dummy text feature, typing on a new line =rand(x,y) where x and y are numbers, and then pressing Enter, will produce x paragraphs each consisting of y sentences of 'The quick brown fox...'. Openoffice (and, as our screenshot shows, Staroffice) has an equivalent feature. Type DT followed by F3. This will produce a racy 290-word Autotext entry.

What kind of file?

Q While looking to back up my Word 2003 Autocorrect (.ACL) files, I found a set of .PIP files in the same folder. What are these and should I back them up?
Phil Weaver

A These files store personalised menus; that is, Office menus that show your most-used choices first followed by the full menu after a pause or clicking on the arrow at the bottom. If you don't have this option enabled (Tools, Customise, Options) then you can safely ignore these files.

My style

Q Much as I like the new themes and fonts in Word 2007, I would prefer to have a serif font as the default – such as Cambria – and keep the sans serif Calibri for headings. However, the default seems to be the other way round. How can I change this?
V. Waldorf

A There are several ways. First, if you go to the Page Layout ribbon and click on the Fonts button in the Themes section, you'll find you can change to the Office 2 theme, which swaps these two fonts, but only for the current document. If, however, you go to the Fonts section of the Home ribbon and click the small arrow bottom-right of the Font section, you'll get the familiar Word font dialogue, where you can choose a font, then click the Default... button to make this the default font for all new documents based on the Normal template. Alternatively, if you've upgraded from a previous version of Word, you can carry on as if nothing had happened by going to Word Options in the Office menu, then at the very bottom of the Advanced section, click File Locations. You will then be able to change the 'User Templates' folder to where you stored the templates for your previous version.

An on-screen keyboard

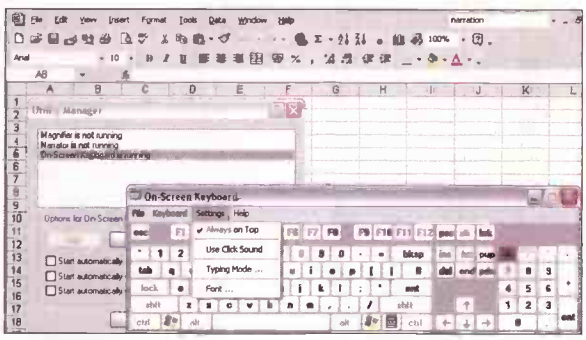
SPREADSHEETS

Q I am using Office XP running under Windows XP. Is it possible to display a working keyboard on the screen for use with Excel?
Cathy Russell

A Certainly. You can display this keyboard by clicking Start, then pointing successively to All Programs, Accessories, Accessibility, and then clicking On-Screen Keyboard. Alternatively, with the standard Microsoft keyboard, press the Windows key and U together.

This displays the Windows Utility Manager. It offers three utilities to help the disabled, including the On-Screen Keyboard you are looking for. With a mouse or joystick you can click the on-screen keys to type text. In scanning mode, the utility continually scans the keyboard and highlights areas where you can enter keyboard characters by pressing a hot key or using a switch-input device. In hovering mode, you can use a mouse or joystick to point to a key for a predefined period of time, and the selected character is typed automatically.

With your speakers switched on you can choose whether or not to hear an audible click when you select a key.

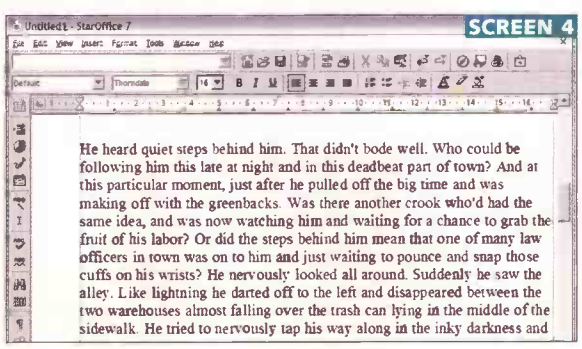


Displaying an on-screen keyboard

Way out

Q I use Word 2002 and Avery L7160 labels. If I select an address in a Word document and use Tools, Letters and Mailings, Envelopes and Labels, Labels to print a single label, the text prints bang on the left-hand side of the label, or even off the edge. Word is set up to use the built-in L7160 label layout, and I can only overcome the problem by inserting a few spaces before each line of the address. Should this be necessary?
Bill Dover

A Not really, but mistakes do slip through. You can correct a misplaced label by clicking Options in the Envelopes and Labels dialogue, and choosing a label. Click the New label button, increase the left margin a little, then save the label as a custom format.



Dummy text in Staroffice and Openoffice

LET US HELP YOU

All our experts welcome your queries. Please respond to the appropriate address below

Databases database@pcw.co.uk
Digital imaging & video digitalimaging@pcw.co.uk
Hardware hardware@pcw.co.uk
Linux linux@pcw.co.uk
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Hyperactive hyperlinks

We solve an unusual hyperlink problem and help you with Windows Update

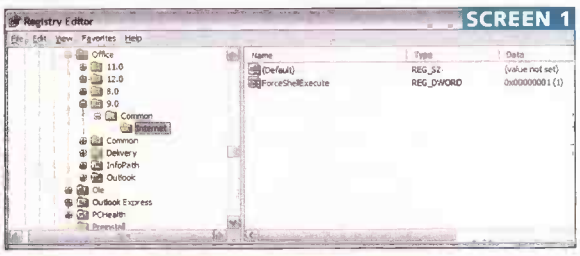
Here's a piece of weirdness I've been investigating with our spreadsheet columnist, Stephen Wells. And since we couldn't decide whether this was a Word or Excel problem, it has wound up here.

As you doubtless know, you can put hyperlinks to a file on your hard disk into an Excel Worksheet or Word Document. If you click on such a link (Control & click in some versions of Word) then the file will open in its associated program. Except, as reader Geoff Legget found, it didn't.

Geoff had a database of about 4,500 photos in Excel, with a hyperlink to each one. He had set Irfanview as the default program for all images, and opening any image from Windows XP Explorer did so in Irfanview. Excel and Word, however, opened the linked images in Microsoft Photo Editor, which Geoff found rather annoying, especially as the latter defaulted to showing a small corner of the full-size picture rather than Irfanview's scaled-to-window version. Other users have reported a similar problem in that linked images open in Internet Explorer, each in a separate instance.

So, having inserted a few image hyperlinks into one of my own documents, I found I had a similar problem to Geoff. Some files that normally opened in the Windows Picture and Fax viewer were going to Paint Shop Pro when hyperlinked. After a fairly thorough look at file associations in Explorer and in the Registry, I was getting nowhere. So, I asked around and discovered the following Registry tweak (screen 1).

First, create a System Restore point, then Start, Run regedit. Go to HKEY_LOCAL_MACHINE\Software\Microsoft\Office\9.0\Common\Internet and create a new DWORD value named ForceShellExecute.



Double-click on this and give it a value of one, then close the Registry editor. You will probably have other version numbers of Office as Registry keys. I was using Office 2003 and had keys for 8.0, 9.0 and 11.0. Adding the key to 11.0 didn't work, but adding it to 9.0 caused the hyperlink associations to correspond with the Explorer associations. This should also work for Office 2000 and Office XP.

A related annoyance is that when you try to open a hyperlinked Tiff file you get a warning that 'Some files can contain viruses or otherwise be harmful to your computer. It is important to be certain that this file is from a trustworthy source'. Sound advice though this may be, it gets rather tedious to read it and confirm every time you open a link to one of your own trusted Tiffs (see screen 2).

This only happens in Office 2003, and this time you don't need any Registry editing. In Explorer, go to Tools, Folder Options and turn to the File Types tab. Scroll down to Tiff, and click the Advanced button. In the 'Edit File Type' dialogue that appears, clear the 'Confirm open after download' box. OK out of this dialogue, then close folder options.

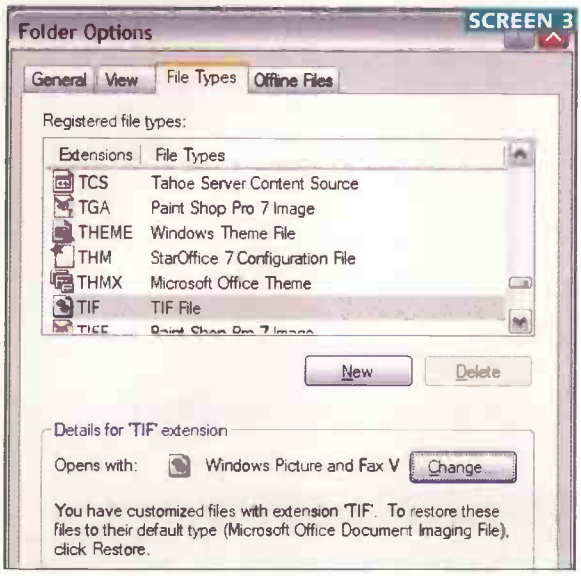
Top: Normalise the behaviour of Office hyperlinks with a simple Registry tweak

Above: Turning off this irritating warning in Office 2003 is straightforward

There is a further catch here, and it's one of Microsoft's finest. If you've changed the file association from what Microsoft considers to be the default (usually Microsoft Document Imaging for Tiffs), then you don't get an Advanced button – you only get a Restore button to return to the default association (see screen 3). So here's what you do. Click on that Restore button, and you'll get the Advanced button back and can do the necessary as per the previous paragraph. Now click on the Change button – for maximum satisfaction whistle nonchalantly as you do this – and select the application you want as the default. Make sure the 'Always use...' box is ticked and click OK. You'll be back with your chosen association, but the 'Confirm open...' setting will stick, and you won't get the warning message anymore.

Paranoia corner

If you log on to a secure website – such as your bank – you will often find that as well as a normal username and password you have to enter several letters chosen at random from a further password or item of 'memorable information'. You can't type these in – you need to choose them from a list. Though this may be irksome, there is a reason for it. Keylogging software (or hardware) can intercept everything you type, but it's far more difficult – though not impossible – to intercept mouse movements. So, if this is a possible worry in other situations – entering credit card details, for example – then why not try the Windows On-Screen Keyboard (OSK)? You'll find it in the Accessories, Accessibility section of the Start Menu. Note that you can set it to be 'Always on top' in the Settings



Above: The Windows on-screen keyboard can relieve your online security concerns

menu and that you don't even have to click on the keys – there's a 'hover' option. You do, however have to switch focus to the target window before you start using the OSK (see screen 4).

Who stole the advanced button?

'Automatic Windows XP Updates are fine – when they behave'

Taming Updates

Automatic Windows XP Updates are a fine thing – when they behave properly. Generally, I find the process completely painless. There are a number of ways you can tame Updates, via Control Panel, Automatic Updates or via the XP Security centre. I find the most useful option is to download the updates automatically, but ask before installing.

One major annoyance is when an update needs a reboot and Windows puts up a little notice telling you about this. You happen to be rather busy, so you tell it to come back later, which it does with annoying regularity – every five minutes by default. Other users have reported that Windows has rebooted while they were away from the PC and that they lost data. I haven't had this happen, but then I always hit the save button on anything I'm working on before taking a break. However, I have had the nuisance of having to relaunch applications, open files, find the web pages I had open and so on. If you suspect this has happened, rather than a power failure or a poltergeist, look in the event log for items that have Windows Update Agent as the Event Source and 22 as the Event ID.

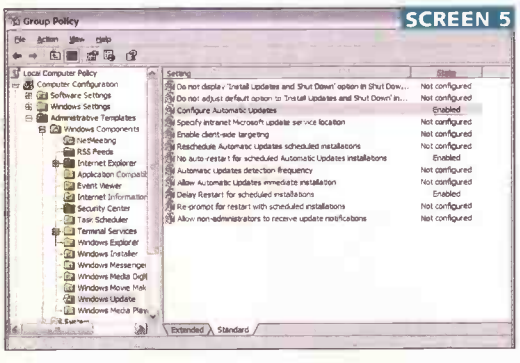
It will come as no surprise that there are Registry settings to control this behaviour, but it's not a simple matter to set them up directly, as it involves creating two keys and seven values. The smart way is to be logged on with admin status and use the Group Policy editor (Start, Run, gpedit.msc). First you need to burrow down through Computer Configuration, Administrative Templates, Windows Components, Windows Update (see screen 5). Before any other settings will take effect, you need to make sure 'Configure Automatic Updates' is enabled. Even if you have done this through Control Panel it may not appear here, so double-click on the entry and click the Enabled option. The settings below should now reflect your choices in Control Panel – rectify if not so (see screen 6). Next, open the 'No auto-restart...' item and enable that. This will prevent Windows automatically rebooting if anyone is logged in. Finally, you can also tweak the nag frequency – double-click on 'Delay restart...' and you'll find you can wind this up to 30 minutes.

Cache and carry

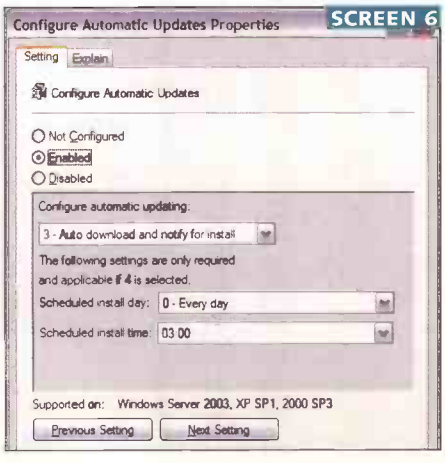
Since the dawn of time Internet Explorer has 'cached' images and other content from websites in the Temporary Internet Files folder – the idea being that if you revisit a page you don't have to download its contents all over again. But if you've moved to Mozilla – which at the time of writing has 31 per cent of the browser market – then it's not that easy to find the cache. In the current version, 2.0, you'll find it in your profile under Local Settings \Application Data \Mozilla \Firefox \Profiles \profile.name \Cache. However, that is quite a journey. I make it nine levels down from 'My Computer' and when you get there you are in for a disappointment, as the files don't have meaningful names or any extensions.

Fortunately, there's a much smarter way to do this. Just type 'about:cache' in the Thunderbird address bar and hit Enter. You'll get info on the size and number of entries in both the disk cache and the memory cache. You can expand these to see the details of each entry – URL, size, modification and expiry dates and fetch count – the number of times the item has been retrieved from the cache. Two more clicks will retrieve the item for view in the browser, so you can see what exactly your kids have been up to.

Here's another Firefox tip – you don't have to go to the Edit menu or even use two fingers (Control & F) to do a 'Find in page'. Just type a forward slash followed by the text you're looking for. As you add letters, Firefox will home in, highlighting the found string; for example, typing /windo might make it jump from wit to wine to wind to Windows. **PCW**



Above: group policies for Windows Update



Right: configuring Automatic Updates

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.

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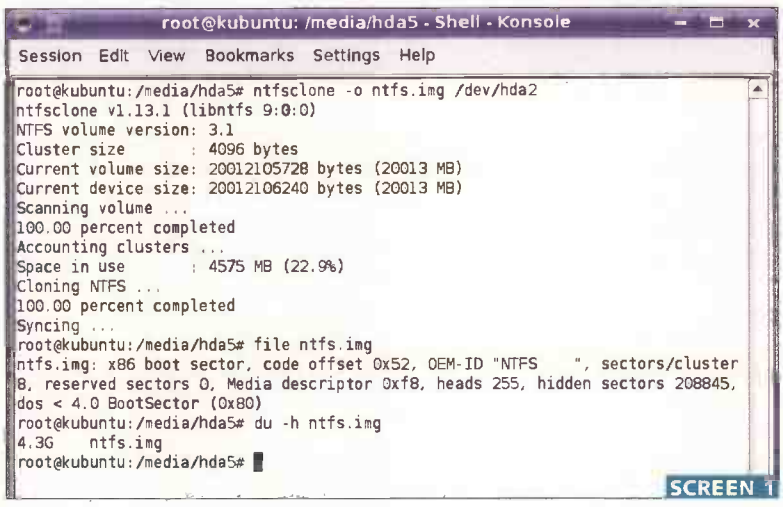
Send in the clones

A look at the ins and outs of running other operating systems alongside Linux

Recently, we looked at setting up hard drive partitions on a PC, with dual-boot configurations for Linux and Windows installations on the same drive – an extremely common occurrence. We have also seen how to get read and write access to NTFS, the filesystem used by Windows XP and Vista, from within Linux. This month we'll delve further and see how to manage dual-boot setups more easily.

A few months back the Linux NTFS project (**www.linux-ntfs.org**) released beta drivers for full read-and-write access to NTFS partitions. Previously, read-only support was offered in the kernel, with write support considered unstable and for developers only. The great news is that in February the new drivers, known as ntfs-3g, became stable and version 1.0 was released. This finally removes the need to have a FAT32 partition for people who want to exchange data directly between their Windows and Linux installations. While adequate for small devices, FAT32 is not resilient enough for a modern large filesystem. Head over to **www.ntfs-3g.org** for more details on the new driver.



Ntfsclone is a powerful tool to back up only the used data on an NTFS filesystem

NTFS cloning

If you have installed Windows XP before, you will be familiar with the tedium involved: a long installation procedure, many driver installations to get the most basic hardware operating, and frequent reboots in between. If you find yourself having to reinstall Windows a lot, all of this can be avoided by cloning the partition in Linux once the installation is finished. As with the standard 'dd' command, this makes an exact copy of the partition that can be saved elsewhere on the disk, and later placed back to restore the partition to the same state. The Linux NTFS project provides a utility called ntfsclone, which performs this task for you. The difference with dd is that ntfsclone understands the filesystem and, as a result, it doesn't need to duplicate the entire partition. It needs only to save the used parts. On a fresh installation this is particularly effective. If you have created a 60GB partition for Windows, the fresh install is probably using no more than about 3GB of that. Using dd would mean duplicating the entire 60GB somewhere else, while this tool requires only that 3GB of spare space.

You can get hold of the latest version of ntfsclone from **www.linux-ntfs.org**. It is part of ntfsprogs, an open-source suite of tools to manipulate the NTFS filesystem. In Ubuntu you can obtain a recent version by running sudo apt-get install ntfsprogs; unless you are running Feisty Fawn it is unlikely to be the latest. An alternative is to download the latest source code and build and install it yourself. You can do this with the usual 'configure and make' procedure.

The command is very simple to use. Specify the output file after -o (or —overwrite if it already exists) and provide the device name for the NTFS filesystem; for example, if /dev/hda2 is the device and ntfs.img is the file we want to create:

```
$ sudo ntfsclone -o ntfs.img ↙
/dev/hda2
```

(Key: ↙ code string continues)

Any raw access to a partition requires root privileges; hence, sudo is used above. See screen 1 for the command in action, this time running as the root user. Here we can see that the partition size is 20013MB (roughly 20GB), but only 4575MB is in use. After creating the image, using the file command on it reveals that it is a bootable NTFS image, just as would be produced with dd. However, using the du (disk usage) command shows that just 4.3GB of space is taken up with the image file. To write this image back to the partition simply reverse the options, using —overwrite instead, since the target file (the partition itself) already exists:

```
$ sudo ntfsclone –overwrite ↙
/dev/hda2 ntfs.img
```

This copies the clone back to the partition, thus restoring you to your fresh install automatically in about 30 seconds, and without a single reboot. Of course, this

Find the exact start and end sectors for partitions using the fdisk command

SCREEN 2

root@kubuntu: ~ - Shell - Konsole

Session Edit View Bookmarks Settings Help

```
root@kubuntu:~# fdisk -ul /dev/hda

Disk /dev/hda: 251.0 GB, 251000193024 bytes
255 heads, 63 sectors/track, 30515 cylinders, total 490234752 sectors
Units = sectors of 1 * 512 = 512 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/hda1              63      208844      104391   83  Linux
/dev/hda2   *      208845    39294989    19543072+   7  HPFS/NTFS
/dev/hda3        39294990    78381134    19543072+  83  Linux
/dev/hda4        78381135   490223474   205921170    f  W95 Ext'd (LBA)
/dev/hda5        78381198   273715469    97667136   83  Linux
/dev/hda6       273715533   295210439    10747453+   b  W95 FAT32
/dev/hda7       295210503   334280519    19535008+  83  Linux
/dev/hda8       334280583   357719354    11719386   83  Linux
/dev/hda9       357719418   383118119    12699351   83  Linux
/dev/hda10      383118183   392885639     4883728+  83  Linux
/dev/hda11      392885703   476487899    41801098+  83  Linux
/dev/hda12      476487963   480455954     1983996   82  Linux swap / Solaris
/dev/hda13      480456018   490223474     4883728+  83  Linux
root@kubuntu:~#
```

procedure is great for regular backing up of NTFS partitions, too, and may be particularly useful before making major changes to your Windows installation, should things go wrong.

Moving clones

The method above works perfectly when you restore an image to where it originally came from. It also works fine if you want to move standard NTFS partitions about on a disk, or even to a new disk. However, if you write a cloned image to a different place you will not be able to boot from the new partition. This is because Windows XP stores information in the boot sector of the partition about where the partition is on the disk. If you move the partition to anywhere else, this information no longer reflects the actual state, and rather than correct it, XP simply refuses to boot at all. The ntfsclone documentation itself mentions this issue, stating: "ntfsclone is a filesystem, not a system utility. Its aim is only NTFS cloning, not Windows cloning."

'Editing raw data on the disk directly isn't for the faint-hearted'

The way around this is not for the faint-hearted as it involves editing raw data on the disk directly. It does work, however, and so long as you are careful about what you do, and follow the instructions fully, there should be no risk to your data.

The best way to get to grips with the rather complex procedure is to follow an example. With the command above, a 20GB NTFS partition (/dev/hda2) was cloned to a file named ntfs.img. The first step in moving the data is to find out where on the hard drive the new partition physically sits. If you run the command fdisk -ul /dev/hda you will see the partitions listed, together with the sector at which they start and end (see screen 2). In this example we will assume that the cloned partition is going to be written to /dev/hda3, which is the same size as the original.

