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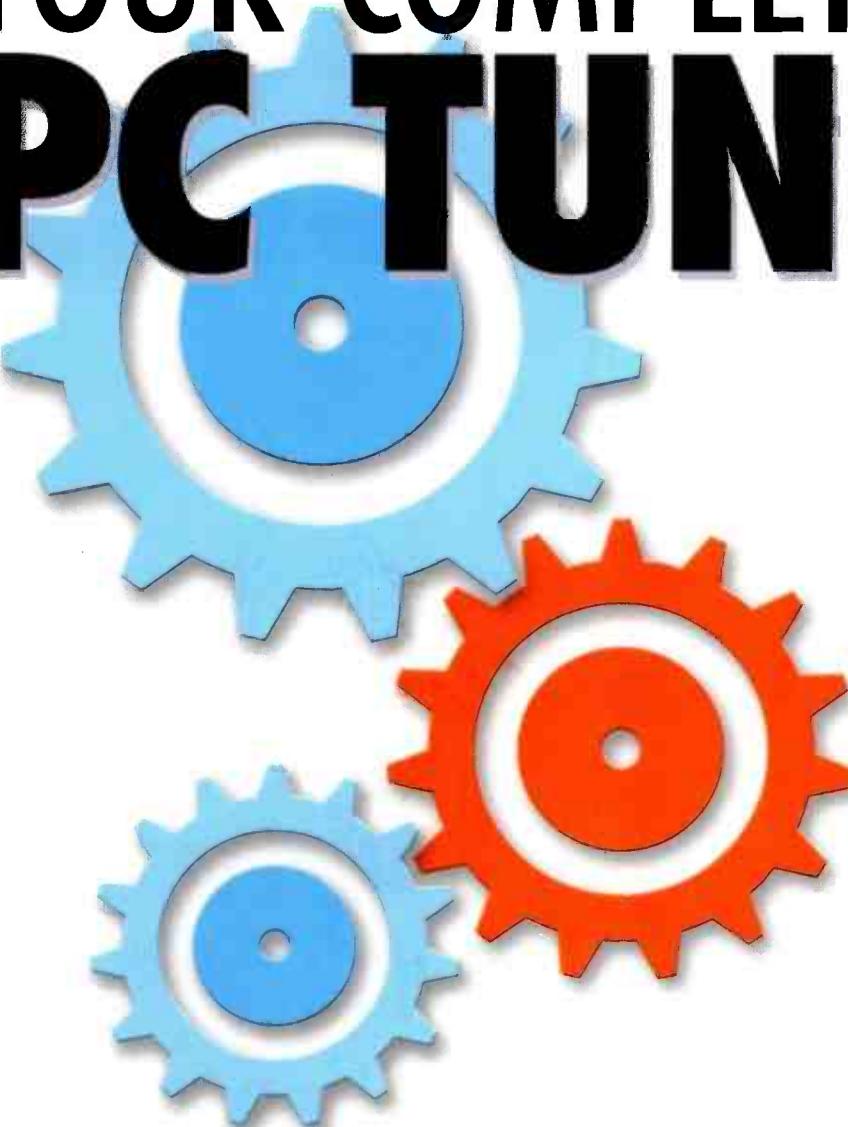
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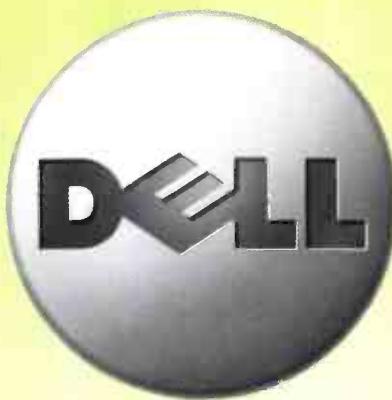


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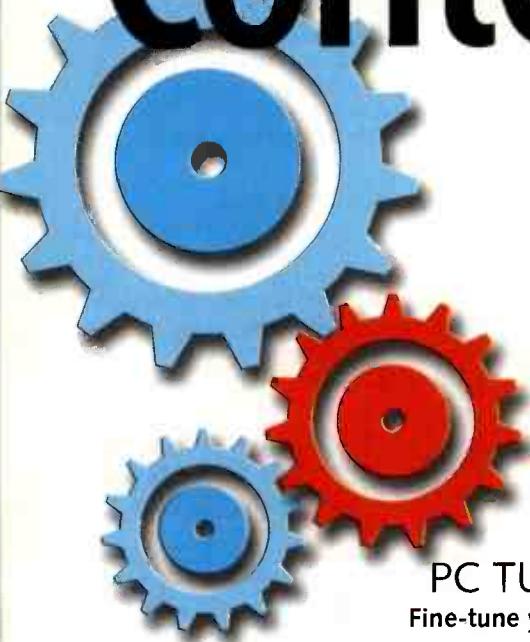
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# Contents



52  
PC TUNE-UP  
Fine-tune your system



58

MOVE TO VISTA  
The full picture on upgrading



## REGULARS

- 7 Editorial
- 199 Competition
- 200 Contact us & PCW on the web
- 201 In the next issue
- 202 Flashback

## INTERACTIVE

- 26 Letters
- 31 Gordon Laing – Inside information
- 34 Barry Fox – Straight talking
- 51 Guy Kewney – Kewney @ large

## NEWS

- 10 Anger at UK Vista mark-ups
- 11 Kodak cuts printing costs
- 12 BBC rapped for Microsoft lock-in
- 14 Intel jumps the gun on 11n
- 16 Web apps challenge IT giants
- 18 Intel in miniaturisation breakthrough
- 19 PCIe data rates double
- 20 Floppy disk obituary

## COVER DISC

### 9 & 193 Five full programs

Webroot Spy Sweeper 5; Novapdf Lite 3.3; Ashampoo Music Studio 2007; Secured Email; Website X1, plus loads more resources and freeware

## REVIEWS

- 75 **Contents**
- Hardware**
- 76 Evesham Solar Eclipse
- 77 Hi-Grade Notino W5600
- 78 Packard Bell iPower 7650

### Peripherals

- 80 Evesham iPlayer
- 81 ECS N8800GTX-768MX
- 82 AVM Fritzbox Fon WLAN 7140
- 82 CTX W1961A
- 84 Sony NW-S706
- 90 iHome iH19
- 90 Viamichelin X-980T
- 91 Panasonic BL-PA100KT
- 91 Fujifilm Finepix F31fd
- 92 Nikon Coolpix S9

### Components

- 95 CMS ABSplus Notebook Backup
- 95 Antec Fusion
- 95 Trendnet 621 PC Card
- 95 Asus Silent Knight

- Software**
- 96 E-Frontier Anime Studio 5
- 97 Navicore 2007 Personal
- 98 Xara Xtreme Pro
- 99 Incomedia Website X5

### Games

- 101 Race: The WTCC Game
- 102 UFO Afterlight
- 103 Europa Universalis III

### 104 How we test



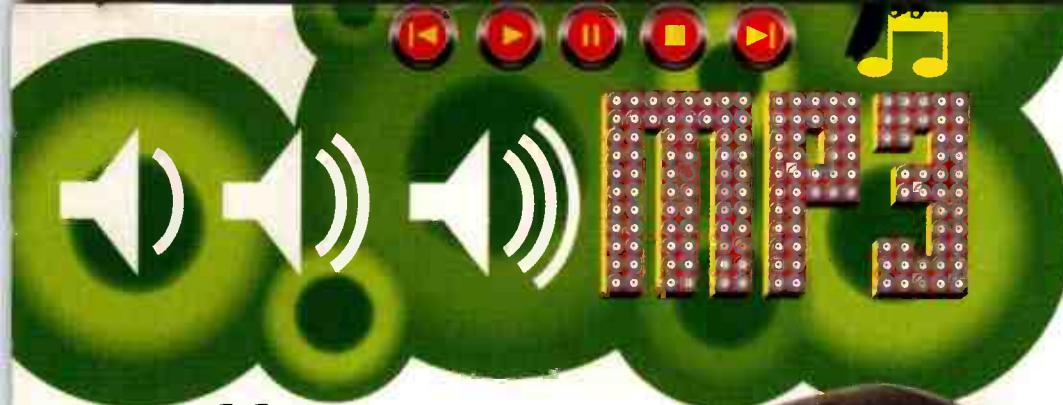
## GROUP TESTS

### 107 £999 PCs

If you're in the market for a mid-range PC and are looking to upgrade to Vista in the near future, one of the five models we test here may be for you

### 117 HD-ready projectors

Make the most of your wall space with the latest high-definition projectors. We examine five from the current crop



66

MP3s

Get your music files in order



117

HD-READY  
PROJECTORS

We test five of the best



107

PC GROUP TEST

Great PCs for under a grand

COMPETITION



199 Sapphire  
X1950XTX &  
X1900XT  
graphics cards

## FEATURES

### 52 The ultimate PC tune-up

The fundamentals of keeping your system in tip-top condition

### 56 Computer CSI

PCs are becoming a vital source of clues for trapping high-tech villains

### 58 Goodbye XP, hello Vista

The Vista upgrade process explained

### 66 Mastering your music

How to store your audio efficiently and bring order to your sound file chaos



## HANDS ON - Practical how-to advice

### 143 Contents

### 144 Question time

Our experts answer your questions

### 148 Hardware

Build your own Nas device

### 150 Performance

DIY projects will bear fruit eventually, it might just take a little perseverance

### 154 Windows

Encrypt your confidential data correctly

### 156 Linux/Unix

Some indispensable disaster-recovery tips

### 158 Digital imaging & video

Find out how to reduce image noise on your home videos

### 160 Word processing

Word Smart Tags explained

### 162 Spreadsheets

Set up your own personal functions and save them as Excel add-ins

### 164 Web development

Build a web-search function with Perl

### 166 Networks

Support your peripherals with Power over Ethernet

### 168 Databases

Relational databases, Psion tools and the uses of '&'

### 170 Visual programming

XNA: powerful games programming made easier

## BUSINESS

### 129 Contents

### 130 What's in a server?

A practical guide to small-business servers for those looking to expand their operations

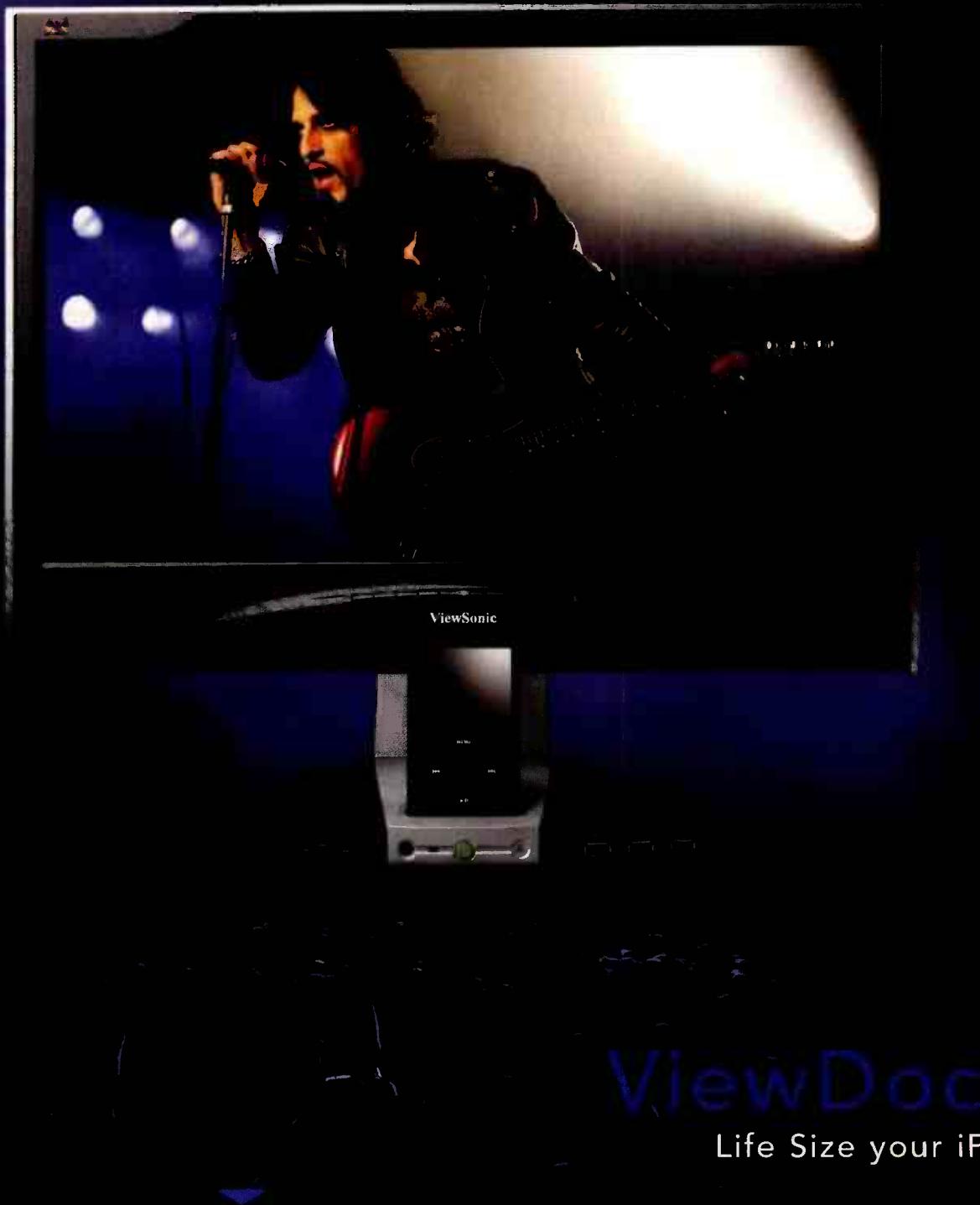
### Reviews

- 134 Swyx Swyxware Compact
- 136 Linksys SPA942
- 138 Vasco Digipass Smart Pack
- 139 Harrissoft Properite
- 140 Neon Software Cybergauge 7.0
- 141 Cardscan Executive