The fdisk command shows that partition hda3 begins at sector 39294990. But our clone's boot sector still points to /dev/hda2. If you refer back to screen 1, you can see that the file command mentions 'hidden sectors 208845' for the cloned data, which matches the starting location of /dev/hda2 (as shown in the fdisk output). It is necessary to modify the data on the new partition so that it too matches the new position on the disk.

Unfortunately, things become more complicated at this point. We cannot simply write 39294990 onto the disk, it must first be converted to hexadecimal and the partition edited using a binary hex editor. Convert the figure to hexadecimal using a utility such as kcalc, or just enter '39294990 to hex' in Google. For our example disk, the sector start in hexadecimal for /dev/hda2 is 0x32FCD and for /dev/hda3 is 0x257980E. After the cloned image is written to the new partition, run the hexedit tool on it to change the boot sector:

```
# hexedit /dev/hda3
```

Note that you are now editing the contents of the disk directly, so take extra care. The bytes that must be changed are the four bytes beginning at position 0x1C, so move the cursor over to this point, as shown in screen 3. These four bytes represent the starting sector of the partition. To make things even more complicated, the hexadecimal pairs are stored in reverse order, so rather than 32FCD (the starting sector for hda2) we have CD 2F 03 00. In other words, the pattern AaBbCcDd is stored as DdCcBbAa, with zeroes to fill any space. The hda3 partition begins at sector 0x257980E, as we saw above. This is therefore written 0E 98 57 02, and these figures need to replace the old values. Once edited, save and exit with Ctrl & X. The new partition is now bootable.

For this method to work you must ensure that the drive letter in Windows doesn't change. If your original installation booted with drive C:, so must the new one. Windows is fussy about this. You must also change the partition type to NTFS. In our example it was marked as Linux; you can fix this with the fdisk program.

While this procedure is far from simple, it is very useful if your disk layout needs to change (such as adding a new drive) and you want to restore a previous installation. Note that these steps are necessary only when you want to move a bootable NTFS partition. If you don't need to boot the partition, you need only write the partition back with ntfsclone. The data will be fully available to Windows, whether the partition is bootable or not. **PCW**

SCREEN 3

root@kubuntu: /media/hda5 - Shell - Konsole

Session Edit View Bookmarks Settings Help

```
root@kubuntu:/media/hda5# ntfsclone -o ntfs.img /dev/hda2
ntfsclone v1.13.1 (libntfs 9:0:0)
NTFS volume version: 3.1
Cluster size       : 4096 bytes
Current volume size: 20012105728 bytes (20013 MB)
Current device size: 20012106240 bytes (20013 MB)
Scanning volume ...
100.00 percent completed
Accounting clusters ...
Space in use       : 4575 MB (22.9%)
Cloning NTFS ...
100.00 percent completed
Syncing ...
root@kubuntu:/media/hda5# file ntfs.img
ntfs.img: x86 boot sector, code offset 0x52, OEM-ID "NTFS    ", sectors/cluster
8, reserved sectors 0, Media descriptor 0xf8, heads 255, hidden sectors 208845,
dos < 4.0 BootSector (0x80)
root@kubuntu:/media/hda5# du -h ntfs.img
4.3G    ntfs.img
root@kubuntu:/media/hda5#
```

Shell

Edit an NTFS boot sector directly with hexedit

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.

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Start at the very beginning

What you need to consider before taking the plunge with Vista

Like many people, I've spent the past few weeks installing Windows Vista on my PCs and, like many, I've enjoyed varying degrees of success – from no problem at all to utter frustration. Since this is a subject which will inevitably run and run, I'll keep you updated in future columns, but I have devoted this month's edition to problems you may discover when first installing Vista.

Compatibility issues

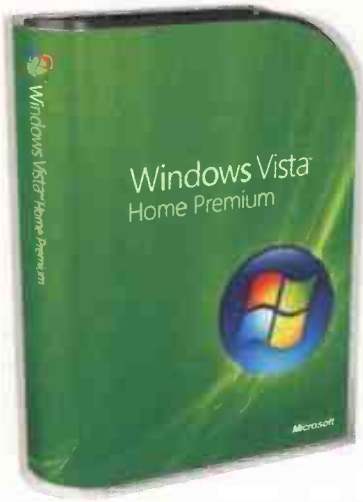
If you're installing Vista on an older system, you'll have two main hardware concerns: first, whether it will be fast enough; and second, how much of it will be compatible with the new operating system. With Microsoft making big claims about driver support, many people assume the former is the more important matter. But in my experience so far, support for older devices is the biggest issue of all.

Don't get me wrong, Vista likes plenty of hardware muscle at its disposal, especially Ram, but after installing it on several systems, I'm still surprised by the number of older devices that worked fine under P, but refuse to play ball with the new operating system. So, if you're thinking of installing Vista, the first thing you should do is run Microsoft's own Windows Vista Upgrade Advisor tool from **www.microsoft.com/vista**. Don't forget to connect all the peripherals you intend to use.

Beyond this you should check the support pages of your various device and peripheral manufacturers to see if there are any specific Vista drivers or comments concerning support.

Older, more obscure devices may never be supported but, worryingly, many common products can also cause problems.

For instance, although I use broadband to connect to the internet, I still like to have a 56k modem for sending the occasional fax.



Before installing Windows Vista on an existing PC, you should carefully check all your devices and peripherals for compatibility

My particular fax modem is a Dabs Value PCI card employing a popular Conexant chipset, but Vista refused to see it. I then, perhaps rather foolishly, tried to provide Vista with the latest XP driver and it virtually locked up the entire system. One swift device removal later and my system was running smoothly again, but any hope of sending faxes with my old modem had been scuppered.

Next up, the Promise Supertrak EX8350 Raid controller card featured in an earlier Hands On column was again unrecognised by Vista, despite it being a modern card from a well-known manufacturer. Promise assures me that a driver will be available on Windows Update by the time you read this, but why wasn't it there, or on the Promise website, from day one?

Then there were my Black Gold digital TV tuner cards. Pairs of these are found in media center PCs because they work without problems. They're a popular choice for DIY enthusiasts and system builders, but despite the manufacturer's efforts, you won't get two operating simultaneously under Vista Media Center.

So, if you're 'upgrading' MCE 2005 to Vista and currently employ a pair of Black Gold PCI TV cards, you'll lose the ability to record two shows at the same time. Newer Black Gold cards, which offer dual tuners on a single card, work fine under Vista, but if you've got the older single tuner PCI models, you'll only be able to use one of them under Vista.

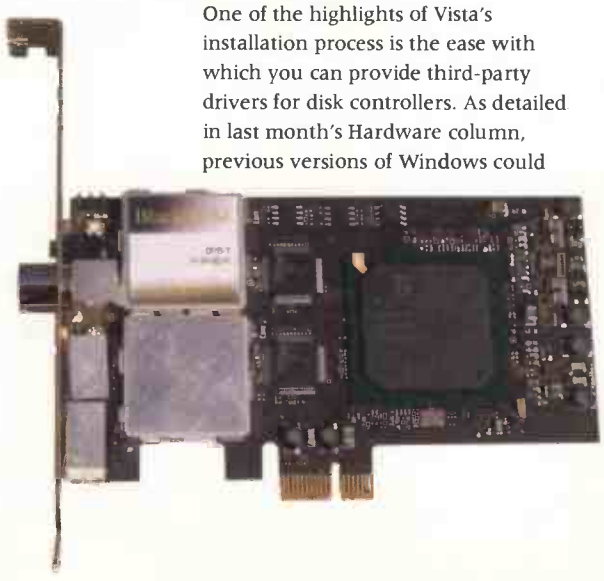
Upgrading to a dual tuner card may not be that straightforward for owners of older motherboards either, because many dual tuner cards require a PCI Express slot. It's for all these reasons that my own media center PC is sticking with MCE 2005.

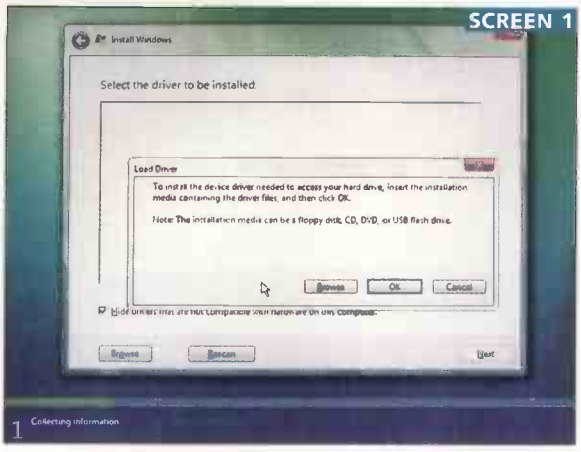
I should also mention that my admittedly ageing webcam and USB video capture box didn't work under Vista, and due to their vintage I'm not expecting this situation to be resolved in the future. Both worked fine under XP though. The moral, therefore, is to check very carefully for support for all your devices and peripherals, or you could end up either unable to use several of them, or forced into buying newer models.

Many media PCs use a pair of Black Gold PCI TV tuner cards, but Vista will only support one of them. To record two channels simultaneously, Vista prefers the dual tuner version, similar to the model pictured

Hard disk controller driver

One of the highlights of Vista's installation process is the ease with which you can provide third-party drivers for disk controllers. As detailed in last month's Hardware column, previous versions of Windows could





only accept third-party drivers from a floppy disc, with the catch-22 being that there are few, if any, modern PCs equipped with a floppy drive.

While Vista still accepts drivers from a floppy disc, you can now alternatively supply them from CD or an external USB device such as a memory key. Good news all round, but you may not be in the clear yet. For some bizarre reason, Intel still exclusively supplies the drivers for its Matrix Storage Manager in a self-extracting executable, which looks for a floppy disk on which to expand itself.

While a floppy may still be necessary to supply the driver to older versions of Windows, you'd think Intel would be considerate enough to also provide the files alone for Vista installers to download straight onto a CD or USB key. As it stands, Vista installers will still need a floppy drive just so the Intel executable can expand the drivers onto it. Or will they?

Considerable relief can be found under section 7.2 of Intel's Readme file for the floppy executable file, at **http://downloadmirror.intel.com/df-support/12093/ENG/readme.txt**. By entering "c:\iata_enu.exe -a -a -pc:\<path>" without the quotes in the Command prompt, the drivers buried within the iata_enu.exe file can be extracted to a path of your choice. Bingo. Simply extract the files to a USB key and feed that to Vista during its installation to enjoy the best disk performance from motherboards employing Intel chipsets.

One of the best aspects of the Vista installation process is being able to supply drivers for disk controllers on CD, DVD and USB-connected sources along with the floppy disk

File sharing

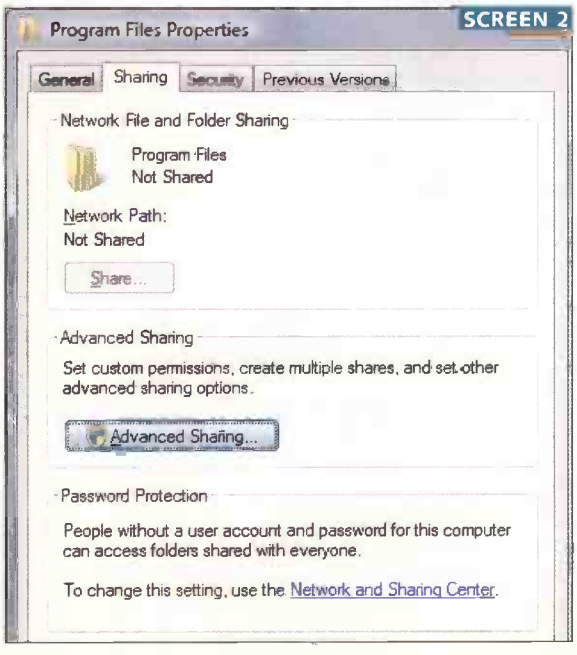
Before wrapping up, I should mention one aspect of Vista's file sharing that had me fooled for some time. Vista has changed the way file sharing is handled, and it's no longer so easy to just share any folder you like. For example, the Program Files and Windows folders don't allow the same sharing options as other standard or user-created folders. This makes a certain amount of sense, considering they're system folders or contain files that are best left unshared, but this nannying can catch you out under certain circumstances.

I run Apache server on one of my PCs for locally proofing web pages before uploading them to a live site. I know Linux followers will roll their eyes, but I've always run this Apache installation under Windows and it has worked fine. Simply install the software and you're ready. Enable File Sharing on the htdocs folder (the place where Apache stores web pages) and anyone on your network can transfer files for local hosting and proofing.

Well, they could if the htdocs folder were fully sharable, that is. Like most Windows applications, Apache for Windows defaults to installing itself in the Program Files folder. This doesn't cause any problems on earlier versions of Windows, but Vista considers this folder and any sub-folders within as precious, and so limits your sharing options. Consequently, network users can't modify files in this folder, and I also found certain Apache or MySQL services refused to start automatically.

The solution is simple: if you want to share a program's folders or files under Vista, don't install it in the default Program Files folder. Instead, create a new folder in C and install it there. Job done. Well not entirely. I've also been experiencing additional networking problems between my two Vista PCs, where one regularly loses the ability to access any shared folders on the other. Some have blamed Internet Connection Sharing, while others say support for IPv6 is the problem. After several highly unproductive days, I ended up reformatting one system and reinstalling XP, while looking into a dedicated server running CentOS. Both solutions felt pretty good.

Vista restricts your file-sharing options with certain folders, such as the Program Files folder. If you need to fully share files, put them in a different folder



If it ain't broke

As with all new operating systems, there's a learning curve to Vista as you figure out what has changed and how to get it looking or working the way you'd like. And like earlier upgrades, as you curse one aspect, you notice another that is really neat.

The thing I wasn't quite prepared for was the sheer number of devices I owned that had worked fine under XP, but just wouldn't play ball with Vista. To be fair, many were getting on a bit and only connected as and when I needed to use them. Hence, they were missed by any initial compatibility scans, but nonetheless there were more than a few moments when I regretted making the move.

As someone who needs to test the latest software as part of my job, Vista was a mandatory installation for my own systems, but if it wasn't strictly necessary I'd certainly think twice about putting it on an existing PC. Indeed, I've stuck with XP for my media center PC because it works fine now. As a mission-critical system for this TV addict, I'm not going to take any chances. Besides, as mentioned earlier, I know Vista won't support my existing pair of digital TV tuner cards at the same time.

So should you avoid installing Vista? Not necessarily. It's a fine operating system with many worthy features, but I personally wouldn't bother unless you can verify every bit of your hardware is fully supported – and that includes all the peripherals you wish to connect. Again, to be fair, the situation with driver support should steadily improve as time goes on, but there will remain some devices that will never be officially supported.

So, if you're buying a new PC and own modern, well-known peripherals, I'd say go for Vista. But if you're thinking of upgrading an older system and are in any doubt over support for devices you don't want to replace, then I'd steer well clear – at least for the time being. As the saying goes, 'if it ain't broke, don't fix it'. 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.

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Blu-ray thinking

What you need in order to watch Blu-ray movies on your media PC

If you have a sufficiently quick processor and graphics card, you can equip your PC for high-definition movie playback with relative ease. Last month we showed you how to get Microsoft's Xbox 360 HD-DVD drive working on a PC, and now it's the turn of Blu-ray, with the internal Sony BWU-100A drive.

Video decoding

Blu-ray, like HD-DVD, supports three different video codecs: Mpeg-2, VC-1 and H.264. While the first Blu-ray movies were encoded with Mpeg-2, newer (and probably all future) titles will employ the more efficient VC-1 and H.264 formats.

VC-1 and H.264 offer superior quality to Mpeg-2 at the same bit rates, but at the cost of higher processing overheads. This doesn't pose a problem for consumer Blu-ray or HD-DVD players, which employ dedicated hardware to take the strain, but they can prove a struggle for all but the quickest PCs.

You'll need two things in order to watch Blu-ray or HD-DVD movies on your PC: a software player that can understand the new codecs, and quick enough hardware to do the maths.

In terms of software, the only viable option right now is Cyberlink's PowerDVD Ultra, and version 7.3 adds support for PCs lucky enough to have both Blu-ray and HD-DVD drives fitted. It costs about £60 from **www.cyberlink.com**.

In terms of hardware you'll need a graphics card that supports H.264 acceleration (that means a minimum of an Nvidia Geforce 6600 GT or Ati X1600). You'll also need to download the very latest drivers. You'll still need a quick processor, though, with a single or dual-core Pentiums clocked at 3.2GHz or 3.0GHz, respectively, or an Athlon 64 4000+ as a minimum.

Sony's BWU-100A Blu-ray drive can equip PCs with Blu-ray recording and HD movie playback capabilities

Copy protection

Blu-ray and HD-DVD both support the High Definition Content Protection (HDCP) system. HDCP is only supported by digital connections like HDMI and DVI, and it was long-believed you'd need HDCP-compatible displays and graphics cards to watch any Blu-ray or HD-DVD movies.

Today, though, it seems you only need HDCP-compatible displays and graphics cards if you want to watch Blu-ray or HD-DVD using a digital DVI or HDMI connection. If you go for an analogue VGA connection instead, you could be enjoying HD movies in their full glory, without having to invest in HDCP hardware. Well, for now anyway.

The big issue is the Image Constraint Token or ICT flag which, when present on any content, tells the player it must reduce the quality over an analogue connection. Luckily rumours suggest the movie studios unofficially agreed to avoid ICT flags on discs until 2010, which is great news for owners of non-HDCP displays and graphics cards.

In practice

Setting up a PC to play Blu-ray movies is simple – as long as your hardware meets the minimum requirements. We fitted the Sony BWU-100A Blu-ray internal IDE drive to systems running Windows XP and Vista, and both operating systems recognised it straight away, reading CDs and DVDs without additional software.

To record Blu-ray discs or play Blu-ray movies, you'll need to install specific software and the Sony drive is supplied with a suite of suitable Cyberlink products. Wanting to support both Blu-ray and HD-DVD drives on the same PC, though, we used our own copy of PowerDVD Ultra 7.3.

As expected, digital DVI connections were only allowed for movie playback if both the display and graphics card supported HDCP, although switching to an analogue VGA connection eliminated the need for HDCP hardware.

Blu-ray movie playback was smooth on our Core 2 Duo E6700 and Core Duo T2600 systems equipped with Gigabyte NX66256DP Geforce 6600 and Sapphire X1600PRO HDMI PCI Express graphics cards, respectively. The right graphics driver is crucial, though, and while the latest are the safest bet, you may need to roll back to an earlier one.

Format wars

It's possible to equip a media PC with the capability to play either Blu-ray or HD-DVD movies, or even have the so-far unique capability of supporting both rival formats in one box.

Of course, they remain rival formats and it's unknown which (if either) will triumph over the other. At the time of writing, Blu-ray drives were also pricey – at about the £400 mark – although they also offered recording facilities. Microsoft's Xbox 360 HD-DVD drive may not record but, at £130, it's a much more palatable option for equipping a PC with HD movie playback capabilities, especially at a time when the outcome of the format war is far from certain. **PCW**

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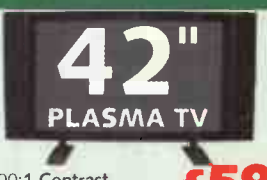

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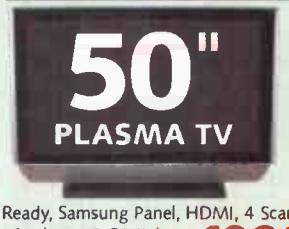

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Tim Nott is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

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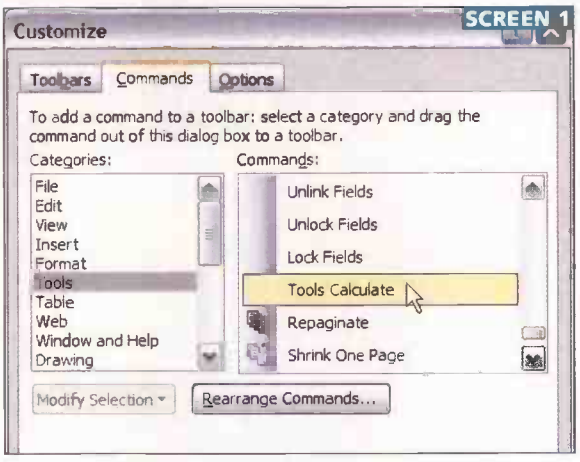
Day of reckoning

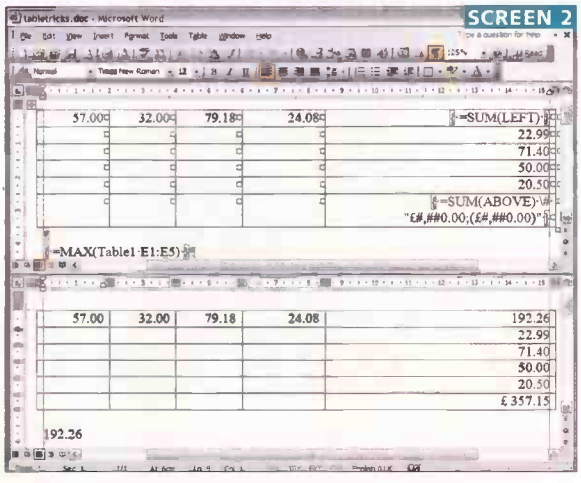
Word can do your sums for you. It can even look at the new Docx format

Spreadsheets – who needs them? Well, we probably all do, but Microsoft Word is no slouch when it comes to doing calculations. Let's look first at the built-in calculator. This used to be on the Tools menu, but seems to have fallen off in recent versions. It is easy enough to get it back, however. Go to the Commands tab of Tools, Customise. Select Tools in the list on the left, and in the right list scroll down to Tools Calculate and drag this on to the Tools menu – or any Toolbar (screen 1). If you're using Word 2007, you can only add the command to the Quick Access Toolbar. Right-click on it, Customise and you'll find Calculate under All Commands. Close the Customise dialogue and you're ready to start reckoning. The calculator recognises most arithmetical operators you can get from the keyboard. As well as +, -, * and /, you'll find that it also evaluates ^ (to the power of) % (per cent) and brackets. We haven't, however, been able to get it to work out factorials! It will retain currency formatting, but only for the default Windows currency symbol, as defined in Control Panel, Regional Options.