## BUYER'S GUIDES

A listing of the best products PCW has tested, helping you to make the right decision when planning a purchase

- 173 PCs
- 174 Graphics cards
- Notebooks
- 175 Motherboards
- Digital music players
- 176 Hard drives
- DVD drives
- 177 Printers & TV tuners
- 178 Monitors
- Digital cameras
- Routers
- 179 Product index



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# Editorial

## How the world of personal computing became PCW

As PCW celebrates its 29th birthday, Kelvyn Taylor reflects on how technology has shaped the magazine



When Personal Computer World's founder, Angelo Zgorelec, launched the first issue of this magazine in 1978 (it was actually published on 8 February, but for some reason, we've always designated the April issue as our 'official' birthday), the PC as we know it wasn't even invented. It was three years before IBM grabbed a slice of the burgeoning home computer market by launching its Personal Computer. The PCW archives don't record whether IBM's choice of name was greeted with glee or despair by the editorial team, but 'personal computer' was already a common term even before PCW was born, so they couldn't really get too upset.

I doubt whether anyone involved in the launch of PCW ever truly believed that it would still be going strong in 2007. A magazine is usually a child of its time, launched to meet a need or fill a gap in the market. PCW was no different in that respect: the first issue was specifically timed to coincide with the launch of an affordable British-designed microcomputer kit, the Nascom 1, which graced the cover of that issue.

Our founder certainly thought that home computing was going to be big – although he could never have guessed just how big – but even then, he couldn't predict whether or not the magazine would sell, so the first issue was deliberately published without a cover date.

The IBM PC didn't immediately change the market, as it carried a price tag beyond the reach of most home users. The breakthrough came in 1982 when Columbia Data Products and Compaq engineers reverse-engineered the IBM PC's Bios (to avoid copyright violation), so they could launch the first IBM PC clones. Phoenix then did the same, but sold the resulting Bios to anyone who wanted to make a clone.

At last, cheap PCs that would (in theory) run any of the dozens of applications written for the IBM PC were available, and the public couldn't get enough of them, spurring the popularity of computer magazines. By the 1990s, these were chock-full of mail order adverts for PCs: in those heady days, PCW regularly had 400 pages or more per issue, with some competitors topping out at more than 1,000 pages. But, of course, the bubble had to burst eventually as hardware prices plummeted and dozens of PC makers went to the wall.

However, the pace of innovation kept accelerating. A basic £400 PC these days offers possibilities beyond what anyone foresaw in 1978 – at that time even local area networks (Lans) were still in the research labs. Yet despite the technological advances, PCs and the software they run can still be totally frustrating, mainly because they are flexible, general purpose machines. Our DVD players, hi-fis and televisions are limited-function devices, and they do those functions very well. A PC can now perform any or all of those functions, and hundreds more, but it can't do any one of them very well, which is where PCW comes in. We've always tried to help you understand and master your PC, whatever it is you're trying to do.

But it's you, our readers, who are the real secret of our success. PCW isn't aimed at whichever section of the population happens to be the marketing flavour of the month, or at any particular level of expertise and experience. It's written for people who are fascinated by the world of personal computing in all its forms, and written by people who share that same interest. And, unless you tell us otherwise, that's exactly what PCW will continue to do for the next 29 years. **PCW**

*Dylan Armbrust will return next month*

**'A basic £400 PC these days offers possibilities beyond what anyone foresaw in 1978'**

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# APRIL COVER DISC

Let our workshops show you how to use some of the software on the CD and DVD



see page 194

see page 195



see page 196

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For workshop see page 196

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See page 197



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For workshop see page 198

### Linux and open source

Fedora Core 6 Live, Mandriva One 2007, Metisse  
Knoppix 5.1.1



**PLUS MUCH MORE!**

FOR A LISTING OF SOFTWARE TURN TO PAGE 193

# NEWS

## IN THIS SECTION

### NEWS

- 12 BBC rapped for Microsoft 'lock-in'  
Standard could end inkjet price confusion
- 14 Intel jumps gun on 11n UWB gets go ahead – but not yet
- 19 PCI Express speed doubled  
HP beats Moore's Law
- 20 Floppy-disk obituary  
Flash prices plummet

### MICROSOFT LAUNCH

- 16 Challenge of web apps
- 17 Loophole allows clean upgrade  
Open XML standard bid falters

### SPECIAL REPORT

- 18 Intel great leap forward  
The Vista launch overshadowed news of a claimed breakthrough that will allow Intel to move to 45nm scale and push up processor clock rates

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# Fury over Vista UK mark-ups

The new Windows Vista operating system and Office 2007 applications suite have finally arrived, after what by Microsoft standards was a very low-key launch. The company immediately ran into a row about UK prices, which are up to 60 per cent higher than those in the US – twice as much, if you include Vat.

There was frustration, too, when sites for redeeming Vista Express Upgrade coupons bundled with recently purchased PCs crashed under massive demand. The Dell and Toshiba sites were affected; so was that of Moduslink, which handles customers of Mesh, Evesham and Acer, among other manufacturers.

Dell extended the deadline for claiming these upgrades by two weeks to 31 March. It said most upgrade discs would be sent out this month, although code for a couple of high-end systems, such as the XPS 710 and 710 H2C may take longer because of delayed drivers.

However, the fury over pricing is likely to last longer: Microsoft forums were flooded with complaints, including one calling for a boycott of Vista until prices are adjusted. Chairman Bill Gates, who launched the new software from the British Library in London, seemed unprepared when the BBC TV's Huw Thomas challenged him on the matter.

Gates replied: "We have tried to keep prices largely in line from country to country and I haven't followed how the exchange rate may have made that drift. We do get cases where things go out of alignment, when currencies go up and down."

If Microsoft has been tracking exchange rates, it clearly has not looked at them for a while because the pound has been pushing towards the \$2 level for months. An upgrade for the Home Basic edition of Vista costs \$99.95 (£52) in the US, compared with £85 ex Vat in Britain, or £99 inc Vat.

US prices of the full versions of the Ultimate, Premium, and Basic editions, translated into UK prices are respectively £213, £128 and £99; respective UK prices are £314.89 (£369.99 inc Vat), £187.20 (219.99 inc Vat) and £153.20 (£179.99 inc Vat).

Microsoft said in a statement: "Microsoft is committed to keeping prices low for customers, and Windows Vista editions and the 2007 Office system will be offered at the same prices as comparable Windows XP and Office 2003 versions."

It said that pricing was set by retailers rather than Microsoft. The statement went on: "For those people buying a new PC with Windows Vista and the 2007 Office system pre-installed, the price of a PC will generally be lower than it was three years ago if comparing core specification."

To read more on the launch news, see page 17 Clive Akass



Vista marks the coming of age of Windows, which was 21 in November. This picture, taken at PC World, shows Windows 1.01 running on PCW's own Compaq Portable 486c (far left). Windows 1.0 was delayed by a cheeky Apple lawsuit claiming Windows aped the Mac's look and feel. In fact, Apple had pinched the idea from Xerox's famous Parc Lab. Windows did not really take off until version 3.0 in 1990. It wasn't until well after the release of Windows 95, with the more mature Pentium processors, that PCs had the power to run a graphical interface comfortably. Some things haven't changed, though. Many Microsoft products still don't succeed until the third or fourth generation (such as Explorer and Win CE). And Apple still talks as though it invented everything from WiFi to the music player.

# Watford Electronics and Savastore sold

Online retailer Savastore.com stopped trading as we went to press. This happened after its parent company Watford Electronics was bought out by Globally Limited, which trades from the same address. Watford Electronics was believed to have

had its credit limits reviewed by some suppliers.

Savastore said all remaining orders would be fulfilled and customers would not be charged until the item was dispatched. A notice on the site said the closure would be temporary.

Redten Internet, which offers a free Watford Electronics PC to people who sign up to a £20-per-month broadband deal, said it would continue to operate but that there might be delays to delivery of the computers. See [pcw.co.uk](http://pcw.co.uk) for updates.

# Kodak inkjets shake industry

**T**wo new Kodak inkjets will print photos at between a third and half the cost of rival systems and up to four times as fast, the company claims.

The Easyshare 5300 and 5500 could disrupt the much-criticised industry practice of selling consumer printers cheaply and making money from consumables, confusing customers about the true cost of printing, said one analyst.

Both models double as a scanner and copier; the 5500 also offers fax. Both print A4 documents but using a second 6x4in tray automatically puts them into photoprint mode.

Kodak is being curiously reticent about the UK prices; but the US prices of \$199.99 (£104) and \$299.99 (£156) for the 5300 and 5500 respectively are on a par with devices of this class – unless the company decides to use a Vista-style exchange rate. The 5300 will be available in May and the 5500 will be available in July.

The machines use one black cartridge costing £6.99 and a £9.99 five-colour cartridge; a pack of both costs £14.99. A 'value pack'



It will cost you less to print photos with Kodak's new inkjets

of the colour cartridge plus 180 6x4in blank sheets costs £17.99 and works out at 7p a print.

Kodak claims £10 worth of its ink will print 105 pictures, compared with 61 on the Canon 160, 39 on the HP C5180 and 23 on the HP C3180.

Kodak is new to the consumer inkjet market but draws on years of experience in the photo-printing business. The new machines use a combination of pigmented inks and porous paper that dries immediately on printing, and is resistant to water and smudging.

Philip Grote, business-printer specialist at Current Analysis, who last year wrote a devastating report on industry pricing (see [www.pc.co.uk/2163973](http://www.pc.co.uk/2163973)), said: "This is not your usual printer introduction. Kodak completely changes the game with these new all-in-ones (AIOs) and they will not be welcomed by competition."

He added:

"Competing openly on cost-per-print in retail puts the profits of the printing industry in grave danger. To compete with Kodak, competitors will have to reveal what their own printing costs are and ultimately lower prices."

"While this is great for consumers, it is bad for printer manufacturers' bottom line. Kodak's AIOs combine lab quality photo-printing and fast home office printing in one affordable device that will take the market by storm."

[www.kodak.co.uk](http://www.kodak.co.uk)

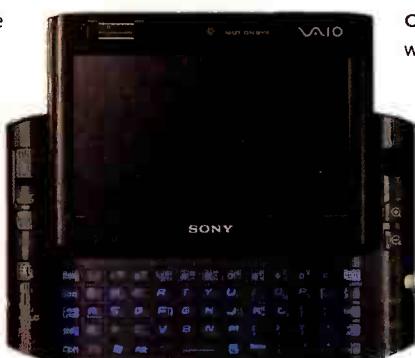
New standard for cartridges, see page 12.

## Sony offers lightweight PC at luxury price

Sony has launched an ultra-mobile PC (UMPC) weighing just 480g – the first on the market in this category with a built-in keyboard, and the first to be just about pocketable (15.2x3.62x9.5cm). But the price is a shocker: £1,999.

Microsoft chairman Bill Gates has set a target price of less than \$700 (£370) for UMPCs.

The Vaio UX1, which has a 4.5in screen, the smallest yet for an ultra-mobile, arrived at PCW Towers as we went to press. It is a little disappointing, at first sight at least, because it seems designed more as a super-PDA than as a serious mobile working platform – and the fascination



of UMPCs is in experimenting with just how small one of these can be.

It has calculator-style buttons rather than proper keys, which does not seem a great improvement over a soft keyboard, and you need to

Open and shut case... the UX1, with its keyboard visible

cart the docking station around to plug in a larger screen.

It has a 32GB solid-state disk, 1GB of Ram, a 1.3GHz Intel ultra-low-voltage Core Solo processor, two cameras, one USB port (three on the docking station), and a Memory Stick Duo slot; Bluetooth and 11a/b/g WiFi are also supported.

It should be available by the time you read this – as will our full review at [www.pc.co.uk/2174237](http://www.pc.co.uk/2174237). So don't be put off by our first impressions. *Clive Akass*

● New Nokia webpad, see page 16.

## In brief

### PS3 price hike

The UK head of Sony Computer Entertainment has defended the £425 price for the 60GB Playstation 3, which sells for \$599 (£305) in the US, and £60,000 (£252) in Japan. Ray Maguire told *The Guardian* that the price was based on euro and yen values. It will be available on 23 March. A cheaper 20GB model will be available later.

[www.pc.co.uk/2174083](http://www.pc.co.uk/2174083)

### Rugged Dell

Dell has launched its first laptop designed for harsh environments and military durability standards. The Latitude ATG D620 has a cushion-mounted hard drive, a spill-resistant keyboard and port covers. It uses a Core 2 Duo processor and a 14.1in display optimised for outdoor use.

[www.dell.co.uk](http://www.dell.co.uk)

### Xara is Magix

UK software house Xara has been bought by the German company Magix, which sells a music, video and photo-editing products. Xara sells graphics packages, including Extreme and Extreme Pro, as well as providing online web-design utilities.

Products will be marketed under both the Xara and Magix brands.