You don't need to use equals signs – just select a formula, such as (7+5)*5/6, go to Tools Calculate and you'll see the result, 10, in the status bar. It will also be copied to the clipboard, so Control & V will paste the answer in to your document. The calculator will also treat white space as a plus sign, and so will evaluate 5 6 7, for example, as 18. It also ignores text between numbers so will evaluate that last sentence as 36.

Apart from the rich range of calculation available in VBA macros, Word can also perform calculations using fields that contain formulas. These can use a far more sophisticated range of operators, and when used in tables can function as a very basic spreadsheet. Although it's no match for Excel, it is handy for situations where you need to mix text and figures – such as a quote or an invoice. In this kind of case you have an Autosum button on the Tables and Borders toolbar, which will insert (depending on the position of the cell) a SUM(ABOVE) or SUM(LEFT) field – in other words totalling a column or row. There are two things to watch out for here – a blank cell will limit the scope of the autosumming, so either insert zeroes into blank cells or define the range manually; for example, SUM(E1:E10). There are also problems if you try to add more than 85 cells, according to Microsoft, but with a table that size you'd be better off in Excel.





Top: Getting the calculator on board

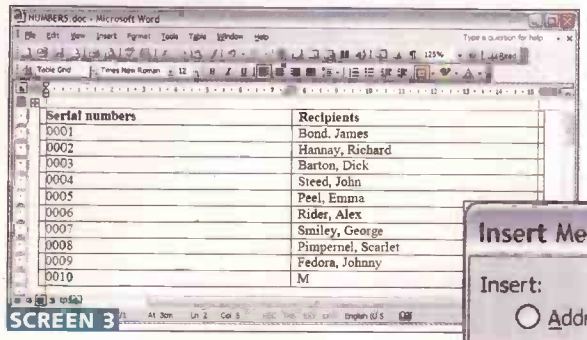
Above: Using Word as a spreadsheet – formulas top and results below

There's a huge range of functions you can use – not just sums, but averages, minima, maxima and so on. Like other fields, you can use a 'numeric picture' to format the results. For instance, £#,###0.00 gives pounds sterling with a comma thousands separator. You can get at these functions either from Insert, Field or Table, Formula, but there's little hand-holding. You'll need to consult the Help file to find out the syntax and type the fields in manually. One useful touch is that you can extract data from a table and show it elsewhere in a document. To do this you need to bookmark the table and include the bookmark name in a formula field. For example, =MAX(Table1 E1:E5) anywhere in the document will return the highest value in cells E1-E5 in the table bookmarked as Table 1 (screen 2).

You can get even more ambitious using logical operators such as IF fields in conjunction with calculations, but we'll leave that as an exercise for the curious. Next month my colleague, Stephen Wells, will be telling us how to write a best-selling novel in Excel.

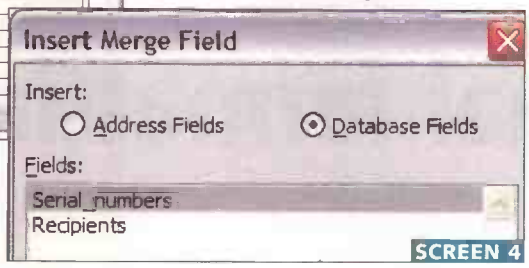
Serial numbers

Staying with numbers, sometimes you may need to print multiple copies of a document, each with a different serial number printed on every page. For example, say you have created a confidential document and you want to give 10 people paper copies. Each copy will have a serial number from one to 10 at the bottom of every page. You keep a record of who had which number, so if the document – or a page of it – is found lying around, you know whom to sack.



Top: The numbered recipients

Bottom: Getting the merge field



We looked at a similar problem – generating sequential invoice numbers – a while back, but that involved a separate document for each invoice. In the current situation, we just want one document, printed 10 times. One way to do this is with a macro that prints a copy of the document, then finds a bookmarked number, increments that number, prints another copy, etc. An easier method is to use mail merge.

First create your top-secret document. Next create the merge data file. This is just a two-column table. The first column is headed 'Serial Number', and below that 0001, 0002, etc, up to the number of copies you want. The second column is headed 'Recipients' and contains the name of each person destined to receive the document (screen 3). Save this as NUMBERS.DOC, for example, and close it. Now return to the original document and turn on the Mail Merge toolbar from the View menu. You could go via the Mail Merge wizard, but the toolbar route is less long-winded. First you need to specify your data source, so click on the Open Data Source button (second from left) and browse to NUMBERS.DOC. If you've password-protected this document, you'll need to supply that password. Now View Headers and Footers, and type some suitable text into the first page header, such as 'Document Copy Number:'. With the cursor to the right of this, click the Insert Merge Field button (sixth from left, if you haven't customised the toolbar). You'll see a choice of two fields – Serial_numbers and Recipients. Select the former, click Insert, then Close (screen 4). If you've set up Headers and Footers to be the same on every page, you should see '<<Serial_numbers>>' in each header.

In a normal mail merge you'd be inserting other fields – such as the recipient's name – but in this situation you don't want any names associated with any copy of the document. That information stays locked in your password-protected data source file.

Click the View Merged Data button (ABC under double chevrons) and you'll see the actual merged data. Clicking the arrow buttons will page through each numbered copy of the document (screen 5). Now hit the 'Merge to printer' button (third from right on the Merge toolbar).

You don't have to start your numbers from 0001 in the data source, and they don't even have to be sequential or even numbers. You can put any alphanumeric combination in each cell to obfuscate things even more.

2007 tips

One of the things I like about Office is the way you can add favourite folders to the 'Places Bar' on the left of the File Open/Save dialogues. I have Hands On WP and Windows as permanent residents. To do this in Word 2003 and earlier, you first select a folder in the dialogue, then go to the Tools menu and 'Add to My Places'. But, to my dismay, the Tools menu in the Office 2007 open and save dialogues has been removed. All is not lost, however. Selecting a folder, then right-clicking in the Places Bar, gives the option to add the folder.

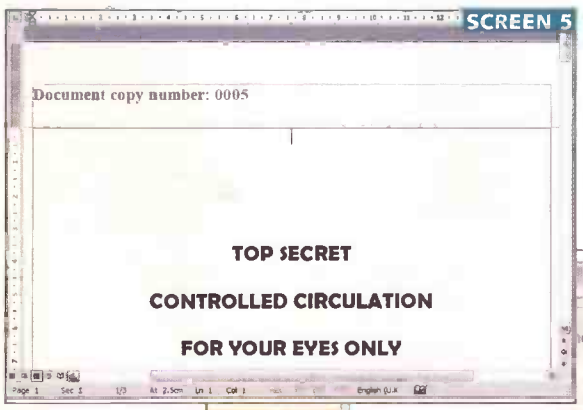
Much as we all love the new ribbon interface in 2007, it takes up a lot of room, but you can hide the ribbon. Press Control & F1 and the ribbon will vanish, leaving only the tab headings. Clicking on one of these restores the ribbon, but as soon as you issue a command it disappears again. Control & F1 restores it to a full-time state.

What's up Docx?

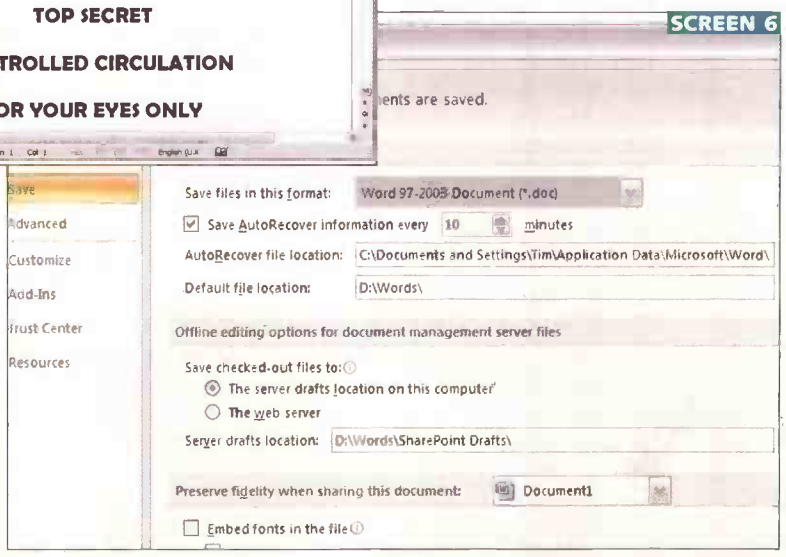
The new Word file format is going to pose problems for a lot of Word users. But first the good news. Word 2000, XP and 2003 users can get free converters to open and save Docx and other Office 2007 files. On my PC, these just turned up in the course of Office Updates, but you can download them manually from http://tinyurl.com/y5a879.

The bad news is that users of Word 97 and earlier, Mac Word and Word for the Pocket PC are left out in the cold. If desperate, you could try the on-line converter at http://docx-converter.com/, but don't expect much in the way of preserved formatting.

Better news is that the new format is not compulsory, though it is set as the default on a new Word 2007 installation. If you go to Word Options, at the bottom of what I will continue to call the File menu, then click on Save, you'll find you have the choice of making the Word 97-2003 .doc format the default (screen 6). PCW



Top: The number sequence in place



Bottom: Going back to the Doc format

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.

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Conditional formatting

Excel can highlight the information that really interests you, making it easier to read

Jason Harper writes, "I am using Excel 2003 to keep a list of the contents of my freezer. When I use something up, I change the quantity of that item to zero. I know I can use conditional formatting to change the colour of the cell when it has a zero value, but is there any way I can apply that formatting easily to the whole row of data?"

Let's assume Jason's list looks something like screen 1, with the name of each item in column A and the current quantity of the item in column E. Select cell A2. Choose Conditional Formatting in the Format menu. In the first box select Formula Is. In the second box enter

=$E2=0

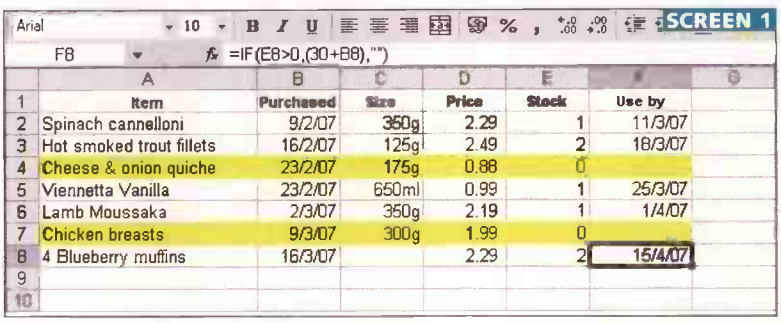
Click the Format button and the Patterns tab and select a cell background colour. OK out. Use the Format Painter tool to extend this conditional format to the full range. In this example, it's A2:F8. Now, if a zero is entered for any item in column E, all the used cells in the row referring to that item will display the chosen background colour.

This got me thinking about other ways in which Excel's Conditional Formatting feature can be useful. Some are other applications of the Formula Is option. Some utilise the alternate Cell Value Is option. Surprisingly, you can even insert a Name in a Conditional Formatting formula that exploits macro code.

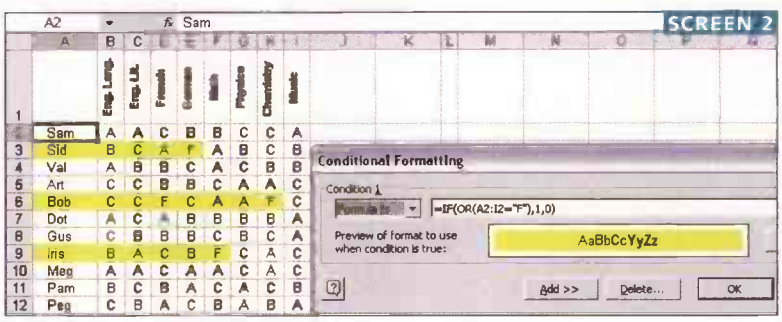
As I often receive queries from teachers, I'll start with an application that might be useful to them. Suppose you have a record of student results in various fields of study – as in screen 2 – you might want to pick out the names of students who received an F in one or more subjects. The applicable range here is A2:I12. Highlight all those cells. In the Conditional Formatting dialogue box, pick Formula Is and enter

=IF(OR(A2:I2="F"),1,0)

and select your preferred method of formatting. In this example, the names of the students will be highlighted and all the cells along the row to the subject in which they received an F, or their final F if they received more than one. Excel will automatically adjust the formula to suit each cell.



Conditional formatting can be used to highlight items that need restocking in your freezer



Picking out students' names and the subjects in which they gained an F

Colouring formulas

Any time you want to display the formulas on an Excel worksheet, you can press CTRL & ` (grave accent) – the key to the left of the exclamation mark on the standard keyboard. Alternatively, you can choose Tools, Options, View and check the Formulas box. But you can use the combination of a Name and Conditional Formatting to flag all the cells on a worksheet containing formulas by colouring them. This method works with all versions from Excel 97 onwards. First define a new Name. Press Ctrl & F3. In the top box enter the single word, Formula. In the 'Refers to' box enter

=GET.CELL(48,INDIRECT("rc",↙ FALSE))

(Key: ↙ code string continues)

Choose Add and OK. This coding is from the original XLM macro language that is still included in the latest versions of Excel, though seldom drawn on today.

There are 53 different conditions the GET.CELL function recognises. It always returns True or False. Using 14 as the first argument would show True or False if a cell is locked. Use 49 and it will indicate if the cell is part of an array. But using 48 as a value for that argument, as here, returns True if the cell contains a formula.

The INDIRECT function returns the reference specified by a text string. You can use INDIRECT when you want to change the reference to a cell within a formula, without changing the formula itself. Here it creates a

reference to each cell in your selected range. As the second argument is False it means the text uses the Excel R1C1-style reference instead of the A1-style reference.

Select the range where you wish to flag the formulas. To select the whole sheet click the rectangle to the left of the column letters and above the row numbers, or use the keyboard shortcut, Ctrl & A. On the Format menu choose Conditional formatting. From the dropdown list select Formula Is. In the adjacent box type =Formula. Click the Format button and the Patterns tab and select a background colour. If the background is a dark colour you can also format the font to be white. Click OK twice. All the cells with formulas will show up with the colour you've chosen.

Staff absence chart

One of the most popular applications of a spreadsheet is to provide an automatic graphic representation of a table of data. A chart often helps to make tabular data instantly clear. You can do this in Excel without even using the built-in graphing facilities. Conditional Formatting can be used to quickly show when staff will be absent for training, vacations, or for other leave from work. This simulates the type of planning and progress chart devised by Henry L Gantt and so is known as a Gantt chart (see screen 3).

On a new worksheet, list the staff members in column A. Nine of them entered in cells A2 to A10 will get you started. In columns B and C enter the start and end dates in one year of their planned absences. Format the dates how you like,0 but I would suggest you could use the Custom format d/m.

Q22

SCREEN 3

	A	B	C	D	E	F	G	H
1		Starts	Ends	Jan	Feb	Mar	Apr	May
2	Sam	31/8	30/10					
3	Val	1/2	20/4					
4	Sid	1/11	31/12					
5	Art	31/3	25/5					
6	Bob	30/4	30/6					
7	Dot	1/8	30/10					
8	Gus	1/3	25/4					
9	Iris	31/7	28/9					
10	Meg	1/1	20/2					

Creating a Gantt chart to show staff absences

Pointing up the highest scoring players in a team

SCREEN 4

	A	B	C	D	E	F	G
1		Sam	Sid	Val	Art	Bob	Highest score
2	7/1/2007	23	45	60	33	19	Val
3	21/1/2007	40	55	54	39	29	Sid
4	4/2/2007	60	59	44	45	50	Sam
5	18/2/2007	47	54	48	49	55	Bob
6	4/3/2007	39	48	39	49	39	Art
7	18/3/2007	58	59	44	39	29	Sid
8	1/4/2007	61	59	49	41	31	Sam
9	15/4/2007	59	49	62	51	48	Val
10	29/4/2007	55	47	48	58	59	Bob

In cell D1 enter 1/1/2007 or whatever year you have used in columns B and C. Give this cell the Custom format mmm. Right-click on the Fill Handle (bottom right-hand corner of cell), drag out to column O, and choose Fill Months. Highlight the range D2:O10 and choose Conditional Formatting on the Format menu. Click the down arrow in the first box and choose Formula Is. In the adjacent box carefully enter

```
=AND(D$1>=$B2,D$1<=$C2)
```

Click the Format button and, under Patterns, select a colour. OK out.

Accentuate the negative

There are options on the regular Format menu for displaying negative values in red, but with Conditional Formatting you can make more of a production out of it. Choose the cell to be emphasised when its value is negative. In the Conditional Formatting dialogue box choose Cell Value Is with the first dropdown arrow. Choose less than with the second dropdown arrow and enter a zero in the third box. Click the Format button. Under the Patterns tab choose red. Click the Pattern: dropdown arrow and choose a cross-hatch.

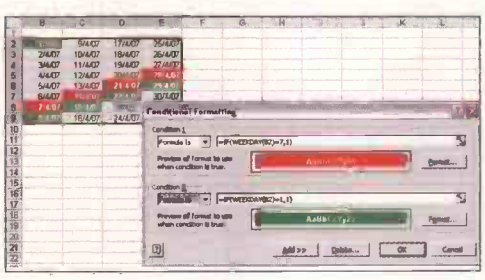
Finding the highest score

Screen 4 shows a table of scores achieved by each of several players for several games. The names of the players are the labels for columns B through F, and the dates of the games are listed down column A. The results for the games are entered in the range B2:F11. The names of the best players for each game will appear down column G. In cell G2 enter

```
=INDEX($B$1:$F$1,MATCH(MAX↙
($B2:$F2),$B2:$F2,0))
```

The MAX function finds the highest score in the row and the INDEX and MATCH functions work together to find the name of the player who made the score. Drag this formula down from G2 to G11. To automatically emphasise the highest score in each row, highlight the range B2:F11, select the Conditional Formatting option on the Format menu and make it read Cell Value Is equal to =MAX($B2:$F2). Pick your format, such as Font Bold and Colour Red. PCW

Something for the weekend



Conditional formatting can highlight specific days of the week

If you have a range of dates and wish to draw attention to the Sundays, highlight the range, and choose Conditional Formatting. If the range of cells is from B2:E9, the Conditional Format condition would be Formula Is =IF(WEEKDAY(B2)=1,1). Excel will automatically adjust the formula to suit each cell. To highlight both Saturdays and Sundays, the formula would be =IF(OR(WEEKDAY(B2)=7, WEEKDAY (B2)=1),1,0). To give the Saturdays and Sundays different colours, make Condition 1 =IF(WEEKDAY(B2)=7,1). Click the Add button and make Condition 2 =IF(WEEKDAY(B2)=1,1). Format the two conditions individually as in the illustration.

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.
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Joined in perfect harmony

Cartesian joins can bite, unless you know how to tame them

All good database professionals have a set of tools they can apply to various problems they encounter. Of course, to use any one tool effectively you have to understand how, when and where to apply it. The 'Cartesian join' is a tool that should be in every professional's toolbox, but is so misunderstood it's often overlooked.

The word Cartesian means "relating to René Descartes", the influential French philosopher and mathematician. A Cartesian product in mathematics is the direct product of two sets. In relational databases, a table is, in essence, a set of data, so a Cartesian join is performed when we join every row in one table to every row in another table.

Rather sadly, you often hear the term used abusively, as in "You complete idiot! That was a Cartesian join! Don't you know that..." This is mainly because the answer table produced by a Cartesian join can be what we call, in these politically correct times, 'significantly challenged in the size department' (or terrifyingly, massively vast).

To see why this happens, imagine two tables – one with four rows and the other with three. An example of a 'normal' query we could run is:

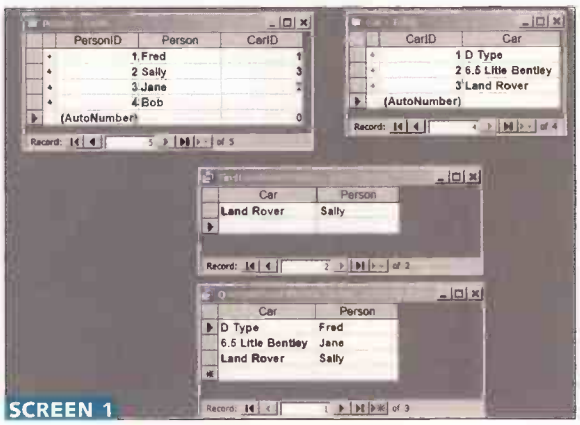
```
SELECT Car, Person
FROM Car INNER JOIN People ON ↙
Car.CarID=People.CarID
WHERE Car="Land Rover";
```

(Key: ↙ code string continues)

This returns one row because only one person was assigned the Land Rover (see screen 1). If we leave out the WHERE clause:

```
SELECT Car, Person
FROM Car INNER JOIN People ON ↙
Car.CarID=People.CarID;
```

then the query returns three rows, one for each person. However, if we don't



SCREEN 1

Running two queries against two simple tables

give the database engine any specific instructions about how to join the two tables:

```
SELECT Car.Car, People.Person
FROM Car, People;
```

then it assumes we want every single row in the first table joined to every single row in the second table. In other words, it assumes a Cartesian join (see screen 2).