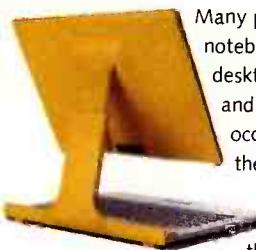
[www.pc.co.uk/2173886](http://www.pc.co.uk/2173886)

### USB charger

Ultima Store's pocket-sized £20 USB Power Pack recharges or powers portable devices that can run off a PC's USB ports. It boasts almost double the capacity of a Sony PSP battery at 3,200mAh, and four times that of the iPod Nano. The 106g device can recharge itself off a USB port while powering another device at the same time.

[www.ultimastore.co.uk](http://www.ultimastore.co.uk)

## Fly away notebook



Many people buy notebooks as desktop replacements and travel only occasionally with them. But the new Flybook VM combines the best of both worlds by being both portable and having a screen that pulls out high over the keyboard, like a desktop model.

Mark Needham, managing director of Widget UK, which is selling the machine, says the pull-out 1,280x768 21.1in widescreen can be adjusted to any angle and is useful when trying to adjust your workspace to the peculiar geometry of aircraft seating.

The Flybook VM uses an Intel Core Duo 1.66GHz processor, 1GB of Ram, 30GB HDD, a dual-layer DVD burner, camera and Express card slot. Prices start at £1,599.

→ [www.widget.co.uk](http://www.widget.co.uk)

## Sylvan Wifi

Ah, the joys of yattering on the phone in the woods. Even better when you can yatter for free by using Voice over IP.

This rustic scene (pictured) was released by Cambridge Silicon Radio to mark the launch of a reference design called the UniVox Mobile, around which manufacturers can build dual-mode phones capable of making standard cellular calls or VoIP over Wifi. The module also supports Bluetooth, with an FM option. CSR claims it uses a fraction of the power of rival designs.

→ [www.csr.com](http://www.csr.com)

• Broadcom 3-in-1 chip – page 14



## BBC accused of Microsoft bias

The Open Source Consortium (OSC) has slammed the BBC for allegedly locking online TV viewers into Microsoft products.

The services will be unavailable, initially, to people who do not use Microsoft software or have an up-to-date version of Windows. The OSC says this is anti-competitive, and in breach of the BBC charter.

OSC chief executive Iain Roberts said: "Open-source [developers] are competing hard in a fast-moving market and winning new customers every day.

"Seeing their licence fee going to advertise one of their largest competitors is not acceptable, especially from the BBC which has a duty to be unbiased. We want the BBC to reject any moves that restrict consumer choice."

A statement from the BBC Trust says the service relies on Microsoft's Digital Rights Management (DRM) system.

But it goes on: "The Trust will require the BBC Executive to adopt a platform-agnostic approach within a reasonable

timeframe. This requires the BBC to develop an alternative DRM framework to enable users of other technology, for example, Apple and Linux, to access the on-demand services."

The BBC uses Real Player software for its radio streaming. It has developed an open source codec called Dirac which is capable of streaming high-definition video (see <http://tinyurl.com/3xc52z>). One reason for doing this was to reduce the royalties it would incur on proprietary codecs.

## One in the iPhone

Sony Ericsson has unveiled seven new mobiles ranging from basic call-or-text models to the new flagship Walkman W880 music phone (pictured), which is 9.4mm thick.

Naturally it invites comparison with Apple's yet-to-launch iPhone, though head of marketing Steve Walker avoided doing that at the launch. But he did point out that 20 million people have already bought Walkmans, compared with the eight million that Apple hopes to attract by the end of 2008.

→ [www.sonyericsson.com](http://www.sonyericsson.com)



## Print standard could end confusion

Confusion over the true cost of printing could become a thing of the past, at least for inkjets, with a new international standard for rating cartridge life.

Manufacturers have for years been unable to agree on how to measure the number of pages a cartridge will print, a figure that clearly depends on what you are printing.

The issue has compounded people's confusion when buying printers sold with 'sample' quantities of ink: when replacing cartridges they quickly discover they can cost as much, or even more, than the machine.

The Office of Fair Trading (OFT) criticised the four major

manufacturers, Epson, Canon, HP and Lexmark, four years ago about lack of information on the true cost of ownership.

The OFT called on the industry to devise a standard for page yield and also stated that relevant figures should be on view at the point of sale and on web pages. This standard was meant to be in place by 2004 but the OFT gave the industry extra time.

Now it has been approved by the International Organisation for Standardisation (ISO) and a consortium of manufacturers including HP, Canon, Epson and Lexmark. Testing involves printing standard files.

## Breakthrough battery 'outlasts Li-ion'

A secretive Texas company claims to have developed a technology that could make traditional batteries a thing of the past and power devices of all sizes. EESTor says it could ship a system for use in an electric car as soon as this year.

The first product will be an Electrical Energy Storage Unit (EESU) weighing less than 100 pounds and capable of driving a small electric car for 200 miles – and then recharge in less than 10

minutes, the company claims.

At US prices, the unit could power a car for 500 miles on \$9 (£4.60) worth of electricity.

The EESU is described as a 'battery-ultracapacitor hybrid'. An ultracapacitor is a more spacious version of the tiny capacitors used in electronics, which act as a reservoir of charge. They can charge and discharge very quickly but cannot store anything like as much electricity as a battery.

EESTor claims to have got round

this problem with a device capable of storing 280 watt-hours per kilogram – twice the energy density of the lithium-ion batteries used in laptops.

Richard Weir, EESTor chief executive, told MIT Technology Review that the system can be "tuned" to applications at widely different scales – right down to driving a heart pacemaker.

The claims have been met with some scepticism.

→ [www.pcw.co.uk/2173169](http://www.pcw.co.uk/2173169)

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## In brief

### Free roaming

Mobile operator 3 has removed roaming charges for customers using sister networks abroad. This is seen as pre-empting proposed EC legislation to cap charges.

Voice calls, text messages, MMS, video calls and data links will cost the same for 3 users in Australia, Denmark, Italy, Austria, Sweden, Ireland, and Hong Kong.

→ [www.pcw.co.uk/2173094](http://www.pcw.co.uk/2173094)

### 50p Satnav

Mobile devices will be able to access satellite navigation facilities for as little as 50p, following two acquisitions by Cambridge-based Bluetooth pioneer Cambridge Silicon Radio (CSR), the company says.

Technology acquired with the purchase of Cambridge Positioning Systems and Stockholm-based Nordnav will enable it to create a low-cost software-based GPS system, suitable for mobile phones and other handheld devices. The first GPS products will appear in the first half of this year.

→ [www.pcw.co.uk/2172542](http://www.pcw.co.uk/2172542)

### Skype TV

Web telephony pioneer Skype has unveiled a prototype TV service called Joost, which will allow broadcasters to use peer-to-peer links to distribute content.

Joost allows you to switch channels, time shift, rewind and fast forward programmes, but it faces competition from YouTube and BitTorrent, which has signed a deal with four movie studios.

Users can apply to become beta testers at the website below.

→ <http://www.joost.com>

### Youtube to pay

Video-sharing service YouTube plans to share advertising revenues with people who post amateur videos.

Founder Chad Hurley, who sold the service to Google for \$1.65bn (£8bn), said at the World Economic Forum: "We have an audience large enough to foster creativity by sharing revenue with our users."

# Intel jumps gun on Wifi draft

Intel is shipping products supporting the latest draft of the next-generation 802.1n Wifi specification, as experts cast doubt on whether the technology will live up to its hype.

Centrino Duo-based PCs supporting 11n went on sale with the consumer release of Microsoft's new Vista operating system.

David Hofer, Intel's director of wireless marketing for mobile platforms, said the company had decided to jump the gun on the final ratification by the Institution of Electrical and Electronics Engineers (IEEE) standards body because of the unanimous adoption of the latest draft, 1.10.

The company's first product, Wireless N, comes in the form of a mini PCIe card supporting 11a/b/g products as well as draft 11n. In addition, Intel has started a Connect with Centrino program, which will grant a logo to access points (APs) that have been tested for interoperability with the new product.

AP vendors that already have compliant products include Asus, Belkin, Buffalo, D-Link and Netgear. Notebook vendors with Wireless N products ready to ship

this month include Asus, Gateway, Acer and Toshiba, said Hofer.

He claimed Wireless N has twice the range of existing Wifi products and between two and five times the speed, depending on the range.

But the top speed depends partly on 'channel bonding', which uses two 20MHz Wifi channels instead of one. Hofer said that in the crowded 2.4GHz band, neighbours would be 'polled' to see if this would hog their bandwidth; if so, operation would be restricted to single channel.

More channels are available in the 5GHz band, but their number is

effectively halved as Wireless N defaults to 40MHz channels.

Asked if Intel had tested whether or not the increased range, wider channels, and expected high-definition data streaming would worsen contention in cities, Hofer said Intel had tested for interference with neighbouring legacy networks. He made no mention of neighbouring Wireless N networks.

He announced that Wireless N would be implemented in Santa Rosa, the fourth generation of Centrino, which is due out in the first half of this year.

## 11n speeds could be disappointing

Real-world speeds for 11n could average at about 100Mbps/sec, even under ideal conditions, some experts say. Winston Sun, of wireless specialist Atheros, said an 11n device might hit 150Mbps/sec within 20 feet of an access point, but the rate would drop off with distance.

When an 11a/b/g device is nearby, the bit rate could drop to 50Mbps/sec at 2.4GHz because the system defaults to a single channel. When several networks are contending for airspace, as they certainly will be in cities, this could cast doubts on 11n's ability to pass high-definition content. Read Shaun Nichols for more on this at [www.pcw.co.uk/2173309](http://www.pcw.co.uk/2173309)

# UWB wireless cleared for use – eventually

Next-generation ultra-wideband (UWB) links have been cleared for use here, following a little-noticed EC ruling, backed by UK regulator Ofcom late last year. But the decision by the EC's Radio Spectrum Committee (RSC) can come into effect only through new or modified legislation.

Ofcom said it did not know how long Parliament would take to do this. "I'm not sure whether we have even begun the process," a spokeswoman said.

If UWB links live up to their promise, they will be a better way of throwing high-definition video about than 11n: with Wifi already cramming the airwaves we should arguably be encouraging shorter



Belkin has demonstrated its own UWB version

The Bluetooth Special Interest Group is drawing up a specification for a UWB version of its technology. This, essentially, uses standard Bluetooth to find devices and calls up UWB for fast data delivery.

UWB spreads data across a wide range of frequencies below the noise floor, so receiving it is like picking out a distinctive whisper from a noisy crowd. It can share frequencies already being used for conventional wireless.

The RSC ruling allows UWB to work between 3.1 and 10.6GHz in the US, 6 to 10GHz in the UK, and 7 to 10GHz in Japan. Belkin said a UWB-based wireless USB hub and dongle could be available by March if the technology was approved.



Spot the hard disk drives (HDDs)

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# TOSHIBA

\*IDC market research 2005/2006

Storage Device Division

1) Television 2) Games Console 3) HDD DVD Video Recorder 4) Personal Digital Assistant (PDA) 5) Mobile Phone 6) Notebook 7) MP3 Player

## Google sells search box

Online applications (see right) are not the only way Google is integrating itself into office life. Last month it launched a small-office version of a search appliance called the Google Mini box, which plugs into a network and provides search facilities across attached devices.

It costs £1,295 ex Vat for searching up to 50,000 documents, and £5,995 for up to 300,000.

It will also index your site and provide a search box for your home page. "Users will be optimising it for Google at the same time," said Roberto Solimene, enterprise director for Google Europe.

  
Optimise your web searches with the Google box

## Web apps challenge bloatware

Vista has inevitably drawn comparisons to the Mac OS, although Apple has nothing to compare with Office 2007. However, the most interesting competition to both companies challenges the need for do-it-all bloatware.

Google's Docs and Spreadsheets service (see <http://tinyurl.com/25vesw>) lets you use basic office applications and access your files from any machine, anywhere in the world, using only a browser. The service will import standard Office files and store them online.

Microsoft offers a rival Office Live service consisting of email and calendar applications, but there is no spreadsheet or word processor.

The idea is becoming more viable with robust broadband and WiFi links, and it enables relatively low-powered pocket devices to do the most common tasks performed by high-powered notebooks.



Touchstar's Raven tablet and the new Nokia N800

Nokia has just released a new web tablet, the N800, which shows what is possible. It can easily fit into a pocket, the battery lasts for five hours of work, and it can connect to the web directly via WiFi or indirectly via Bluetooth and a 3G/GSM phone.

The handwriting recognition and soft keyboard are not up to heavy duty work, but a Bluetooth keyboard would make this possible.

Devices such as the N800 (see review at [www.pcw.co.uk/2174158](http://www.pcw.co.uk/2174158))

could provide a lower-cost alternative to ultra-mobile PCs, especially for home use where (given the software) they could double as a remote control. The N800, which also acts as a media player and a web video phone, costs £237.50 ex Vat.

● Manchester-based Touchstar has introduced a range of ruggedised tablets running Windows CE with a number of connection options for specialist business use.

[www.touchstar.co.uk](http://www.touchstar.co.uk)



There is a huge amount of positive growth in the mobile marketplace. Over 40.7m users of mobile phones browsed the mobile internet in the UK during the last 3 months of 2006!

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# Loophole allows clean install

**A**loophole in Windows Vista lets you perform a clean installation from an upgrade DVD, saving you money and possibly leaving you with a faster system.

PCW has not tried it but there are several reports on the web from people who have. Microsoft has no plans to block the workaround, saying that it trusts most people to pay the full price.