So the number of rows returned is equal to the number of rows in the first table, multiplied by the number of rows in the second – in this case 12. Given these tiny tables, that's hardly a problem, but tables are often larger in production systems – 100,000 row tables are perfectly common. Performing a Cartesian join on two such tables will generate an answer table of 10 billion rows.

There are two problems with an answer table of this magnitude. First, it's unlikely to serve any real-world purpose. Second, its sheer size will glue most database servers to the floor.

The problem is, of course, that those who know nothing about joins tend to leave them out of the query, so running a Cartesian join is a classic mistake made by people who are learning. The first anyone knows about it is when the server grinds to a halt. So it is unfair, but understandable, that the words 'Cartesian join' and 'idiot' often occur in the discussions that ensue.

Even worse, if you build such a join using three tables of 100,000 rows, the output table is 1,000,000,000,000,000 rows. To put that into perspective, if the database can output a million rows a second, the query will take more than 31 years to complete.

So, many people learn the hard way, very early on in their careers, that Cartesian joins are bad things, which simply isn't true. Cartesian joins are like any tool. If you use them badly, they will bite, but use them well and they are reliable servants.

One of the characteristics of Cartesian joins is that they scale very badly but, as long as you know that, they are fine. All of which brings us to a real-life problem.

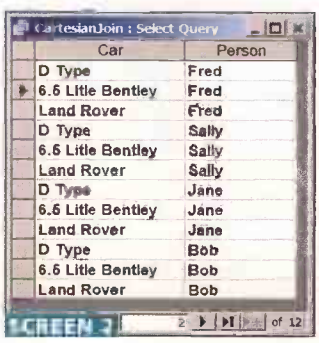
Navigating our way through a Cartesian join

Max White uses a database to store about 500 navigation marks, each consisting of a latitude and a longitude value. He already has a formula that will calculate the bearing and distance of one mark from another. If he selects his current position and the mark to which he wants to travel, his database already tells him the bearing and distance. Excellent.

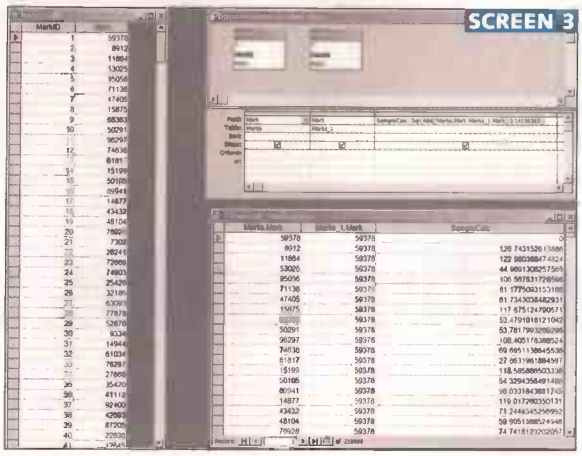
However, very sensibly, he also wants the program to tell him which other marks in the database would be close to his intended route.

To achieve this, Max White asked me how he could create a new table that contains the bearing and distance from each mark to every other. If he has this information, he is confident he can then

Running a Cartesian join against the same two tables



SCREEN 2


SCREEN 3

A Cartesian join that joins a table to itself

build the relevant queries and forms for display purposes.

One solution to this problem is, of course, a Cartesian join. The only oddity in this situation is that instead of joining two tables, we are going to join the table to itself.

In case this sounds confusing, I've built a sample database (DBCJUN07.MDB on the cover DVD or at **www.pcw.co.uk/2151344**). It has a table called Marks, which consists of 500 unique numbers.

The query called 'PerformCalc'

'I'm looking at an interface and it purports to be Access'

performs a Cartesian join on this table with itself. The result is a 250,000 row (500 x 500) answer table, in which each row in the original table has been joined to each of the others. It takes less than two seconds to run (see screen 3).

The query performs a trivial calculation (it finds the square root of the absolute difference between the two numbers divided by Pi) just to prove that a calculation can be done. Max White can, of course, substitute his more complex calculation for this basic one. Since we know this is a Cartesian join, we must always consider the scalability. I ran a few simple tests on a 2GHz Centrino with 2GB Ram (see screen 4).

If we assume that Max is happy with a response time of five seconds or lower, then this solution is fine for about three times as many marks as he needs, which makes this solution a reasonable one.

So, the take-home message is that the Cartesian join should never be feared. Used appropriately, it becomes one of the many useful tools in your database toolbox.

As a side note, I became intrigued by the overall problem described here and worked out a solution to the general matter of finding marks close to a route that doesn't need any calculation of bearing and distance, thus avoiding the Cartesian join. I'm not suggesting this is a better solution for 500 points, but it is set-based and does scale better. I'm sure that mine is not the only solution, so readers are invited to mull over the problem for themselves and send in their own solutions. We'll publish a round-up of the best suggestions in a few months.

Access 2007

I've been playing with it for a few months now and here are my initial and later impressions.

First impressions

There must have been some mistake, surely. I'm looking at an interface and it purports to be Access. But it cannot be. The comfortable fluency of four years has suddenly and totally evaporated. Hmmm. No worries. I'm a professional, I can hack this. It's only a user interface (UI). Let's open an existing file. Err... that's probably... err... right. OK. Fine. Let's try something simple and create a new Table. Select the Tables tab and... err... no. That's not it. Ummm, where is it? Oh, I see. Forget the Tables tab. Choose the Create tab at the top of this ribbon thing (screen 5) and that lists all of the objects you can create, including Tables. Click on Table: there we are! Oh no, we're not. I actually wanted the Design view rather than Table view. OK. Click on... I don't know. What? Views? Yes, that's it – Result! Oh, it's not a result. It appears that to get to Design view, I have to save the table, even though I haven't even entered anything yet. Why? What exactly am I saving? Oh well, never mind, carry on. Accept the default name. Ah, now...

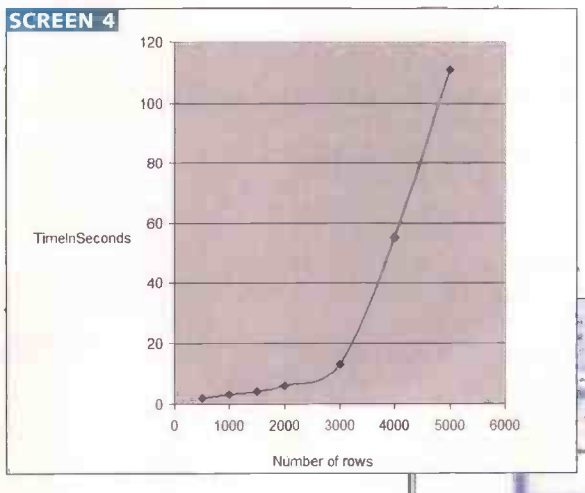
This isn't a UI facelift, this is a face transplant. I can no longer read the expressions of my nearest and dearest. All the familiar context has vanished. This is like waking up next to an alien.

More considered impressions

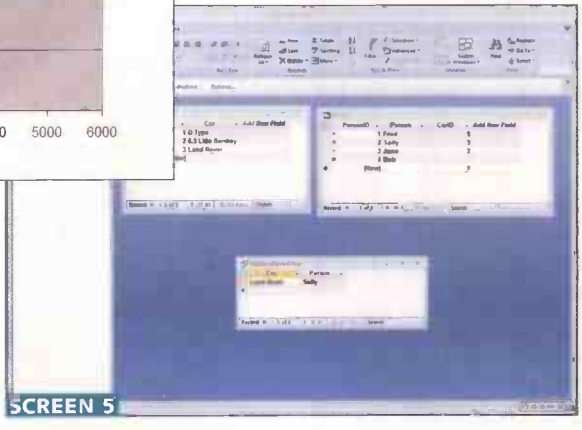
I have lived through every version change in Access since the beta of 1.0. Of one thing I am sure. In a year's time, I will absent-mindedly fire up Access 2003 and I won't be able to drive it. I will have embraced the alien and adapted to 2007. I will actually like the new way of working. There is absolutely no doubt about this because it has happened every other time.

So what am I whining about? Because it is also fair to warn you that this is by far the most radical change to Access I have ever seen. Do not expect to be able to install it and be your usual productive self from day one. Instead, expect to spend a great deal of time simply staring at the screen, trying to find the familiar options you know must be in there somewhere.

Yes, I know that Microsoft wants me simply to dwell on the sexy new features of Access 2007 and, in fact, there are some great new features, so I promise I'll talk about them in subsequent columns. But it seems only fair to share my first impressions. I do wonder if forcing Access to adopt the Office UI is one ribbon development too far. **PCW**



Top: Beware the scalability of the Cartesian join...


SCREEN 5

Right: Access 2007 running on Vista. Sure, it's art. But is it a database?

Nigel Whitfield edited computer magazines before going freelance in 1995. A specialist in internet and consumer issues, he has a degree in Computing Science from Imperial College.

→ Comments welcome on the Web development column. Email webdev@pcw.co.uk *Please do not send unsolicited file attachments.*

Information at your fingertips

Make your site easy to navigate with any browser, and confound overseas spammers

When you have a large website, one of the trickiest things is making sure that people can find all the information it contains. If there are only a few pages, then it's not a hard task, but when you have dozens of pages, with lots of useful content, it can be tricky.

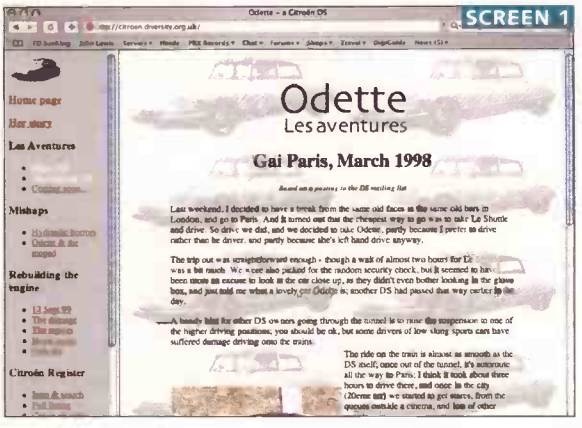
One of the sites I manage has a vibrant forum, and also plenty of FAQs, downloadable guides, and other useful reference material. But, by and large, most people skip the FAQs and the guides, and when they want to know something they post a question in the forum. That's understandable, but if the response to questions is always to say, "Please check the FAQs", you can run the risk of looking a little unwelcoming to newcomers.

One solution to this is to flag useful information. In forums, this is often done with 'sticky' threads, which appear at the top of the list of posts. While they sometimes work, often people don't bother to read them. Even adding a reminder in large text to the top of the new message posting box doesn't seem to help.

Adding links to the forum page doesn't always help, either. I've tried adding large buttons and dropdown menus with helpful labels such as "FAQs about..." and they're still frequently missed by visitors. I'd be interested to hear from other readers how they deal with this sort of issue.

Site navigation

Good site navigation is obviously key to making sure people can find the information they need. There are various approaches to achieve this, all of which I've tried at various times – helpful icons, Javascript navigation menus and even framesets (screen 1), which these days probably bring about a collective shudder.



Framesets can keep your navigation visible, but they're fiddly to work with

While framesets aren't a recommended way of doing things, they did help achieve a useful look for some sites, with a navigation panel on screen all the time, providing easy access to all the different parts of your site, while the main content changes.

These days, though, you can achieve much the same effect using CSS instead, which also means that with a little scripting, you can degrade things gracefully. I've just been redesigning one of my sites with a three-column layout; there's a left-hand navigation panel, with links to all the main areas of the site, the main part of the screen for the content, and a right-hand panel for secondary navigation, which changes to provide information relevant to whichever page you're looking at.

It's quite simple to manage this in CSS. This code provides an area at the top of the page for a masthead, with a navigation area at left and right, then a page footer:

```
#masthead {
        background: #FFFFFF; }

#mainnav {
        width: 15% ;
        float: left ;
        background: #EEE;
        margin-top: 18pt ; }

#bodytext {
        width: 68% ;
        float: left ;
        background: #FFF ; }

#rhinfo {
        float: right ;
        width: 15% ;
        background: #EEE ;
        margin-top: 18pt ; }

#footer {
        clear: both; }
```

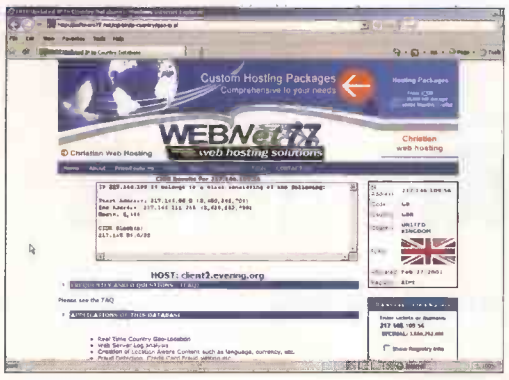
Save that code in your CSS file, and then link to it in the web page. You then lay out information in the HTML like this:

```
<div id="header">Put your ↙
page header here</div>
<div id="mainnav"><?php ↙
include ('navbar.php') ; ↙
?></div>
<div id="bodytext">
<h1>Welcome to my site</h1>
<p>Page text goes in here</p>
</div>
<div id="rhinfo"><p>Page ↙
specific options ↙
here..</p></div>
<div id="footer"><p>Copyright ↙
etc</p></div>
```

(Key: ↙ code string continues)

The page looks fine in Safari, but not Opera

Beating the spammers



Software77 provides a free database mapping IP addresses to countries

Spam isn't just a problem for email; anyone who runs a forum will know there are plenty who sign up and post spam. Unscrupulous marketing fools even sell programs specifically designed to spam forums that run on popular software, such as phpBB. One solution is to manually approve all the people who join your forum, but that can be time consuming. There are some phpBB hacks that reject sign-up requests where people specify a URL. Often they just want it displayed in the member list, so it can be found by a search engine.

Another option you may consider is banning people from certain countries. How do you do that? Geo-IP mapping is one solution, where you check the country to which an IP address is assigned and block people if necessary. On one of my forums, the solution I've chosen is to allow users to register automatically if they're in an EU member state, and to require administrative approval (or, more usually, summary deletion of accounts) for people who try to register from elsewhere. You can't necessarily block people right away, though. AOL users often appear to be coming from one of the company's US proxy servers, and the same is true of some large corporations.

But where do you get the database from? I'm using a freely downloadable database from **http://software77.net/cgi-bin/ip-country/geo-ip.pl**. You can download the database and load it into your local database server, then run a simple query to determine if a visitor to your site is from one of the countries on your approved list.

The data from Software77 is loaded into a table giving start and end ranges for IP addresses in decimal format, and the two letter country code. A separate table simply lists those country codes that are deemed acceptable. This PHP line builds the query, using the decimal version of the client IP address, $decIP:

```
$query = sprintf("SELECT geoipmap.country FROM ↙
geoipmap JOIN trustedcountries WHERE %s BETWEEN ↙
geoipmap.ipfrom AND geoipmap.ipto AND ↙
trustedcountries.countrycode = geoipmap.↙
country", $decIP) ;
```

(Key: ↙ code string continues)

and if there are no rows in the result, then the request is from an IP address in a country you've decided not to trust, and you can handle it appropriately.

Browser quirks

Now, that works fine, but using CSS unfortunately means you really have to test the page in different browsers. The margin-top attribute you can see in the definitions for each of the side panels is there to ensure they line up with the top of the body text. If that margin's not there the alignment is wrong in Firefox, Opera and Safari, and the 18pt headline won't line up with the two side columns. The reverse is true in Internet Explorer.

There are some very subtle gotchas, too. Screen 2 shows a page which has a table containing details of stores. In fact, there's one instance of the table for each store in the database. It looks fine in Safari and Firefox, but in IE and Opera the tables for each successive entry are laid out to the right of each other, resulting in a horrible mess.

The solution, it turns out, is a simple one in this case. In the definition for the table, there's an attribute `align="left"` that we need to remove. Using a centre align in the table tag causes the problem too. It took a while to track down – even ensuring a paragraph tag appears between entries isn't enough to persuade these browsers to start again at the left-hand margin.

So, while CSS can make layout easier in some ways, it can also lead you to spend a long time trying to track down obscure layout problems. Fortunately, there are plenty of sources of information for 'CSS hacks' that will help you overcome the worst lunacy of web browsers, and it's a topic we'll return to one day. I'd be particularly interested in hearing from users of any specific issues they've needed to address for the latest Firefox and IE7. Meanwhile, you'll find some useful tips on handling various CSS issues, and ensuring the best compatibility in *Web Design in a Nutshell* by Jennifer Niederst Robbins, published by O'Reilly. **PCW**

A Perl mea culpa

Perl is a great language; it's so flexible that people have even written poetry in it. And like many great languages it has its fans, one of whom, Ant Skeleton, wrote to point out a couple of errors in the code I presented last month.

Now, I never promised the code would be pretty, but I really shouldn't have mixed up two different ways of referring to variables in subroutines – 'my' and 'local.'

If you want a genuinely local variable that can't be accessed outside a subroutine, use my; for example:

```
my ( $a, $b ) = @_ ;
```

Then, $a and $b will be accessible only within your current subroutine.

Using local gives a subtle but important difference; you might have global variables called $x and $y, and saying

```
local ( $x, $y ) = ( $a, $b ) ;
```

will override the global values of those variables, within the current function and its scope. So, if the current function calls another function which references the global variables $x and $y, it will see the values you just set rather than the global ones.

I should also have made clear that you don't have to prefix a subroutine call with do; you can just use the name. Though personally, I find it easier to spot where I'm referring to my own routines by using 'do'.

One of the beauties of Perl, of course, is that you can do many things in different ways – brackets can be optional, as can many other things. You'd expect nothing less from a poetic language; try googling 'Perl poetry' and see what you can find. And for the best way to learn Perl, I recommend the O'Reilly book *Learning Perl*.

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 column.
Email digitalimaging@pcw.co.uk
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Photoshop gains extra magic

Adobe's latest version of Photoshop has some major improvements

In December last year, Adobe announced it was releasing a public beta of Photoshop CS3. Since then, the beta has been available for download from the Adobe website. By the time you read this, the finished product should be shipping and for a complete rundown of everything that the new version has to offer you'll have to read the reviews, or buy the upgrade. I'm not going to provide a full review here, but there are some new features that will have such a huge impact on the way we do things with Photoshop I think they're worthy of some Hands On scrutiny.

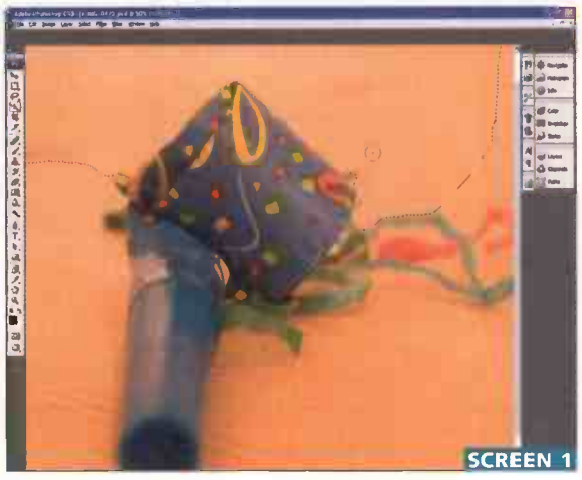
I'm going to confine myself to talking about some of the new features that impact on techniques previously covered in Hands On. These are, pretty much by definition, digital imaging tasks that are frequently undertaken and often form part of the routine image-editing workflow.

The CS3 public beta is available for both Windows and Mac platforms, the latter being a universal binary that will run natively on Intel Macs. It's time limited and, unless you have a valid serial number for an earlier version, you'll get a mere 48 hours in which to play with the new version. As (bad) luck would have it, the beta wasn't interested in my perfectly legitimate serial number, so it looks as if my days are numbered.

As well as Photoshop, the download contains CS3 beta versions of Adobe Bridge, Adobe Stock Photos and a new application called Device Central, which allows you to create templates for mobile devices.

New selections

It's testament to the fact that making selections is such a core activity that Photoshop CS3's only new tool is for making selections. The Quick Selection tool (see screen 1) shares a toolbox flyout with the Magic Wand. Adobe must feel quite confident that this will quickly become the tool of choice for making quick, accurate selections as they've made it the default – if you want the Magic Wand tool you'll have to switch to it from the flyout.



Above: Photoshop CS3's new Quick Selection tool in action

After a few minutes working with the Quick Selection tool, I have to say that Adobe's confidence is not misplaced. It's easy to use and it just works – you hardly need to think about it. The Quick Selection tool is a brush, so the only things you really need to set from the Tool Options palette are its size and hardness. Painting inside your intended selection area picks up like-coloured pixels all the way to an obvious boundary.

As it stands, the Quick Selection tool would be a very useful addition to the toolbox, but selections can be further refined using the Refine Edge controls. Five sliders provide a very high degree of edge control; Radius and Contrast improve soft-edged details, Smooth acts like a variable anti-alias, feather blurs the selection edge and a contract/expand slider changes the size of the entire selection area.

Five buttons provide a variety of preview options, including a standard selection border, a quick mask, an alpha channel mask and preview selection on black and white. This last one is useful for checking for fringing on selections that are going to be cut and pasted.

Black and White

In past Hands On columns, I've looked at various methods for converting colour images to black and white and for tinting mono photos. By far the best method for converting to mono, and the one used by most professionals, is the Channel Mixer. Adobe has added a handful of presets for commonly used black and white filter effects – a small, but nonetheless useful, improvement.