If users factor in the cost of their time, they may decide not to bother because the install will take much longer. It involves booting from the upgrade DVD, opting for an Install and clicking Next when prompted for a product key. A 30-day trial version is then installed.

The next stage is to repeat the procedure, this time giving your



The upgrade DVD for the Vista install takes a long time, which could deter people from using it

product key. In effect, you install Vista on top of itself. Previous Windows upgrades required you to insert a CD of the old version to prove your ownership.

A Microsoft spokesman said: "People without a licensed copy of XP who use this workaround are violating the terms of use agreed to

when they purchased the upgrade version of Windows Vista.

"As such, we believe only a very small percentage of people will take the time to implement this, and we encourage all customers to follow our official guidelines for upgrading to Windows Vista."

Ironically, the workaround first appeared in Microsoft internal documentation. IT writer Paul Thurrott discovered it after trying to find out whether or not it was possible to do a clean install from an upgrade disk, because of the theory that installing over an existing operating system would hit performance. However, Microsoft said the install virtually wipes out the old OS. *Tom Sanders*

## Microsoft Open XML standards bid falters



Microsoft faces an uphill battle to get the new Open XML formats in Office 2007 recognised as an international standard.

The formats have been approved as a European Computer Manufacturers' Association (ECMA)

Outlook 2007's new interface... but the outlook for Open XML looks less bright

standard, which is seen as a way of fast-tracking global International Standards Organisation (ISO) approval.

The British Standards Institute (BSI), which represents the UK on ISO, issued what is called a "contradiction" when the first phase of the standards process ended on 5 February.

Proponents of the rival Open Document Format (ODF), which is already an ISO standard, argue that

there is no point in having two document standards. European organisations have stressed the need for a standard that will allow documents to be used on different platforms without translation.

Objections at this stage covers whether Microsoft's application should be fast-tracked or go forward at all. A BSI spokesman could give no details of the "contradiction", but said it meant the next stage of the application would not proceed for at least 90 days.

The application could be rejected at this stage, or in the next phase when details of the specification are being considered. If the objections are minor, Open XML could become a standard.

Microsoft stands to lose lucrative government contracts if its bid for standardisation fails.

- Version 1 of a Microsoft-backed open-source plug-in allowing Word XP, 2003 and 2007 to save or open Open Document Format files is available at <http://tinyurl.com/2k9nb7>.

## Adobe presents second challenge

Microsoft faces a standards battle on two fronts following Adobe's submission of the full specification of its portable document format (PDF) to the ISO for formal recognition as a global standard.

The move came the day before the consumer launch of Vista and the Office 2007 suite, which includes a rival technology called XPS. It could mean the PDF format will be preferred in organisations that insist on open standards, including within the EC.

## In brief

### Security pack

Microsoft launched its OneCare consumer security service in the UK at the same time as Vista. It offers unified virus and spyware scanning, as well as flexible back-up options, and costs £37.99 for up to three PCs for a year. A 90-day trial version is available at <http://oncare.live.com>

→ [www.pcw.co.uk/2174209](http://www.pcw.co.uk/2174209)

### SP1 already

Microsoft has already started development of the first service pack for Windows Vista and has appealed for beta testers. It could be released as soon as this year.

### Fire sale

Retailers are expected to drop the price of Windows XP PCs to offload them in the wake of Vista's launch – although Dabs said its stock will sell at full price. PC World said most of its stock had already been upgraded, but it always had some bargains available.

A British Retail Consortium spokesman said he expected cut-price XP PCs to go on sale.

### XP lives longer

Microsoft has extended by five years the support period for the Home and Media Center editions of XP, bringing them in line with Enterprise editions.

This means users will receive mainstream support until April 2009, including security updates and hot-fixes, followed by five years of extended support of security upgrades and paid-for hot fixes.

### Piracy peril

Fifty per cent of 'cracks' allowing people to use non-activated pirated copies of Vista contain malicious code, a security expert has warned.

John Safa, security specialist at Drivesentry, said hackers are attaching malicious programs to original cracks.

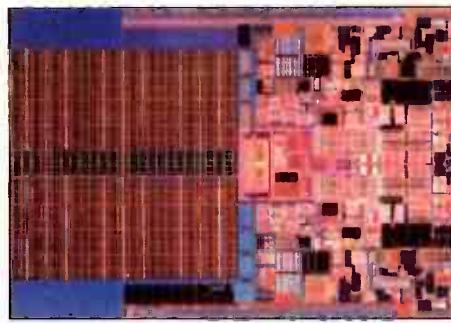
→ [www.pcw.co.uk/2173455](http://www.pcw.co.uk/2173455)

# Intel 45nm chips beat clock rate cap

Intel has made a breakthrough in processor miniaturisation and will start manufacturing processors with smallest-yet 45nm features in the second half of this year. The new design, codenamed Penryn, is described as second-generation Core 2 with a microarchitecture enhanced to take advantage of the extra transistors it will be able to pack in.

There will be more cache, new power-management logic and support for some extra streaming SIMD extension (SSE4) instructions to speed up media processing and high-performance tasks.

The breakthrough involves using metals rather than silicon for transistor gates and a new high-K dielectric (see box below). Intel



founder Gordon Moore described it as "the biggest advance... since the introduction of polysilicon gate Mos transistors in the late 1960s".

The technology is not new – Intel announced 45nm SRam memory chips last year. The breakthrough is to apply it to processor chips that can be made

The new design 'Penryn' will be able to pack in extra transistors using existing processes.

Intel claimed its rivals were at least a year away from being able to match the technology – although this was denied by

AMD's partner company IBM.

Penryn could end Intel's 3.8GHz cap on clock rates, imposed two years ago after experiencing overheating and leakage problems when raising the frequency on current designs.

Steve Smith, vice president of Intel's digital enterprise group

operations, said clock rates will go up but he would not be more specific. "We are not doing any product-level announcements at this stage," he said.

The power envelopes for today's server, desktop and notebook chips (80W, 60W and 35W, respectively) will be retained for the Penryn generation, allowing system builders to pack more performance into existing designs.

The first five Penryns will have a dual-core processor in each of these categories, plus a quad-core desktop and quad-core server.

Production will ramp up at Intel's D1D Oregon Fab, and Fab 32 in Arizona, in the second half of this year and begin at Fab 28 in Israel next year.

Clive Akass

## We have done it too, claims AMD's partner IBM

IBM claims to have developed, with partners AMD, Toshiba and Sony, a similar technology to that used in Intel's Penryn, which will allow it to start shipping 45nm processors by 2008.

"Until now, the chip industry was facing a major roadblock in terms of how far we could push current technology," said Dr T C

Chen, vice president of science and technology at IBM Research.

"After more than 10 years of effort, we now have a way forward. With chip technology so pervasive in our everyday lives, this work will benefit people in many ways."