The reason Adobe hasn't gone further with the Channel Mixer is that it has added a dedicated Black and White command to the Image>Adjustments menu. This dialogue box also provides black and white filter presets, but its six sliders – red, green, blue, yellow, magenta and cyan – provide much more control over the influence of original colours on final greyscale tones (see screen 2).

Below: Converting to black and white made easy

The black and white dialogue box also allows tinting of mono images via hue and saturation sliders. This combination makes it easier than ever to produce mono and tinted images from colour ones. Of course, if you want to produce advanced split-toning effects, you'll have to refer to those back-issue Hands On columns.

The final thing to say about the new Black and White feature is that, as you'd expect, you can apply it as an adjustment layer, so you can keep all your colour data intact.

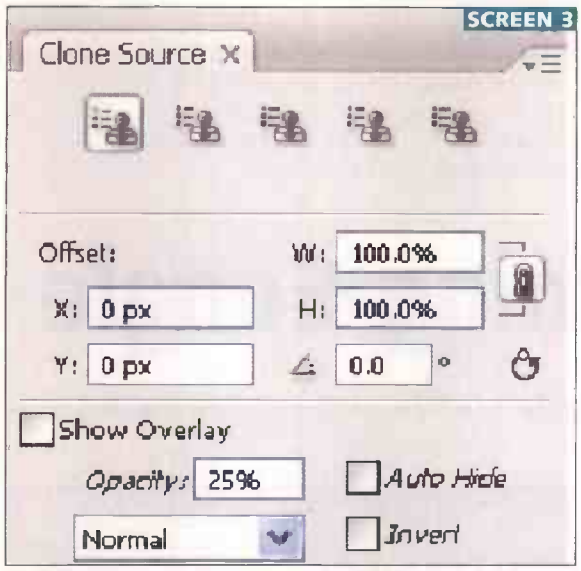
Cloning

Another technique I've frequently covered in past columns is cloning. Photoshop's Clone Stamp tool remains unchanged, but a new Clone source palette has been added which allows you to define and switch between up to five separate clone sources (see screen 3). This could prove useful when cloning from multiple layers.

The Clone Source palette also provides an overlay option, which displays the clone source as a tint of the entire offset layer. This is a huge advantage because you can see rather than guess the source before you press the button. It also provides a bit of an insight into how cloning works – all you're really doing is selectively painting in an offset layer. You can change the opacity and blend mode of the clone source overlay, (which only changes how the overlay appears – not the result of the cloning) but it works pretty well at the default 25 per cent and normal blend mode settings.

The Clone Source palette displays the offset in pixels and you can overwrite this, which provides a more accurate method of resetting the source than clicking with the brush, though I'm not sure how useful that will be. You can also resize and rotate the source; this also is a bit superfluous because if you really wanted to do this you could duplicate and transform a layer prior to cloning. Having said that, the true utility of new features such as this often doesn't become evident until you've had a bit of experience using them, so we'll have to wait and see.

One last thing about the Clone Stamp tool that I only belatedly noticed is that the source layer selections in the tool options palette have been expanded. Now, in addition to cloning with the currently active layer, or all layers as the source, you can choose 'Current and Below' so layers above are excluded.



Top: The new Clone Source palette

Above: The Bridge's new loupe tool

Even more usefully, there is a button you can turn on to ignore adjustment layers when cloning. This one made me punch the air and shout "Yes". Fortunately, there was no one else in the room at the time. This has been one of the biggest cloning pains I have experienced using Photoshop. If you apply, let's say, a Levels adjustment layer, then start cloning, you clone adjusted, not original layer pixel values – which the adjustment layer then makes a second hit at. The result is an ugly mess which you have to undo before turning off the adjustment layer and starting again. Not any more, though.

Curves

Personally, I prefer to make tonal adjustments using Levels, but a lot of people swear by Curves, and Adobe has upgraded the Curves dialogue box to provide even more power and flexibility. A Curve display options tab at the bottom of the dialogue box allows you to choose between additive (light) or subtractive (ink) displays, and you can also toggle the histogram and other display options.

An auto button provides automatic curves adjustment and you can choose from one of three algorithm options; enhance Monochromatic contrast clips each channel identically to preserve the colour balance, Enhance per channel contrast clips the channels independently, and Find dark and light colours clips to the highest and lowest value pixels in the image.

Bridge

The new Bridge looks and behaves very differently from the previous version. In the default view the image thumbnails are displayed in a central window with navigation and sort filter tools on the left and preview window, metadata and keyword panes on the right. One of the coolest things, though admittedly not of any huge practical advantage, is the way the metadata pane displays ISO, exposure and metering info – in a facsimile of your camera LCD panel.

It's not all cosmetic; Bridge has some improvements of real substance. New workspace arrangements include a filmstrip-style layout with a big preview window atop a strip of smaller thumbnails and a 'Metadata focus' list view.

There's also a 'Light table' workspace. This displays medium-size thumbnails which you can reorder, but they occupy a rigid grid layout and there's no Aperture-style free placement and resizing. There is a loupe tool, though. In the beta it's only available in the filmstrip workspace (see screen 4), but it works really well and its round-edged square shape is much more practical than Aperture's.

These are just some of the new features that will be making their way into the production release of CS3. There's a lot I haven't talked about, for the reasons I mentioned earlier, but other new features and improvements, such as the revamped interface, Smart Filters and video tools, coupled with the improvements in Bridge and the huge developments in Camera Raw 4.0, will make this an attractive upgrade proposition for all existing CS2 users. The Bridge-Camera Raw-Photoshop trio now provides a powerful and sophisticated end-to-end workflow that provides just about everything a pro photographer is likely to need. And, if it doesn't, there's always Lightroom – but that's another story. PCW

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.
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Programming Google Calendar

Here's how to link to Google's online services from your applications

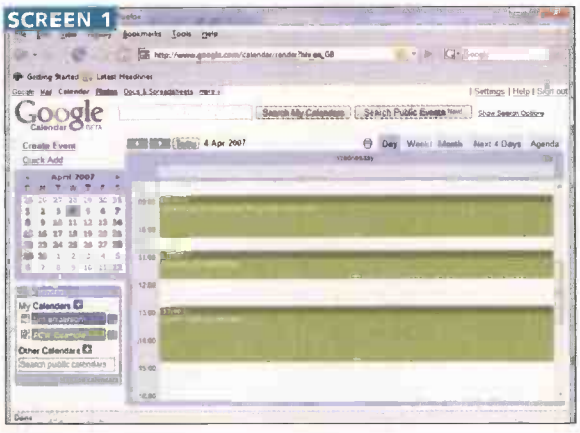
Hypertext Transfer Protocol (HTTP) is not just for browsing the web. Although that was its original purpose, the same protocol can be used to retrieve and send data programmatically, enabling applications that run on the desktop, or behind another web page, to interact with applications on the internet. You might do this to draw on services from websites such as Google, Windows Live, Amazon or Wikipedia; or to create private applications that store data on the internet and can be accessed from any computer; or for business transactions. Programmatic access gives you full control of the user interface, and also lets you merge web functionality into other applications.

The wider context is the trend towards web-hosted, on-demand applications and the shift of data from desktop PCs and local networks to internet locations. This is very convenient, but not all applications work best in the browser. Using web services with desktop applications gives you the best of both worlds. You can also devise ways of caching internet data locally, for when the internet is offline.

What follows is an example using the Google calendar API. Google calendars (see screen 1) are a great way to store your appointments on the internet, and to share forthcoming events with others. Each Google user can create multiple calendars. It's a free service, and so is ideal for small businesses as well as individuals. You can add comments to events, making this an effective collaboration tool.

Programmatic access to Google calendars makes them more powerful. You can write applications that take data from Google calendars and store it offline, or that copy data to and from other calendaring software, such as Outlook. Another idea is to integrate the Google calendar into custom applications for planning rotas or scheduling deliveries.

SCREEN 1



The Google Calendar offers an easy-to-use online interface that can be tailored to personal and business use

Google's calendar API is part of a larger set of APIs for its suite of online applications, covering blogging, documents and spreadsheets, classified advertisements and more. This family is called Google Data APIs. It is separate from other APIs, such as Google Maps and Google Gadgets. The Google Data API is based primarily on Atom, an XML standard for news feeds similar to RSS but with more features, extended with the Atom Publishing Protocol to support posting and editing as well as retrieval. This means that applications interact by sending and receiving XML data. The API conforms to the REST principle, by which internet resources are updated using the POST, GET, PUT and DELETE methods that are part of HTTP.

An advantage of using XML and HTTP is that you can interact with the calendar API using almost any language. Google has also created wrappers for Java and .Net, and the example below using Visual Basic .Net to list, create and delete Google calendar appointments. The free Visual Basic Express edition works fine.

Start with Google calendar

The first step is to create a Google calendar. This involves creating a free Google account and then signing in to the Calendar service. By default you have a single personal calendar, but you can create additional calendars by clicking the plus symbol or navigating to the Manage Calendars screen. I created a calendar called 'PCW Example' and added some entries for 4 April.

To interact with this calendar programmatically, you need to copy its URL. This is not the URL in the address bar, but a separate URL for XML data. Click the dropdown button by the calendar you want to access, and select Calendar Settings. Next, scroll down to the bottom of the settings page and find the section called Private Address. Click the XML button, and copy the URL that appears in Notepad or another editor (see screen 2). You will need this to work with the calendar in your VB code.

The next step is to go to **http://code.google.com** and find the page for the Google Calendar Data API. On that page there is a link to GData client libraries, and from there you can download the .Net client library. This is a zip file. Once downloaded, if you are using XP SP2 or higher, right-click the zip file and choose Unblock, and then extract the zip to its individual files.

Accessing Google Calendar from Visual Basic

Now fire up Visual Basic Express, or another version of Visual Studio .Net, and start a new Windows Forms application. In the Solution Explorer, go to the project references,

SCREEN 2

Calendar Address

Please use the following address to access your calendar from other applications.

http://www.google.com/calendar/feeds/ltdeui9g3meui9g3me7h46joo%40group.calendar.google.com/private-c7ea35i358a89746a5eui9g3me79e43ab/basic

Copy your calendar URL into notepad, as you'll need it for programmatic access

right-click and choose Add reference. Click Browse and add references to the following three DLLs in the cs\lib\Release folder of the Google client libraries (see screen 3):

- Google.GData.Calendar.dll
- Google.GData.Client.dll
- Google.GData.Extensions.dll

Next, add a DatePicker, a ListView and a Label to the Visual Basic form. Set the ListView's View property to List, and its Sorting property to Ascending. After that, open the code behind the Visual Basic form and add the following at the top:

```
Imports Google.GData.Calendar
Imports Google.GData.Client
Imports Google.GData
```

Now take the URL that you copied to Notepad and use it to create two class-level string variables – one called URLWithCookie and the other called URLNoCookie. If you study the URL, you will notice it has several parts. It begins 'http'. Change this to 'https' so that it uses a secure connection. Then change the word at the end of the URL from 'basic' to 'full'. Set URLWithCookie to this modified URL. Copy this for URLNoCookie as well, but with one further change. Towards the end of the URL is a section something like this:

private-c8ea428a87cae46a954dfc23389e43cb

The part after the hyphen is a cookie used by Google to let you access the calendar without any other authentication. Delete this, including the hyphen, so that the URL ends simply 'private/full'.

This is because, although the URL with the cookie gives access to your private calendar, it is read-only access. You will need to supply a username and password, but no cookie, to get update access to the calendar.

Getting data from Google

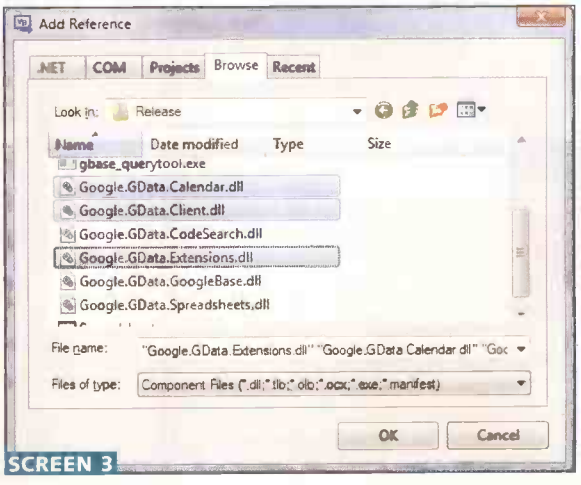
Everything is now in place to retrieve data from Google and display in a Visual Basic application. The idea is that you select a date with the datepicker, and then display the events for that day in the ListView control.

Here is the code:

```
Private Sub UpdateEvents()
Me.ListView1.Items.Clear()

Dim calService As ↙
CalendarService = New ↙
CalendarService("PCWExample")
Dim query As EventQuery = New ↙
EventQuery(UrlwithCookie)

'set the limits of the query
query.StartTime = ↙
Me.DateTimePicker1.Value.Date
'use Date to omit the time value
query.EndTime = ↙
Me.DateTimePicker1.Value.AddDay
s(1)

'get the events
Dim calFeed As EventFeed = ↙
calService.Query(query)

'show the title of the calendar
Me.Label1.Text = ↙
calFeed.Title.Text()

'display the events
Dim entry As EventEntry
  For Each entry In ↙
calFeed.Entries
  Dim time As String = ↙
entry.Times(0).StartTime.Time↙
OfDay.ToString
  Me.ListView1.Items.Add(time ↙
+ " " + entry.Title.Text)
  Next

End Sub
```

(Key: ↙ code string continues)

Add references to the Google .Net DLLs in the Visual Basic project



SCREEN 3

This is skeletal code that shows the essentials of retrieving data from your Google Calendar. Note that you must use the StartTime and EndTime properties of the EventQuery, and not the StartDate and EndDate, which refer to when the event was updated, not its date on the calendar. Another confusing point is that dates returned by the DatePicker control have a time value as well, although the control does not display this. You can strip this unwanted time value by using the Date property. If you omit any limits, Google will return the first 25 events – see the documentation for more options.

Updating and deleting events

Creating and deleting events is done with similar code, but in this case you must include a username and password. There is not enough space to show all the code, but here is the outline for creating a new event:

1. Create a new EventEntry object, and set at least its Title, Authors, StartTime and EndTime properties.
2. Create a new CalendarService object, and call its SetUserCredentials method with a username and password.
3. Call the Insert method of the CalendarService, with the URLNoCookie URI of the calendar and the EventEntry to insert.

Deleting an event involves getting an authenticated CalendarService object as above. Next, get a reference to the EventEntry to be deleted and pass it to the Delete method of the CalendarService.

In a real-world application you could wrap the GData library objects with Visual Basic classes. Another idea is to put the CalendarService calls in a background thread, since these are synchronous calls and could take a while to execute or even time-out completely. It is wise to plan for failure with any web service call.

The Google Calendar service is still in beta and the API details may change. It will be interesting to see if it remains a free service, since there is no payback for Google if you use its services programmatically. It is hard to see how this can be funded by advertising. **PCW**

Resources

Google Calendar is at **www.google.com/calendar**
Google APIs are at **http://code.google.com**
Visual Basic Express is at **http://msdn.microsoft.com/vstudio/express/vb**

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.

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Network superstores

A look at what Nas is, and the options available to home and business users

Prompted by a number of reader emails, the topic for this month's Networks Hands On is network attached storage (Nas). More specifically, I want to cover what Nas is all about and look in some detail at a typical solution designed to be used by home and small business users.

A quick recap

One of the main reasons for setting up any kind of network is the ability to share files, with a file server the traditional way of satisfying this requirement. But because servers are expected to do lots of other things as well – such as host websites and email and database servers – they tend to be complicated and, where Windows is concerned, expensive to deploy. A Nas appliance, on the other hand, is a server that shares only files, so it can be made simpler and a lot easier to manage. So much so that, in many cases, all you have to do is plug it into the network and switch it on.

At least that's what you'll be told. In reality, it's not always that easy. It depends on which product you buy, with Nas appliances available in a variety of formats, from budget single-disk products costing about £100 up to highly specified and very scalable server platforms costing thousands, for use in corporate datacentres.

The software involved can also vary. Most Nas appliances are based on Linux, but proprietary software may also be employed, and there are Windows-based Nas appliances, too. For the most part, however, the software doesn't really matter as long as it does the job of sharing files, is quick, reliable and easy to manage.

A single disk Nas server like this can be used to share files on a home or small business network.

A small example

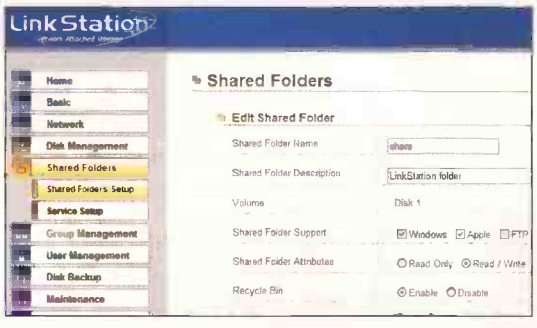
I've used several Nas servers over the years from various vendors. Currently, however, I have a Buffalo Linkstation Pro (reviewed in *PCW*, November 2006), not because it's the best or most complete Nas server, but it does what I want, requires barely any maintenance and didn't cost a lot of money. As such, it's a good example.

Moreover, as you can see from the photograph, the Linkstation Pro is small: the tiny box contains a quiet Linux server and a single Sata hard disk. Mine is a 250GB model, selling for about £125, with capacities up to

The trouble with arrays

One of the emails that prompted this month's article was from a reader bemoaning the loss of a vital file accidentally deleted from a Nas appliance – something the reader thought he was protected against because the appliance was equipped with a storage array.

It's crucial to understand that, in most cases, an array only offers protection against hardware failure. If one disk stops working, the array as a whole can still be accessed until the faulty drive is replaced.



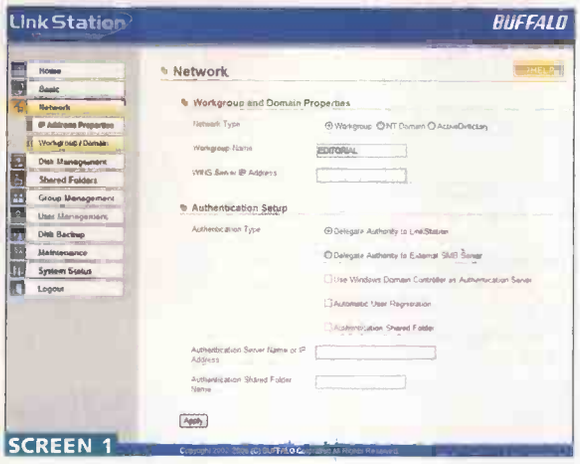
One of the nice features of the Linkstation Pro is the ability to move deleted files to a local recycle bin rather than erase them altogether as on some other Nas appliances

Unfortunately, if you delete a file, the fact that it's stored on an array is of no real significance. And it doesn't really matter what type of array is involved. Where disks are mirrored, for example, any operation applied to the main disk will be immediately mirrored to its twin. So delete a file and it's deleted from both the drives. Likewise, on more complicated arrays (where data and error correction information may be striped across several disk spindles), if a file gets deleted it's usually wiped off the whole array.

Windows doesn't help either. Delete a file on your local hard disk and it's first moved to the Recycle Bin, from where it can be recovered later – assuming you haven't emptied the bin in the meantime. Delete a file on a network share, however, and it's usually permanently deleted straightaway. It won't be in your Recycle Bin or the one on the server and no 'undelete' utilities will be of help – it's gone.

There are exceptions. One of the nice things about the Linkstation Pro, for example, is that it can be configured to move any deleted file into a local recycle folder, rather than deleting it right away. Otherwise, you have to protect data by taking backups. That can be a bit of a chore, so it's worth looking for Nas appliances and servers with a versioning filesystem or a snapshot facility.

Typically only available on more expensive products, snapshots can be configured to automatically keep a record of any changes made to the filesystem enabling not just deleted files to be quickly recovered but other file changes to be reversed.



750GB available. However, bear in mind that the bigger models will cost a lot more (nearly £400 for the 750GB appliance) and for the same price you can find alternatives offering more functionality.

Like other entry-level Nas devices, the Linkstation Pro is easy to get working. I plugged it into the Lan using the cable provided, switched it on and left it to get an IP address automatically from the DHCP server in my internet router. It came with a ready-formatted hard disk with a few preconfigured Windows shares, one containing the documentation and the other an empty public folder for immediate use by anyone on the network.

Like other Nas appliances, the Linkstation Pro is managed via a web interface – used here to specify the Windows workgroup or domain to be used

I had to configure the appliance to be part of my workgroup, as I don't use Microsoft's default names and if it were on a Windows domain or Active Directory network, additional setup would be required. I wanted to change the default admin password, but it's easy as management is via a browser. Screen 1 shows how I configured the Linkstation Pro to be part of my 'Editorial' workgroup. It's not perfect, of course. The web interface is basic and not particularly quick. But then, apart from taking the screenshots here, I haven't actually had to access the GUI in months.

Another drawback is the reliance on a single disk. Should the drive fail, all the data on it will be lost, unless backups have been taken. There's a USB port to which a separate backup disk can be attached. You can take backups to other networked Linkstations and there's a built-in backup tool complete with scheduler.

On a big network you'll need to look for more capable Nas solutions offering expandable storage, possibly configured with a storage array for reliability

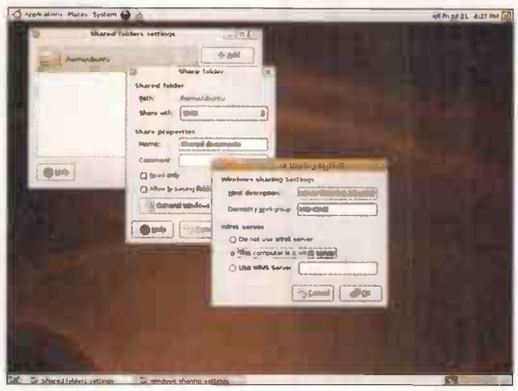
Another restriction is that the Buffalo appliance can only be accessed by Windows and Macintosh clients, but that's not a big problem. As a single disk appliance you can't add extra disks should you need it, which can be awkward. Although there are no hard and fast limits, a Nas appliance such as the Linkstation Pro will quickly run out of steam as more users try to access it. It's fine on my Lan with two or three users, and could probably be shared by 10, but you wouldn't want to use one as the main file server on a big company network.

Bigger examples

Fortunately, there are lots of other Nas products on the market, including much more capable appliances designed to be shared by big networks, with more powerful processors and expandable storage arrays. One example is the Buffalo Terastation Pro, which we also reviewed last year (*PCW*, June 2006), and which can be specified with up to 2TB of shared disk space on four disks configured as a RAID 5 array.

Again, mentioning the Terastation Pro here doesn't mean we're recommending it. Iomega is another brand worth checking out, with a similar product range, including home user products and a number of Linux and Windows-based appliances designed for use by big organisations. Also worth a look is Adaptec, whose Snap Server products extend even further up the scale. Indeed, you'll find a review of a new highly scalable dual-processor Snap Server in the Business Section, starting on page 107. There are lots of others besides, all much easier to deploy and manage than a general-purpose file server. PCW

DIY Nas



You don't have to buy a dedicated Nas appliance. If you've got an old PC and a few hours to spare, you can build one of your own.

If it has Windows on it then all you have to do is create some shares, but Windows isn't really designed to be used in this way and you can run into all sorts of issues – and you're also limited to sharing files with other Windows users.

Like most Linux distros, the latest version of Ubuntu includes Samba, which can be used to build your own Nas appliance

Linux is a better alternative. Most distributions ship with utilities to allow files to be shared by a variety of clients, including Samba, which is an open source file server application that can share files using the same SMB/CIFS protocols employed by Windows. The latest version of Samba can even act as a domain server on a Windows NT or Active Directory network.

Most Linux distributions also have graphical tools to manage both Samba and other file-sharing software, and there are web-based interfaces, too. However, a fair amount of expertise will be required to get it all working. To avoid that, you might also want to look at ready-configured tools, such as FreeNAS (**www.freenas.org**), which I covered in some detail in this column in the December 2006 issue, or Naslite, which Gordon Laing wrote about in the April 2007 Hands On Hardware column.

A complete Nas server based on BSD Unix, FreeNAS is small enough to be downloaded and run from a USB key if you want, with a virtual appliance implementation also available for use with the free VMWare Player utility. It can be used to share files on a variety of networks, not just Windows, and can be configured and managed from a web browser, just like a commercial Nas appliance.

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www.meshcomputers.com
Strong performance and a good price tag make this a very tempting PC.

2 **Evesham Solar Creation**
£999 ★★★★★
Reviewed April 2007
www.evesham.com
A decent Windows Vista Premium desktop for less than £1,000.

3 **HP Touchsmart IQ770**
£1,199 ★★★★½
Reviewed June 2007
www.hp.co.uk
It's one of a kind and looks great, but it needs a significant price drop.

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, sound requirements, size and type of hard disk, CD 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 are generally cheaper than comparable Intel models.

You can still buy budget PCs with older Intel Celeron or AMD Sempron CPUs. These are aimed only at undemanding users. If your needs are for word-processing tasks, surfing the web and some low-end gaming or, a PC running either of these processors will suffice. You won't need a huge hard disk - 80GB will be plenty - coupled with 512MB of Ram and a low-end graphics card. You'll be fine with onboard sound, and can expect to pay up to about £400, depending on the monitor. Be wary of running Windows Vista on a low-end budget PC though.

In the mainstream desktop market, it's Intel Core 2 Duo versus AMD's Athlon 64. Both are 64-bit CPUs, but to take full advantage of this you need a 64-bit operating system and applications - Windows Vista is available in both 32-bit and 64-bit editions.

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 Athlon 64 FX and Core 2 Extreme ranges aimed at the hardcore gaming market. Both are dual-core CPUs (the Core 2 Extreme QX models are quad-core). Dual-core 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.

Most new PCs now come with Windows Vista Home Premium. The Home Basic edition offers improved file handling, but you'll miss out on many of the new features. If it's for a small business, or you need features such as remote access, buy the Business edition of Vista. Few PCs are sold running Linux, and we recommend only the technically confident buy such a 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.

GRAPHICS CARDS

SUB £200

1

Sapphire Radeon X1950
£155 ★★★★☆
Reviewed www.pcw.co.uk/2172003
www.leadtek.co.uk

The best bet for AGP users to get decent frame rates in all games.

2

Leadtek Winfast A7300 GT TDH
£75.20 ★★★★☆
www.pcw.co.uk/2172003
www.sapphiretech.com

Budget AGP graphics card that performs well at lower resolutions.

3

3D Fuzion Geforce 7600GS
£75.20 ★★★★☆
Reviewed November 2006
www.novatech.co.uk

A good value card for those on a tight budget.

4

Sapphire Radeon X1600 XT Ultimate
£110 ★★★★☆
Reviewed September 2006
www.sapphiretech.com

Not totally fan free, but still one of the quietest cards around, and performs well.

£200-£349

1

Asus EN8800GTS
£270 ★★★★☆
Reviewed www.pcw.co.uk/2172183
www.asus.co.uk

A fast graphics card for gamers and Vista users.

2

Gigabyte GV-NX88S640H-RH
£310 ★★★★☆
Reviewed www.pcw.co.uk/2171240
www.gigabyte.com.tw

The G80GTX's smaller sibling offers lots of bang for the buck.

3

Gainward Bliss 7800GT GLH
£244.89 ★★★★☆
Reviewed July 2006
www.overclockers.co.uk

A little expensive, but this card has plenty of overclocking potential.

£350+

1

ECS N8800GTX-768MX
£411 ★★★★☆
Reviewed April 2007
www.ecs.com

The fastest graphics card we've tested, but you'll need a similarly fast CPU.

2

EVGA E-Geforce 8800GTX KO ACS3 Edition
£469.99 ★★★★☆
Reviewed May 2007
www.evga.com

An overclocked beast of a graphics card.

3

Foxconn FV-N88XMAD2-OD
£397 ★★★☆☆
Reviewed www.pcw.co.uk/2184289
www.foxconn.com

High-end graphics card, though slightly faster 8800GTX models are available.

HOW TO BUY

Most graphics cards are based on either the Nvidia Geforce or ATI Radeon family of chips. Each has its 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 7800 or new 8800 series and ATI's latest X1950 XTX card.

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 256MB for the latest games and video applications.

About £40 will buy you a Geforce FX 5700 or Radeon 9550 card with 256MB of Ram, which is good for 2D action/strategy games, image editing and less demanding 3D games.

To play 3D action games smoothly, you'll need to spend around £150 on your graphics card. Serious gamers should consider the Geforce 7800GTX or Radeon X1900 XTX at around £300. If you're really after top performance, opt for a Geforce 8800GTX, but expect to pay more than £400.

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 eight-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 SLI (Scalable Link Interface) technology, which 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

Samsung NP-Q35T006/SUK
£1,056.32 ★★★★☆
Reviewed March 2007
www.samsung.com/uk/

A portable powerhouse with exceptional battery life.

2

Mesh Pegasus S271
£799 ★★★★☆
Reviewed March 2007
www.meshcomputers.com

A good, solidly built all-round notebook with decent battery life.

3

Evesham Voyager C720DC
£1,499 ★★★★☆
Reviewed November 2006
www.evesham.com

A super-fast notebook with Intel's new mobile Core 2 Duo processor.

4

Rock Xtreme CTX Pro
£1,807.75 ★★★☆☆
Reviewed February 2007
www.rockdirect.com

Rock debuts Nvidia's Geforce Go 7950GTX mobile graphics.

5

ACI Matrix 1500 notebook
£1,198.50 ★★★☆☆
Reviewed May 2007
www.aciplc.com

Solid performance in an uninspiring chassis.

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 why you want a notebook. Is it for occasional use, running some office applications and accessing the internet and email? If so, then almost any low-cost notebook will do the job. If it's for playing games or running video-editing software, look 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 Core Duo models, while AMD offers Mobile sempron alternatives.

For the best in performance with power-saving technology, go for Intel's Core 2 Duo or AMD's Turion 64 processors. Intel currently leads the way with its Core 2 Duo models and, if you're looking for top performance, you should opt for one of these.

Any notebook you get should have in-built Bluetooth and Wifi connectivity, an 80GB 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

ECS NF650iSLIT-A
£74 ★★★★½
Reviewed June 2007
www.ecs.com.tw
A mainstream motherboard with good features and performance.

Gigabyte GA-M61VME-S2
£39 ★★★★½
Reviewed Winter 06/07
www.giga-byte.com
Building a cheap, quiet PC for your granny? Job done.

ECS RS485M-M
£43.06 ★★★★½
Reviewed January 07
www.ecs.com.tw
Good budget motherboard for PC builders with home theatre in mind.

MSI K9N SLI Diamond
£99 ★★★★★
Reviewed www.pcw.co.uk/2157641
www.msicomputer.com
A passively cooled AM2 motherboard for quiet gaming machines.

ECS 945G-M3
£64.40 ★★★½
Reviewed www.pcw.co.uk/2159498
www.ecs.com.tw
A compact but well-featured motherboard suitable for home-theatre PCs.

Gigabyte GA-M59SLI-S5
£99 ★★★★★
Reviewed www.pcw.co.uk/2159804
www.giga-byte.com
An impressive, high-end AM2 motherboard, with decent overclocking capabilities.

Gigabyte GA-8N-SLI Quad Royal
£99 ★★★★½
Reviewed www.pcw.co.uk/2157092
www.giga-byte.com
A motherboard with four graphics card slots for quad-SLI.

£100+

Asus M2N32 WS Professional
£183 ★★★★½
Reviewed June 2007
www.asus.co.uk
Another top-notch, albeit expensive, Asus motherboard.

Asus M2N32-SLI Deluxe Wireless Edition
£136.59 ★★★★½
Reviewed www.pcw.co.uk/2156925
www.asus.com.tw
This is one of the new motherboards to support the AMD AM2 socket.

Intel D975XBX2
£180 ★★★½
Reviewed February 07
www.intel.com
The first quad-core motherboard from Intel is a good all-rounder.

HOW TO BUY

The motherboard dictates the type of processor you can use, how well the components communicate, the features on offer and upgrade potential. About £70-£100 gets you the recent technologies, but you can spend upwards of £200.

We recommend Intel Core Duo/Core 2 Duo or Athlon 64/FX processers for an all-round system.

Divided into northbridge and southbridge, the chipset on a motherboard 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 as this will boost performance speeds.

The latest boards support both older IDE and new, faster serial ATA (Sata) hard disks. Check there are enough connectors available for both of these types.

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 add-ons. Look out, too, for onboard Ethernet networking (Gigabit Lan is now common), integrated graphics and onboard sound.

DIGITAL MUSIC PLAYERS

Sony NW-S706
£180 ★★★★★
Reviewed April 2007
www.sony.co.uk
Sony's superbly stylish player threatens to outperform the competition.

Sandisk Sansa e280
£149 ★★★★½
Reviewed March 07
www.sandisk.co.uk
Great range of features for a very reasonable price.

Samsung YP-T9
£149 ★★★★½
Reviewed May 2007
www.samsung.co.uk
A strong 4GB rival to Apple's Nano.

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.

Maxfield Max-Ivy
£125 ★★★★½
Reviewed www.pcw.co.uk/2173471
www.maxfield.de
A super-sleek player takes on the Apple iPod nano.

HOW TO BUY

There are two main categories of mp3 player: Flash memory-based players, which go up to 8GB; and mini hard drive-based models, which can be up to 80GB. Prices for a 256MB player start as low as £20, rising to about £250 for an 80GB player. Although hard disk-based players offer more capacity, flash-based models tend to be more robust since they have no moving parts. In terms of songs, the difference is the ability to hold around 80 tracks on 256MB player and 20,000 on an 80GB model. 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 the battery life.

yoyo TECH.co.uk
House Of Technology

FC-ZE1 Fatality Case Black
ZALMAN
Mft Code: FC-ZE1
YOYO Code: 72076
£221.21 INC VAT

Aluminium V1200A Plus II Silver Case
LIAN LI
Mft Code: PC-V1200a plusII
YOYO Code: 77884
£144.02 INC VAT

SLI ATX, 650I SLI, GLAN, DDR2 800 Motherboard
Mft Code: Fatality FP-IN9 SLI
YOYO Code: 88288
£80.15 INC VAT

Socket 775, 975X, Dual PCI-E, Dual DDR2 Crossfire Motherboard
Mft Code: AW9D-MAX
YOYO Code: 5243
£132.63 INC VAT

Sunbeam TUNIQ TOWER 120 CPU Cooler
£33.72 INC VAT
YoYo Code: 4396

750GB 7200rpm SATA 2 Hard Disk Drive
Seagate.
Mft Code: ST3750640AS
YOYO Code: 4438
£187.81 INC VAT

500GB 7200rpm SATA 2 Hard Disk Drive
Seagate.
Mft Code: ST3500641AS
YOYO Code: 4204
£83.18 INC VAT

Core 2 Duo E6600 Socket 775 CPU
intel
Mft Code: BX80557E6600
YOYO Code: 5142
£187.45 INC VAT

Core 2 Quad-Core Pro Q6600, 775, 2.40 GHz CPU
intel
Mft Code: BX80562Q6600
YOYO Code: 79172
£549.33 INC VAT

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Thr-Sat: 9.30am-7.00pm
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www.yoyotech.co.uk
YOYOtech
30 Windmill Street
Off Tottenham Court Road
London W1T 2JL

yoyo TECH.co.uk
House Of Technology

8800GTS 640MB DDR3 Dual DVI Graphics Card
Mft Code: PV-T80G-THD9
YOYO Code: 50900
£315.37 INC VAT

8800GTX 768MB PCI-E Graphics Card
Mft Code: 471846200-8262
YOYO Code: 6263
£386.46 INC VAT

2Gb(2X1Gb) XMS2 Dominator, DDR2 PC8500, 240 Pins Memory
Mft Code: TWIN2X2048-8500C5D
YOYO Code: 80372
£244.26 INC VAT

Reaper 2GB (2 x 1GB) 1066MHZ PC28500 5-5-5-15 Memory
Mft Code: OCZ2RPR10662GK
YOYO Code: 73524
£208.84 INC VAT

18x DVDRW/RAM 12X RAM Black oem
£20.27 INC VAT
YoYo Code: 8243

620W HX Series Modular SLi PSU
Mft Code: CMPSU-620HXUK
YOYO Code: 14241
£94.41 INC VAT

Infiniti 720W ATX2.2 Modular PSU
Mft Code: EIN720AWT
YOYO Code: 13512
£152.72 INC VAT

Black Aluminum MicroATX Desktop Case
Mft Code: PC-V300B
YOYO Code: 27142
£75.01 INC VAT

Silver Aluminum MicroATX Desktop Case
Mft Code: SST-SG01
YOYO Code: 5238
£77.69 INC VAT

MSI StarCam 370i Webcam with MIC USB with 1.3Mpix Photo
Mft Code: STARCAM 370
YOYO Code: 4051
£13.66

QuickCam Express
Mft Code: 961322-0914
YOYO Code: 4440
£11.63

tel: 08700 27 11 26
www.yoyotech.co.uk
YOYOtech
30 Windmill Street
Off Tottenham Court Road
London W1T 2JL

HARD DRIVES

INTERNAL

1 **Samsung Spinpoint T166 HD501LJ**
£95 ★★★★★
Reviewed June 07
www.samsung.co.uk
A 500GB, 7,200rpm Sata drive that's both cheap and fast.

2 **Seagate Barracuda 7200.10 ST3750640A**
£271 ★★★★★
Reviewed June 07
www.seagate.com
This Pata hard drive has a whopping 750GB of storage space and spins at 7,200rpm.

3 **Seagate Momentus 5400.3 ST9160821AS**
£98 ★★★★★
Reviewed June 07
www.seagate.com
A relatively cheap 2.5in Sata drive with a 160GB capacity and 5,400rpm spin speed.

4 **Samsung Spinpoint M80 HM160JC**
£88 ★★★★★
Reviewed June 07
www.samsung.co.uk
This 2.5in 160GB Pata hard drive offers good value for money.

5 **Samsung Spinpoint P120S**
£80.11 ★★★★½
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 **Lacie Ethernet Disk Mini 500GB Nas**
£259 ★★★★½
Reviewed www.pcw.co.uk/2172135
www.lacie.com/uk
A decent network storage drive with 500GB of disk space.

2 **Western Digital My Book Essential Edition**
£149 ★★★★½
Reviewed June 06
www.wdc.com
A stylish external hard drive, but it lacks a network option.

3 **Buffalo Drivestation Duo**
£159 ★★★★½
Reviewed www.pcw.co.uk/2171578
www.buffalo-technology.com
Safeguard your data with this portable hard drive.

4 **ATMT Ultra-portable HD160**
£240 ★★★½☆
Reviewed www.pcw.co.uk/2164467
www.atmt.co.uk
If portability is important to you, and you're not after a lot of storage, this drive will appeal.

5 **Buffalo Ministation HD-PHS40U2/UC**
£70 ★★★★½
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 Sata (serial ATA) 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 AD-7173A**
£25 ★★★★½
Reviewed www.pcw.co.uk/2170011
www.nec.co.uk
A cheap DVD writer complete with Labelflash.

2 **HP Dvd940i**
£30 ★★★★½
Reviewed www.pcw.co.uk/2172512
www.hp.co.uk
Dual-layer DVD writing with Lightscribe.

3 **Microsoft Xbox 360 HD DVD player**
£130 ★★★★★
Reviewed www.pcw.co.uk/2169633
www.microsoft.com
A great way for Xbox 360 owners to sample high definition movies.

4 **Pioneer DVR-111**
£30 ★★★★½
Reviewed www.pcw.co.uk/2153705
www.pioneer.co.uk
A cheap and versatile optical drive.

5 **Toshiba SD-R6472**
£83.42 ★★★★½
Reviewed September 05
www.span.com
A slimline dual-layer DVD writer that performs well and is perfect for small form factor PCs.

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 that 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 about £3.75.

PRINTERS

PHOTO PRINTERS

HP Photosmart Pro B9180
£499 ★★★★★
Reviewed March 07
www.hp.co.uk
A range of powerful features makes this printer a force to be reckoned with.

Canon Pixma IP6700D
£149 ★★★★½
Reviewed January 07
www.canon.co.uk
A very competent printer, with the added bonus of an auto-duplex feature.

Canon Selphy CP730
£170 ★★★★★
Reviewed January 07
www.canon.co.uk
A simple-to-use dye-sublimation printer that produces good photos.

Epson Stylus Photo R360
£149.99 ★★★½☆
Reviewed January 07
www.epson.co.uk
A good choice if you want to use an LCD control panel, with great-quality prints.

MULTIFUNCTION DEVICES

HP Photosmart C6180
£199 ★★★★½
Reviewed June 07
www.hp.co.uk
Although it has substandard text printing, it does everything else very well.

Brother MFC-440CN
£179.99 ★★★★☆
Reviewed February 07
www.brother.co.uk
A mid-range entry from Brother's new all-in-one range.

LASER PRINTERS

Oki B2500 MFP
£149 ★★★★★
Reviewed March 07
www.oki.co.uk
Expensive toner, but a low RRP and great print quality.

HP Color Laserjet 2605dn
£299 ★★★★★
Reviewed September 06
www.hp.com/uk
An affordable colour laser that would benefit any small business.

Samsung CLP-300
£179.99 ★★★★☆
Reviewed February 07
www.samsung.co.uk
Samsung combines inkjet-like convenience with laser-quality documents.

Brother MFC-8860DN
£527.58 ★★★★☆
Reviewed November 06
www.brother.co.uk
Fax, copy, print and colour scanning combined in a laser multifunction device.

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. Our 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 our reviews and online forums (**www.pcw.co.uk/forums**), and read the manufacturer's technical support site for any known problems.

TV TUNERS

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.

Elgato EyeTV
£69.95 ★★★★½
Reviewed November 06
www.elgato.com
A digital TV receiver and recorder for Mac OSX.

Twinhan Magic Box
£69.99 ★★★★½
Reviewed August 05
www.twinhan.com
A stylish external USB2 tuner with good software and an attractive price.

Terratec Cinergy 400 TV
£89.99 ★★★★½
Reviewed March 05
http://en.terratec.net
A PC Card-based analogue tuner with good software. It's a great buy for laptop users.

Kworld Dual TV Tuner DVB-T 220
£49.99 ★★★½☆
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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G11 Gaming Keyboard
Mft Code: 967929-0120
YOYO Code: 98341
£39.36 INC VAT

G7 Laser Cordless Mouse
Mft Code: 931375-0914
YOYO Code: 3001
£54.99 INC VAT

22" TC003 Silver 8ms TFT Monitor
Mft Code: LC000CE
YOYO Code: 80240
£272.38 INC VAT

32" 8ms HD Ready LCD TV + Remote
Mft Code: DTL-532W100
YOYO Code: 4727
£394.48 INC VAT

Soundbridge M1000
£143.40 INC VAT
YOYO Code: 64415

MediaPlayer 35 Drive-In Kit for 3.5" HDD
Mft Code: 25413
YOYO Code: 4084
£86.29 INC VAT

Labs Sound Blaster X-Fi Elite Pro
Mft Code: 70SB05500200
YOYO Code: 2068
£211.29 INC VAT

Creature II Aluminium 2.1 Speaker
Mft Code: CREATUREIIALU
YOYO Code: 91132
£53.78 INC VAT

Z-5500 Digital 5.1 505W RMS Speaker
Mft Code: 970115-0120
YOYO Code: 9710
£215.55 INC VAT

DIGIPLAYER 1GB white MP3 Player
Mft Code: DIGIPLAYER600
YOYO Code: 4282
£28.99

Dialog 812 Headset
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MONITORS

1 20IN

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.

1 19IN

CTX W1961A
£139 ★★★★☆
Reviewed April 2007
www.ctxeurope.com
A good entry-level screen for multimedia and Vista.

2

Hanns.G HX191DP
£199.99 ★★★★☆
Reviewed June 2007
www.hannsg.com
Budget 19in screen with digital and analogue inputs.

1 17IN+

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, so check the policy before you buy.

DIGITAL CAMERAS

1 DIGI SLR

Nikon D80
£699.99 (body only) ★★★★★
Reviewed January 2007
www.nikon.co.uk
Nikon ups the ante with a 10-megapixel sensor, bigger screen and improved functionality.

1 PROSUMER

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 9-megapixel CCD.

1 COMPACT

Canon Powershot A640
£329 ★★★★☆
Reviewed January 07
www.canon.co.uk
Outstanding image quality and a host of features make for an enticing camera.

2

Casio Exilim EX-770
£230 ★★★★☆
Reviewed March 07
www.casio.co.uk
A superbly stylish compact digital camera.

3

Fujifilm Finepix Z5fd
£219.99 ★★★★☆
Reviewed June 2007
www.fujifilm.co.uk
Fujifilm Finepix Z5fd digital camera.

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

1 WIRELESS/MODEM

Zyxel P-336M
£73 ★★★★☆
Reviewed Winter 06/07
www.zyxel.co.uk
Clearly demonstrates that Super G remains a valid choice, as it is both cheap and effective.

2

AVM Fritz!box Fon WLAN 7140
£129 ★★★★★
Reviewed www.pcw.co.uk/2173339
www.avm.co.uk
A powerful product, yet with excellent ease of use.

1 WIRELESS

D-Link DIR-635 (wireless)
£110 ★★★★☆
Review: www.pcw.co.uk/2169612
www.d-link.co.uk
A slick, advanced and compact choice of router.

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.

1 VOIP

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 connect to the internet and each other remotely, 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
2K Games	Sid Meier's Railroads	Mar 07	3
3Com	3CRUS2475	May 07	3
Acer	PH730	Apr 07	4
★ Acer	C510	May 07	4
★ Acronis	True Image 10 Home	Mar 07	4
Aigo	A029	Mar 07	4
Altar	UFO Afterlight	Apr 07	2
Ambros	Shuttle SD32G2	Apr 07	3
Antec	Fusion	Apr 07	4
Asus	EN8800GTS	Mar 07	4
Asus	Silent Knight	Apr 07	4
Avanquest	Small Business Manager	Mar 07	2
★ AVM	Fritzbox Fon WLAN 7140	Apr 07	5
★ Benq	PE7700	Apr 07	4
★ Blizzard	WoW: Burning Crusade	May 07	4
BT	Internet Radio	Mar 07	2
★ Buffalo	Drivestation Duo	Mar 07	4
★ Buka Entertainment	Pathologic	Mar 07	4
★ Canon	EOS 400D	May 07	5
★ Cardscan	Cardscan Executive	Apr 07	4
★ Casio	Exilim EX-770	Mar 07	4
★ Chillblast	Fusion Tornado Quadro Q6700	May 07	5
★ Chillblast	Fusion Tundra 6300 OC	Apr 07	4
CMS	ABSplus Notebook Backup	Apr 07	3
Corel	Painter X	May 07	4
CTX	W1961A	Apr 07	4
★ Cyberlink	Powerdirector 6	May 07	4
D-Link	Web Smart Switch DES-1228	Mar 07	3
ECS	N8800GTX-768MX	Apr 07	4
E-Frontier	Anime Studio 5	Apr 07	4
Eidos	Battlestations: Midway	May 07	3
Evesham	Solar Quattro G8	May 07	4
Evesham	Lightbook	Mar 07	3
Evesham	iPlayer	Apr 07	3
Evesham	Solar Creation	Apr 07	4
Evesham	Solar Eclipse	Apr 07	4
EVGA	E-Geforce 8800GTX KO ACS	May 07	4
Fujifilm	Finepix F31fd	Apr 07	4
Fujitsu-Siemens	Amilo Si 1520	Mar 07	3
★ Gateway	MT6825b	May 07	4
Harrissoft	Properite	Apr 07	2
Hi-Grade	Notino W5600	Apr 07	2
★ HP	Compaq nc6400	May 07	4
HP	Photosmart A618	Mar 07	4
★ HP	Photosmart Pro B9180	Mar 07	5
HP	Compaq nc6400	Mar 07	3
HP	Compaq dc7700	Mar 07	4
HP	xw6400	May 07	3
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Imprivata	Onesign	Mar 07	3
Incomedia	Website X5	Apr 07	4
Infocus	IN76	Apr 07	3
Intervideo	WinDVD 8 Gold	Mar 07	3
Kyocera	FS-C5025N	May 07	3
★ Linksys	Wireless-G PTZ WVC200	Mar 07	4
★ Linksys	SPA942	Apr 07	4
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Logitech	3D Connexion Space Navigator	May 07	3
★ Meebo	Meebo.com	Mar 07	5
★ Mesh	Pegasus S271	Mar 07	4
★ Mesh	Elite E6600 Vistra PCW	Apr 07	5
Mesh	QX G80 Ultima	May 07	4
Microsoft	Zune	May 07	4
Microsoft	Office 2007	May 07	4
Microsoft	Windows SBS 2003 R2	May 07	3
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Navman	Travelassist	Mar 07	3
★ NEC	AD-7173A	Mar 07	4
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Nikon	Coolpix S9	Apr 07	4
★ Nikon	D40	May 07	4
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PC Nextday	Zoostorm 4-6403	Apr 07	3
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★ RH Computing	Mobile Net Switch	Mar 07	4
★ RIM	Blackberry 8800	May 07	4
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Samsung	GX-10	May 07	4
★ Samsung	NP-Q35T006/SUK	Mar 07	4
★ Samsung	SP-H710AE	Apr 07	4
Samsung	YP-T9	May 07	4
Sandisk	Sansa e280	Mar 07	4
★ Sapphire	Radeon X1950 Pro AGP	Mar 07	4
★ Sega	Medieval II Total War	Mar 07	5
★ Simbin	Race: The WTCC Game	Apr 07	4
Sony	Vaio VGN-UX1	May 07	3
Sony	Vaio VGN-C1S/W.CEK	Mar 07	3
★ Sony	NW-S706	Apr 07	5
Sony	Playstation 3	May 07	4
Symantec	Norton Save & Restore	Mar 07	3
Swyx	Swyxware Compact	Apr 07	3
★ Tandberg	RDX Qsuikstor	May 07	4
Terratec	Grabster AV400 MKII	Mar 07	4
★ THQ	Supreme Commander	May 07	5
Trendnet	621 PC Card	Apr 07	4
★ Vasco	Digipass Smart Pack	Apr 07	4
Viamichelin	X-980T	Apr 07	3
★ Viewsonic	VG2230wm	Mar 07	4
Xara	Xtreme Pro	Apr 07	4
Xensource	Xenserver for Windows	May 07	2

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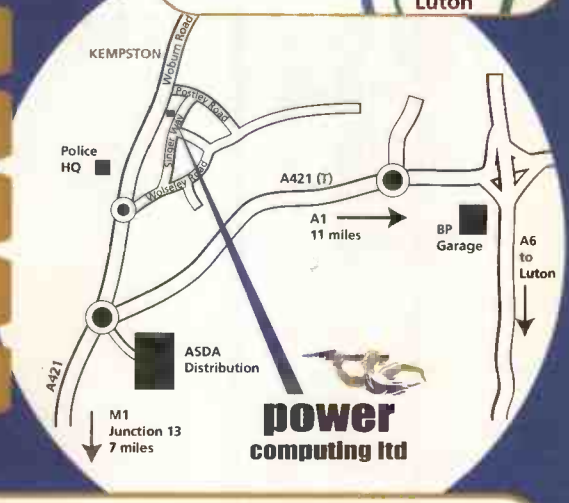

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2x Front USB 2.0 2x SATA
Intel Celeron 3Ghz 512 Cache
512MB DDRII
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Integrated 3D Graphics
Integrated 10/100 Ethernet
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BAREBONE MB BUNDLE 3
ATX Midi Tower Case PSU
ASUS P5VD2-MX Socket 755 M/Board
1x PCI Express x16 2xPCI 1xPCI Express x1
1x Parallel 4x Rear USB 2.0
2x Front USB 2.0 2x SATA
Intel D915 2.8Ghz Dual Core 64 bit
512MB DDRII
6 Channel On-Board Sound
Integrated 3D Graphics
Integrated 10/100 Ethernet
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MB BUNDLE 4
ASUS P5PE-VM Socket 775 M/Board
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4x Rear USB 2.0 1x Parallel
2x Front USB 2.0 2x SATA
Intel Celeron 3Ghz 512 Cache
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ASUS M2N8-MX Socket AM2 M/Board
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1x Parallel 4x Rear USB 2.0
2x Front USB 2.0 2x SATA
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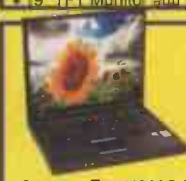

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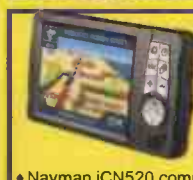

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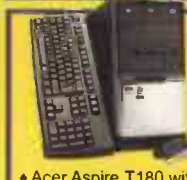

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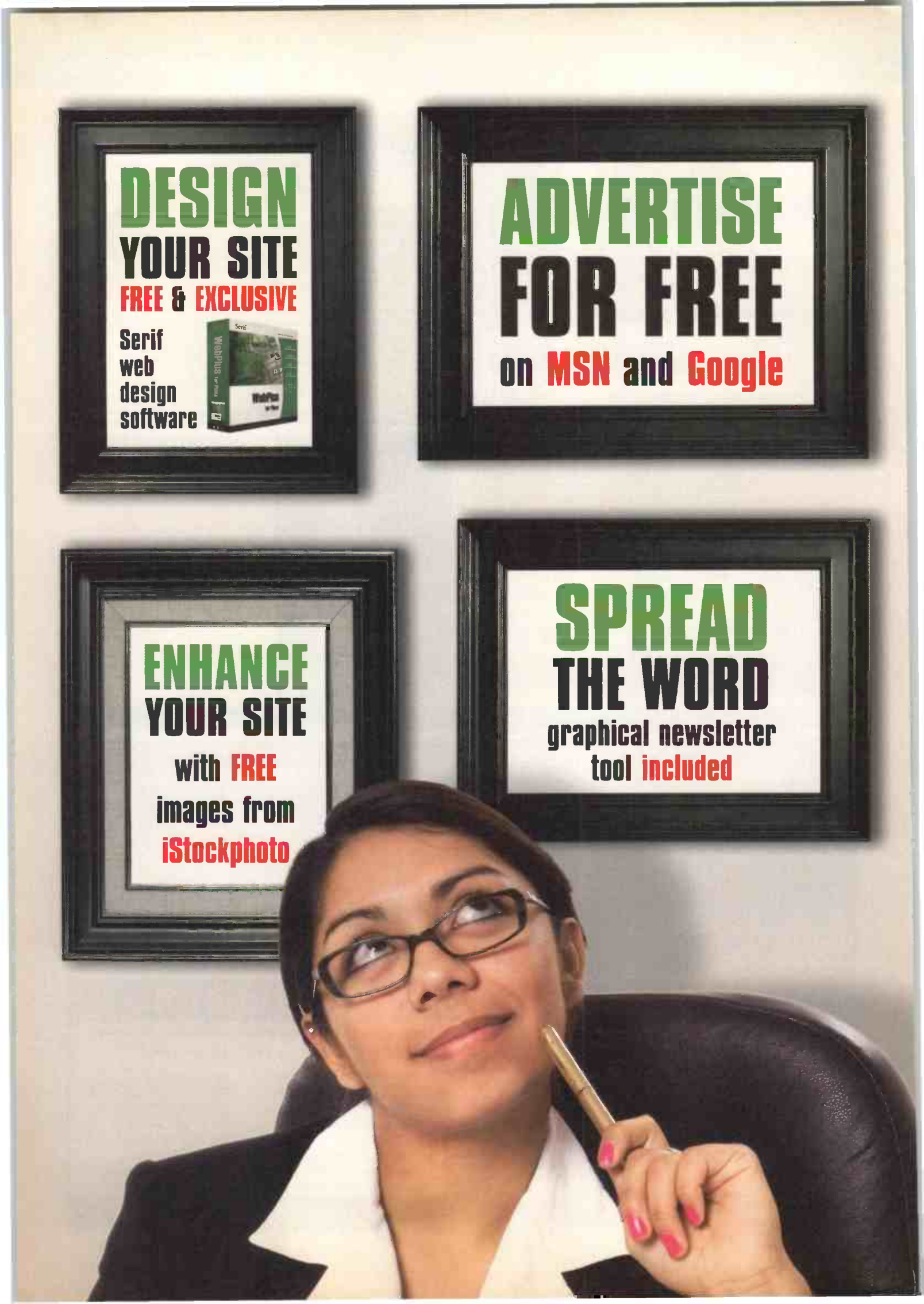
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System requirements
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ON THE 8GB DVD

Katchall Archive Lite ● Austrumi 1.4 ● Freespire 2.0 Preview 2 ● Kubuntu 7.04 Beta ● Monowall 1.23 ● Sam Linux 2007 ● Ubuntu 7.04 Beta

SOFTWARE LISTING

ON THE CD

FULL VERSIONS

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TRIAL VERSIONS

ACDSee 9.0.108
Camtasia 4
Spysweeper 5.3
Versomatic

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Crossloop 1.01
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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 June 2007, cover disc ABT, First floor, 13 Clifftown Road, Southend on Sea, Essex, SS1 1AB quoting reference: 'PCW Vol 30 No 7'.

PROBLEMS INSTALLING/ RUNNING THE SOFTWARE

Check the support page on the disc or check the manufacturer's site.

GENERAL DIFFICULTIES

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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COVER DISC

SIX PAGES OF DISC INFO INCLUDING

- PRODUCT DESCRIPTIONS
- WORKSHOPS
- UPGRADE OFFERS
- KEY FEATURES
- CONTACT DETAILS
- NEED TO KNOW

INFORMATION

System requirements 256MB Ram, Windows 2000/XP/Vista, 50MB disk space

Contact www.magix.com

Registration Follow the instructions during installation, or click Help > Online Registration

Magix Photo Clinic 5.5

Don't live with poor digital photos – fix them. Here's how

You can buy the best digital camera around, add a host of accessories and practise using them until you're an expert photographer, but it won't necessarily make any difference. You'll still download your pictures later and find some aren't as good as they might have been. And that's when you need the image-correction tools provided by Magix Photo Clinic 5.5.

Choose the 1-Click option on the toolbar and you'll get access to a bunch of photographic problem-solvers. Exposure issues? Colour balance? Red eye? Dodgy focus? Most can be fixed in a few seconds. Helpful instructions make it just as easy to remove stains and scratches, clone one part of an image to another, or apply other useful photo-retouching effects.

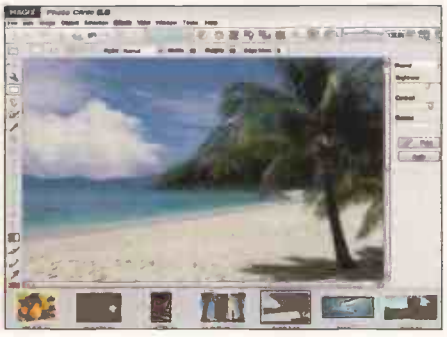
The real star here is the Effects Browser, though, in which almost 70 effects compete for your image processing attention. If you've got an image marred by colour fringing, for example, then the Chromatic Aberration filter might be able to fix it. Another option corrects barrel or pin-cushion lens distortions, and there are more to remove noise, fix colours, gamma, brightness and contrast.

There's much more to Photo Clinic than fixing image issues, though. It's just as good when it comes to annotating photos, adding details of your own with the fill and paint tools.

Almost all the available effects can be further tweaked to get the precise results you want, making this program an excellent choice for your digital dark room.

Fix common photo problems in a couple of clicks with Magix Photo Clinic

1 Magix Photo Clinic is an ideal image-editing solution, even for inexperienced users, thanks to its 1-Click menu. Select this and you'll get quick access to all the common photo correction tools (red-eye removal, exposure and colour correction), along with instructions explaining how to perform each task. Thumbnails at the bottom of the screen assist in managing and fixing multiple images.



2 For more control, click Windows > Effects Browser and try a filter like Brightness/Contrast. You can adjust brightness, contrast and gamma with sliders, and see the results immediately on the Preview window. Click the Paint button to paint an effect on an area of the image to improve fine detail, and use the transparency slider to further tweak the overall effect.

3 Over time you might find that you're applying the same corrections repeatedly to your images: a little more brightness, for example, or a little less contrast. Click File > Batch Processing and you are able to create a script that incorporates these changes along with others like image resizing, rotation and more, then apply them to an entire folder of images in just a couple of clicks.

UPGRADE OFFER

MAGIX PHOTO MANAGER 2006 DELUXE

NEW FEATURES

Create a photo slideshow on DVD
Find and delete similar photos
Export your photos to any format
Automatically optimise your photos
Share your photos with digital devices
Includes advanced photo print studio

If you're impressed with Magix Photo Clinic, or have outgrown the features provided, there are a number of upgrade options. If your digital photo collection is rather large, Magix Photo Manager 2006 will enable you to locate duplicate or similar photos. Magix Photos on CD & DVD 6 Deluxe enables you to output your digital photos on a slideshow via a CD or DVD presentation. Head to **www.magix.com** for more information and to make your purchase.

Syncwrangler

Advanced music and video synchronisation for iTunes and the iPod

INFORMATION

System requirements 256MB Ram, Windows XP, 20MB disk space, iTunes 6.x or 7.x, an Apple iPod (any model)

Contact www.acertant.com

Registration Visit www.acertant.com/vnupromo and use magazine code **BSW-1001-PCW** to get your serial code

Most iPod backup and synchronisation tools use little more than file names and modification dates when they're deciding what to move or delete. This works most of the time, but by no means always, and you may occasionally find that some songs are lost. Which is why Syncwrangler takes a more in-depth look at your music collection.

It looks at the tags of your audio files, too, making it much easier to identify songs, and so virtually eliminates the possibility of errors when merging, backing up or synchronising even the largest music and video collections.

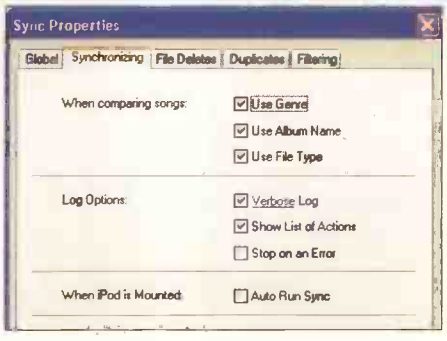
You could just use iTunes to sync your music and video collection for free, but that only copies music from iTunes to your iPod. Syncwrangler can work in the other direction too, and so provides six different sync types: sync iTunes and iPod, merge iTunes and iPod, copy iTunes to iPod, copy iPod to iTunes, make iPod equal to iTunes, and make iTunes equal to iPod.

And, of course, because Syncwrangler has a deeper knowledge of your music collection than most of the competition, it's far less likely to wipe out valuable protected music files, and is able to properly handle duplicate songs, even if they're in multiple music formats.

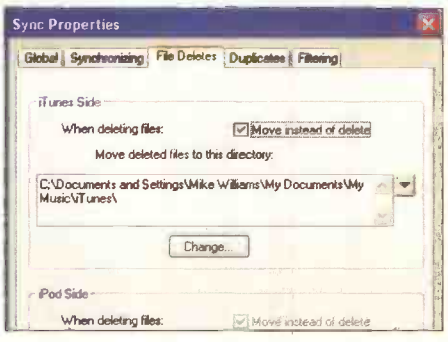
Yes, sure, iTunes shows you duplicate files, but leaves you to decide exactly how they should be treated, and that can be a tricky process: there's the format, file date and size to consider, for instance. Syncwrangler frees you from all this by automating duplicate song management and removal.

Copy or synchronise only chosen music and video files with Syncwrangler

1 Tired of restrictive, one-way iTunes to iPod synchronisations? Syncwrangler can copy music in the other direction, too, effectively making your iPod a backup tool for your music collection. You can also use its advanced filtering capabilities to copy or synchronise only music from a particular genre or artist, or music files of a particular type, and more.



2 By default, Syncwrangler uses tags including genre, album name and file type when comparing songs, but you can easily change this from the Sync Options > Synchronizing dialogue box. If you're happy with the settings, then Check Auto Run Sync to have Syncwrangler work its magic, automatically running the sync type you've chosen each time your iPod is mounted.



3 Click the Duplicates tab to see how Synchwrangler handles duplicate files. Change the rules if you prefer a different approach, but don't worry too much, because by default Synchwrangler moves rather than deletes files during a sync (both on the iTunes and iPod side). Click the File Deletes tab to see how this works.

UPGRADE OFFER

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NEW FEATURES

Restore previous versions of documents
Protect against accidental deletion
Compatible with all file types/apps
Explorer integration for easy recovery
View all archived files at a glance
Extensive user preference options

We're giving away the latest version of Syncwrangler, which means there's no direct upgrade path. The developers produce another tool in Versomatic, though, a useful file protection utility. Each time the program recognises that a file is about to be changed, deleted or overwritten, it archives the original first. These files can easily be restored from Explorer, meaning the entire revision history of any document is only ever a mouse click away. You can upgrade and receive a 25 per cent discount from the retail price. This discount also applies to other Acertant software, including the Mac OS X version of Syncwrangler. Go to www.acertant.com/vnupromo and enter coupon code CPN4430702019.

Ashampoo Burning Studio 6.5

Create data or audio CDs, run backups and much more

INFORMATION

System requirements Windows 98/ Me/ 2000/ XP/ Vista, 18MB disk space,
Contact www.ashampoo.com
Registration Leave 'Get full version key' checked during installation to get your free licence key

Browse what's on offer in the latest disc-mastering tools and it's easy to get lost. Internet telephony, desktop publishing, music creation and video editing are all very useful in themselves, but can get in the way if all you want to do is copy a simple audio CD.

But now there's a better way. Ashampoo Burning Studio 6.5 strips out all the non-essential extras, so that only the pure disc-authoring tools are left, enabling you to create data, music or even some video CDs easily.

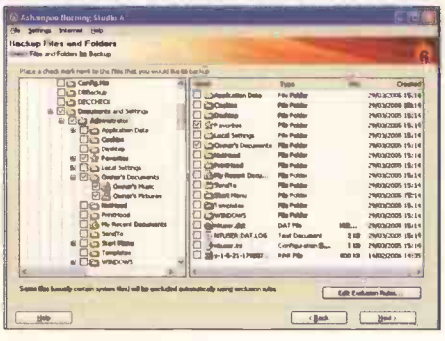
Don't assume this 'back to basics' approach means the program is lacking in features, though. The audio CD module supports all the main file formats, creates mp3 or Wma CDs and rips CDs to Wma with adjustable quality settings.

It's just as easy to build data CDs, by dragging and dropping the files you want to save on to Burning Studio 6.5. And the program goes beyond that with a built-in backup tool, enabling you to create password-protected compressed backup files of your data, which it then saves to external or network drives, as well as CDs, DVDs or even Blu-ray discs.

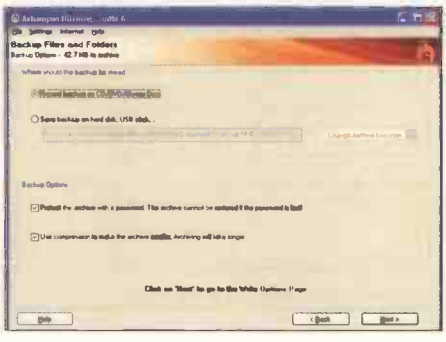
You also get a movie burning module, ready to create VCD and SVCD discs from scratch, or regular video DVDs if you have a prepared folder with the necessary Vob, Ifo and Bup files. The package also lets you burn or create Iso, Cue/Bin or Ashdisc files.

The best part is that these features are free of complex settings or obscure options, enabling you to copy quality discs quickly and easily.

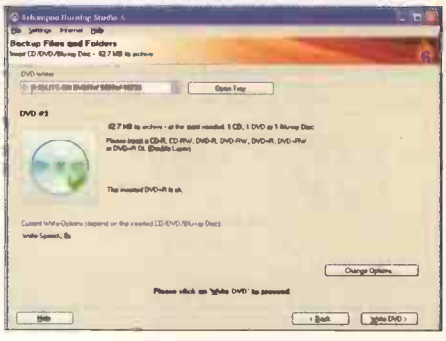
Back up all your vital data in three easy steps



1 Burning Studio isn't just about creating audio, data or video CDs; it's a capable backup tool too. Click Backup or Restore Files and Folders on the opening screen, and you'll see a conventional Explorer-style view of your PC. Check the box to the left of a folder in the left-hand window to select everything it contains, or check boxes in the right-hand window to choose individual files.



2 Click Next and choose the destination for your backup. It can be burned to CD, DVD or Blu-ray (the program will handle spanning multiple discs for you), and local, external or network drives. You can also choose to password-protect the archive (a good idea if you're saving files with confidential information), and turning on compression could reduce the archive file size significantly.



3 If you've enabled password protection, then you'll be prompted to enter the password now. Choose something difficult to guess, but easy for you to remember, because if you forget it your data is lost. Click Next, then Change Options if you need to modify writing speed or a select few other settings. But otherwise, you're finished, so just click Write DVD and let Burning Studio save your data.

UPGRADE OFFER

Create advanced Video DVDs
Design professional animated DVD menus
Ships with pre-designed DVD themes
Create bootable custom discs
Enhanced backup and restore module
Improved audio-CD ripping

ASHAMPOO BURNING STUDIO 7

At the time of writing, Ashampoo Burning Studio 7 is the latest current version. However, the all-new Burning Studio 7 is due for release very soon and will enable you to create advanced Video DVDs, enhanced support for backing up and restoring your files, improved audio ripping so you can rip tracks directly to mp3 and support to make your intended disc bootable. As a user of Ashampoo Burning Studio 7, you'll be able to upgrade at a discounted price. To upgrade or find further information, click Internet. Upgrade to Ashampoo Burning Studio 7 for a special deal on Ashampoo's latest burning software.

Serif Photoplus 8

Sophisticated photo editor packed with tools and special effects

INFORMATION

System requirements Windows 98/ 98SE/Me/ 2000/ XP, 53MB disk space
Contact www.serif.com
Registration Click Help > Registration Wizard

In a world full of competent photo-editing packages, it's far from easy to make your program stand out from the crowd. This doesn't seem to have been a problem for Serif though, who've packed Photoplus with extras just about everywhere you look.

The Effects menu, for instance, constantly delivers more than you'd expect. Instead of just one or two Blue options, Photoplus delivers six, many of which are configurable to produce exactly the effect you need. Classy lighting effects can bring new life to otherwise dull images. And forget the usual 'oil painting' filters you'll find elsewhere; this program lets you turn your photos into artwork in one of twelve different styles, from Expressionist to Van Gogh.

The range of selection tools is just as impressive. Along with the usual rectangle, ellipse, freehand or select by colour options, there's also a Magnetic selection tool that helps in following complex edges, 24 pre-defined selection shapes, and the ability to create a selection in the form of text. And once complete, it's easy to move the selection or otherwise manipulate it in a variety of ways.

You also get a powerful set of vector drawing tools and some very useful paint options. Keep looking and you'll find gradient fill editing, paths and powerful masking options.

The impressive feature set doesn't make Photoplus difficult to use, though, and the program remains suitable for beginners and experts alike.

Three ways Photoplus can add a professional touch to favourite images

1 Photoplus has plenty of interesting and fun effects to play with. Click Effects > Instant Artist to change any image into a painting, for instance. Add realistic lens flare and other lighting effects from the Effects > Render menu. And feel free to explore the Deform and Mesh Warp tools, which can stretch, twist and turn your photos to produce a very original and eye-catching look.

2 Don't like the colour of an object? Then replace it. Click Image > Adjust > Replace Colour, click the left pipette and draw a line across the affected area, telling Photoplus which colours you'll change. Now adjust the hue, saturation or brightness to pick a different colour, and click OK for a near instant colour change. Use the paint tools to retouch any areas that are left over.

3 The selection tools are particularly strong. Draw a rectangle, ellipse, or one of 24 other pre-defined shapes around a feature, then move, expand or contract the selection, feather it and you've got an old-style picture postcard-type image. Or use the Text selection tool to select part of your image, then copy and paste it to produce a stylish, colourful text logo.

UPGRADE OFFER

SAVE £10 ON SERIF PHOTOPLUS STUDIO

NEW FEATURES

- Many new filters and effects
- Integrated screen capture tool
- Paint tools support anti-aliasing
- Easier layer management
- Email photos with a couple of clicks
- Organise your images into albums

The latest Serif package includes goodies like a Documents tab, with thumbnails of all open images. The Quickfix Studio brings your image-correction tools into one place, the Straighten tool fixes photos with sloped horizons, and there are lots of new filters and photographic effects. There's also Albumplus, a tool for organising your photos into albums, then viewing them, printing contact sheets or running slideshows. And all this image processing power can be yours for only £49.99 (plus P&P), £10 off the usual price, if you order by 26th May 2007. To qualify for this special deal, just call 0800 376 7070 (+44 115 9145454 from outside the UK) and quote code RO/PCW/PH8/0407).

Microsoft Virtual PC 2007

FULL VERSION

INFORMATION

System requirements 1GHz CPU, 512MB Ram (1GB to run Vista), Windows XP Professional/XP Tablet PC Edition/Vista Business/Vista Enterprise/Vista Ultimate, 15GB disk space for Vista Virtual PC
Contact www.microsoft.com
Registration Not required
Limitations Virtual PC 2007 runs on Windows XP Home, but Microsoft doesn't support configuration

Your virtual systems act like real PCs, letting you run multiple versions of Windows with no hassle

Better security, improved performance, faster searching and a stylish new interface are just some of the reasons you might want to upgrade to Windows Vista in the near future. But you'll probably have worries, too. The new operating system has undergone some fundamental changes since XP, and it's quite possible that many of your applications won't run until they've been updated to be Vista-compatible.

Don't give up on your favourite programs just yet, though, because Microsoft has a solution that may well help. Install Virtual PC 2007 on a new Vista PC and it will create a sandboxed environment in which you can set up and install Windows XP (or Windows 98, Me, 2000 or even Windows NT, if you've got a CD and licence key). And Virtual PC keeps everything away from your actual operating system so it won't get messed up.

While this type of virtualisation technology is incredibly useful, it still has limitations. It will share your host PC's memory, so you'll need at least 1GB. And your Virtual PC doesn't emulate DirectX, so you can't use it to play games or 3D applications. 2D applications perform very well, though, making this perhaps the most convenient way to use other operating systems on your current Windows installation.

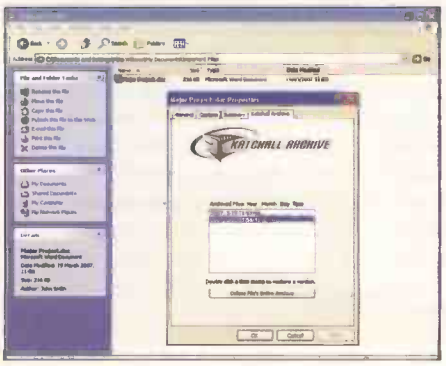
UPGRADE OFFER

MORE VIRTUAL HARD DISKS

This is the very latest version of Virtual PC, not cut down in any way, so there's no upgrade available. If you're a business user interested in getting more out of the technology, though, you could try exploring some of the virtual hard drives that Microsoft has created for free. These include pre-configured environments to let you evaluate tools like Windows Server 2003 R2, Exchange Server 2007, ISA Server 2006 and SQL Server 2005. All the downloads are free. Find out more on the Microsoft Technet site (www.microsoft.com/technet/try/vhd).

Katchall Archive Lite

FULL VERSION



INFORMATION

System requirements 512MB Ram, Windows XP SP2, 10GB free disk space
Contact www.bluesquad.com
Registration Go to www.bluesquad.co.uk/vnu/archive/register and follow the instructions
Limitations None

A few clicks in Explorer is all it takes to recover older versions of your files

It's happened to everyone. You've spent hours, days, weeks or even months working on a document, but then somehow accidentally deleted a big chunk of it, or otherwise rearranged the contents. Worse still, you didn't notice, saved the corrupted file, and now a significant portion of your work has been lost.

If you install Katchall Archive Lite, mistakes like this don't have to be so damaging. The program monitors Word and Excel documents for you, making copies as they change, ensuring you always have the last five versions available.

If something has been lost from a document, right-click it in Explorer, and select Properties > Katchall Archive to see a list of date-stamped earlier versions ready to be restored.

While the program offers an excellent safeguard against data disasters, it does also mean you have to think about how you work with confidential data. If it's easy for you to restore files, then it's also easy for anyone else with access to your PC.

Fortunately, the authors have thought of that, too. Katchall Archive only monitors files stored in My Documents, so if you create Word or Excel files in another folder, they won't be archived. And the archives it does maintain can be deleted in one click.

UPGRADE OFFER

33 PER CENT OFF KATCHALL ARCHIVE

Katchall Archive adds the ability to create your own file-saving rules, archiving any file types in whatever locations you like. It only takes a few moments to set this up, then you can relax, secure in the knowledge that you'll always be able to recover previous versions. The list price for Katchall Archive is £14.95, but as a registered owner of the Lite version, you need only pay £9.95, an impressive 33 per cent discount. Read more at www.bluesquad.co.uk/vnu/katchall/offer, or just buy the program at www.bluesquad.com, using the code BSQ-KATCHALL to qualify for this special price.

COMPETITION

WIN! Win a Shuttle media centre PC

Shuttle® We create!

This month *PCW* has teamed up with Shuttle to offer one reader the chance to win a superb media centre PC base unit worth £835 from the company's latest range of XPC mini PCs.

Running the Windows Vista Home Premium operating system, it may be mini in size, but there's certainly nothing mini about its specifications. The Shuttle XPC mini X 200MC is just 5.5cm tall and expertly designed to save your desk space, with performance specifications ideal for multimedia applications such as video editing or just watching DVDs.

The PC is equipped with Intel's Core Duo 1.6GHz mobile processor, 2GB of Ram, a 250GB hard disk drive, slot-loading DVD writer, an Intel GMA950 onboard graphics accelerator with DVI/VGA out, and multi-channel digital audio. The Shuttle XPC mini X 200MC offers an exceptional combination of powerful performance and oustanding potential for future applications. Moreover, the connectivity options include built-in 10/100Mbits/sec networking capability, a 4-in-1 memory card reader for copying files from your multimedia devices, and five USB2 ports so you can easily connect all your favourite peripherals to the system. It integrates an MCE-compliant hybrid TV tuner that can receive analogue or digital (Freeview DVB-T) TV and FM radio. It also includes a remote control.

Just plug in your own display, keyboard and mouse and you've got an incredibly compact media PC, delivering a great digital entertainment experience with the traditional XPC charm that many have come to love.

The Shuttle XPC mini X 200MC is ideal for many applications, such as a digital hub (music, photos and video), desktop replacement, home entertainment centre or a home office platform.

For your chance to win, answer the question below and enter online at **www.pcw.co.uk/competitions**. The competition opens on 19 April and closes on 18 May 2007.

Which operating system is the Shuttle XPC mini X 200MC equipped with?

a) Linux
b) Windows XP
c) Windows Vista Home Premium

This competition is open to readers of *PCW*, except for employees (and their families) of VNU Business Publications, and Shuttle. 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 winner of the April competition is Martin Bookbinder, who wins a Sapphire X1950XTX graphics card. Runners-up Astrid Schwennicke and Alan Moss each win a Sapphire X1900XT card.

ENTER ONLINE AT www.pcw.co.uk/competitions

On the web

www.pcw.co.uk

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Our labs blog, the Test Bed, gives you regular updates on the latest gossip, technology trends and products. We also have a performance area, where test results can be compared so you can see how well rival products fare against each other. Our database of products makes it the most comprehensive tool you will find and the perfect complement to our Buyer's Guides and reviews.

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You may recognise some entries in this blog from our Letters pages, but they are published here first, letting you add your views and comments.

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If you want to keep up with the latest news, reviews, blogs, Hands on and software downloads then sign up for our weekly *PCW* email newsletter. It is published every Friday and gives you a selection of the highlights from the week. Our Products newsletter goes out on Wednesdays and includes the most important news stories and reviews.

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10 tips for buying safely

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Personal Computer World

NEXT MONTH

ON SALE 17 MAY 2007

Living with Vista Media Center

Media Center is now free with the premium versions of Windows Vista. If you're unsure whether it's for you, don't miss next month's feature. We'll walk you through setting up and using it, plus give you lots of expert advice on how to get even more out of it.

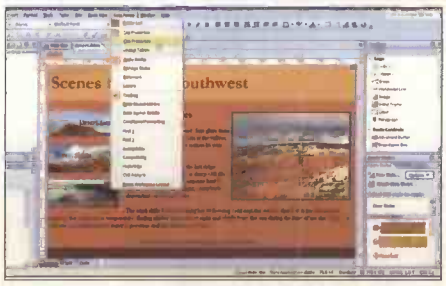
Ultimate laptops

A couple of months ago we looked at what's available when you take the lid off your budget for buying a desktop PC. Next month it's the turn of laptops – and rest assured there are some very tasty offerings at the top of the food chain.

Website creation tools

If you want your website to do more than just look pretty, chances are you'll need a professional website creation tool. We'll see how the latest packages from Adobe and Microsoft stack up against a free, open source alternative.

Protect your identity



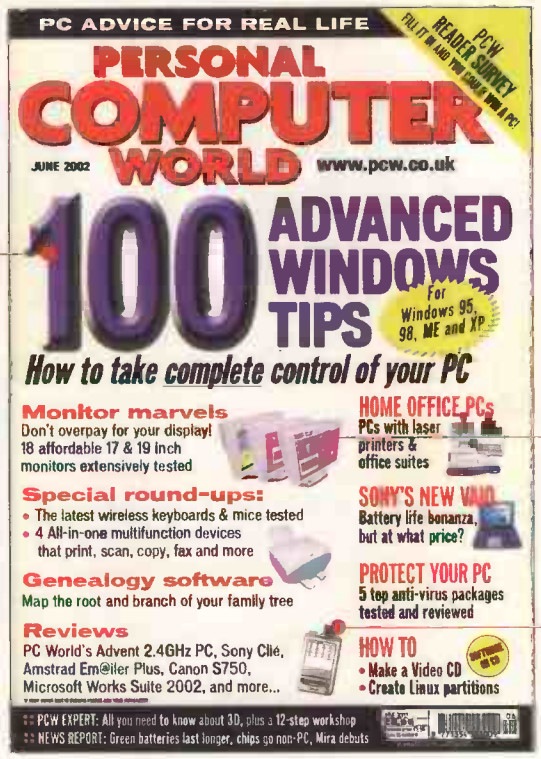
When an online customer database gets hacked, it's headline news. But what's less reported is the vast amount of personal information that's publicly available on the web. We'll explain the risks and show you how to keep your identity safe.

There's lots more in July's PCW
DON'T MISS IT...

JUNE 2002

From the archives: Take a look at the important events in technology five, 15 and 25 years ago.

Five years ago this month, we led with 100 advanced tips for Windows 95, 98, ME and XP. The 40 keyboard shortcuts ranged from bypassing the recycle bin to delete items, to one-button renaming of files. They were especially worth learning because they still work in Vista today.



CRT monitors still ruled the visual roost and we took a look at 18 mainstream models in our Group Test. To get a grasp on such a big group, two Editor's Choice awards were given out. The first went to the budget 17in Iiyama Pro LA702UT, which had a desirable flat glass screen. The second went to the 19in CTX PR960F, with its superb image quality and an astonishing 1,920x1,440 resolution. Costing £345 and weighing 26.5kg, you got what you paid for, too.

Just three years before Sony packed in its PDA division, we looked at the Clié PEG-T625C. Its 320x320 pixel screen was "unbeatable" according to reviewer Nik Rawlinson. It ran Palm OS 4.1 and featured 16MB of D-Ram and 4MB of Flash. Sony claimed a 12-day battery life and Nik concluded it was "the most desirable PDA going".

JUNE 1982

The cover of our June 1982 edition showed a chimp playing with Clive Sinclair's ZX Spectrum, a follow-up to the hit ZX81. Our reviewer David Tebbutt wrote that Uncle Clive had done it again by producing "a decent colour computer at a price only he can conceive". It cost £125 or £175, for either 16KB or 48KB of Ram.

There was no monitor or tape drive – you had to use your television and load programs from a cassette player. Packed into 16KB of Rom was the operating system, character set and a Basic interpreter on which many of today's computer engineers cut their programming teeth. Tebbutt concluded that the ZX spectrum was "the best value for money you can find today".

Also reviewed was the Sharp MZ-80A, which was to supersede the three-year old MZ-80K. The MZ-80B, which had better graphics, was also an earlier model – the order of the letters made no sense. Reviewer Peter Rodwell was not pleased with 80A, concluding: "I am left wondering what Sharp's development team has been doing all this time."

JUNE 1992

The big news on the front cover of *PCW* in June 1992 was the launch of IBM's OS/2 2.0.

OS/2 was the biggest rival to Windows. It was more advanced, as it was capable of real-time multitasking, which Windows was not. Microsoft was preparing its comeback, with Windows New Technology, or NT.

NT's launch was some months away, but *PCW* managed to get a sneak preview of it. The conclusion was that OS/2 was a "better Dos than dos" and that Windows NT showed good potential as a networking operating system.

Other items of interest included a soundcard review by Chris Cain, who pitted the Creative Labs Sound Blaster Pro against the Ad Lib Gold 1000. It was a close call, but Chris would personally have gone for the Ad Lib card because of its superior sound quality.

In our software Group Test, we compared 20 desktop publishing packages. Today Quark and Adobe have pretty well sewn up the professional market, although there are still a few lower priced packages around.

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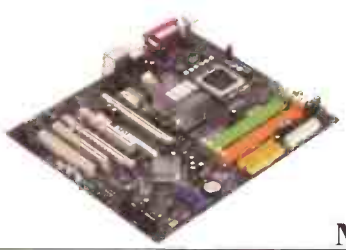

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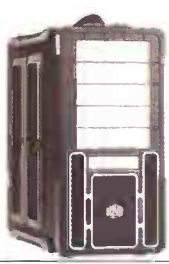

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