IBM's discovery is a blow for Intel, which believed that it was the

only semiconductor manufacturer to have found a way to construct transistors using high-K and metal gate technologies.

Big Blue has not yet demonstrated any working chips based on the technology, but plans to present a summary of its achievements in scientific journals and at technology conferences.

• AMD says it will unveil quad-core Opteron server chips this summer that will be more than 40 per cent faster on floating-point operations than Intel's fastest comparable processor, and 80 per cent faster than dual-core Opterons.

For more information on this story see [www.pcw.co.uk/2173519](http://www.pcw.co.uk/2173519).

Tom Sanders

## How they shrank processors to 45nm without springing a leak

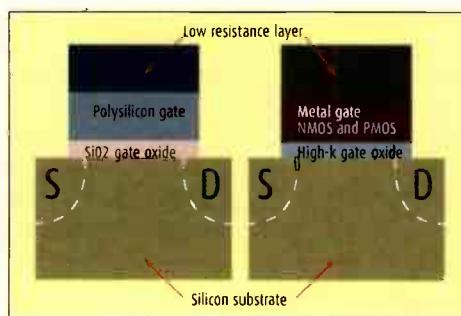
Each transistor in a processor consists of source and drain electrodes sitting in a silicon substrate with a tiny gap between them. Above this gap is a thin layer of insulator, or dielectric; and sitting on that is the gate electrode. Toggling the voltage at the gate toggles the charge distribution across the gap, and thus its ability to pass current between the source and drain.

This solid-state switch is never quite perfect as there are tiny current flows even in the 'off' state. Most important is the 'leakage' across the insulating layer under the gate, made of silicon dioxide ( $\text{SiO}_2$ ) in current designs (left in

Old and (right) new transistors. Letters S and D refer to source and drain

diagram). When it becomes only a few atoms thick, as it does as devices scale down, leakage becomes prohibitively high.

Thickening the  $\text{SiO}_2$  layer reduces the capacitance of the structure, which has the effect of reducing the switching speed. Instead, Intel replaced the  $\text{SiO}_2$  with a high-K dielectric, based on the element Hafnium, which



provides a thicker and less leaky layer of insulation without reducing the capacitance (right in diagram).

Intel has also replaced the usual silicon gate with what it vaguely refers to as a mix of metals. Kaizad Mistry, product

manager for Intel's 45nm logic technology development, said Intel was keeping the precise proportions secret.

The overall effect is to boost current flow in the 'on' state, providing fast switching, and cutting leakage in the 'off' state.

Intel claims, relative to 65nm technology, the Penryn chips will pack twice as many transistors in a given area, with a 30 per cent reduction in switching power, 20 per cent faster switching, and a tenfold reduction in leakage across the gate dielectric.

It also claims a fivefold reduction in current leaking between the source and drain.

# PCI Express data rates double

**D**ata rates on the next generation PCI Express bus have been doubled to give up to 16Gbytes/sec on a 16-lane slot.

The PCIe 2.0 spec, published in January, means that board makers have the choice of offering faster speeds or cutting costs by halving the number of lanes for a given throughput.

The governing PCI-SIG is also developing a new physical specification for the slot, to boost the maximum power that can be delivered to graphics

cards to between 230W and 300W. The maximum of today's PCIe 1.1 cards is 150W.

Other new features of PCIe 2.0 include a facility for drivers and other software to control the speed of a link and to be informed of changes in the data rate.

PCIe 2.0 slots will also be able to run devices designed for PCIe



Yanes: Faster graphics in a year

1.1. Manufacturers are expected to start integrating PCIe 2.0 components into machines within the year. It is not clear whether or not these will have the higher

power rating because the specification has yet to be agreed.

PCI-SIG chairman and president Al Yanes said: "The typical rule of thumb is that within a year of the spec being released, parts will start to show up. Some manufacturers, however, will jump on faster than others. I expect anyone integrating high-end graphics into servers and workstations will be first to use the increased throughput."

The new specification is available to download at <http://tinyurl.com/2gquv7>.

## HP beats Moore's Law

The density of transistors in field-programmable gate array (FPGA) chips, used for network switches and other specialist applications, could increase up to eightfold, thanks to a new HP technology, researchers say. They will also draw less energy per calculation.

The new technology, dubbed field programmable nanowire interconnect (FPNI), uses crossbar switches (a switch matrix) layered on top of conventional CMOS logic. HP said the use of 15 nanometre crossbar wires on top of a 45 nanometre CMOS is miniaturising three times faster than the Moore's Law prediction that transistor density would double every 18 months.

The chips could be built in current fabs with only minor modifications. For more information, see [www.pcw.co.uk/2172896](http://www.pcw.co.uk/2172896) *Emil Larsen*

## Molecular computing is so dense

Researchers have demonstrated a large-scale ultra-dense memory device they said is an important step towards replacing traditional silicon processors with powerful

molecular ones. The 160KB device, developed at UCLA and CalTech, uses a bistable molecule called rotaxane. For more, see [www.pcw.co.uk/2173447](http://www.pcw.co.uk/2173447).

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Specification subject to change. Facilities vary with model.

## Bluetooth NAS for phones

Mobile phones get their own version of network-attached storage with the release of products from Agere Systems and Seagate. The latter's Digital Audio Video Experience range are 1cm thick, credit-card-sized drives storing 10GB or 20GB and linking to phones via Bluetooth. Seagate says the drives have a battery life of 14 days standby or 10 hours' use. No pricing details have yet been released.

Agere's BlueOnyx drives can communicate via Bluetooth or WiFi and store up to 40GB. Models are also available with USB and SD card ports, and cost from £50 to £130. See [www.pcw.co.uk/2173887](http://www.pcw.co.uk/2173887)

## 2TB net drive

Iomega has doubled the capacity of its network storage line to 2TB with its new Storcenter Pro Nas 150d server drive. It comes with four 500GB SATA-II hard disk, Ethernet and four USB2 ports for printer and hard drive links. The internal drives can be configured for Raid 0, 1 and Raid 5.

The 2TB drive will cost about £1,000 when it ships in the UK in a few months. The existing 1TB version costs £550.

## Sony sells CF

Sony will start selling Compact Flash (CF) memory cards this spring – the first time it has supported a memory format other than its own Memory Sticks. CF cards are used by several products from Konica Minolta, whose camera business Sony bought last year. They are also used on Sony's own Alpha 100 digital SLR, as well as models from Konica Minolta [www.sony.com](http://www.sony.com)

## 60GB in 1.8in

Samsung is shipping what it says are the world's first single-platter 60GB 1.8in hard drives. The N series drives, at 5mm thick, also come in 20GB, 30GB, and 40GB capacities. All use perpendicular recording technology to boost data density.

# Killed off by the USB drive



**T**he death of the floppy disk was announced last month, after a short but eventful life. It was aged 38. The sad news was broken by Bryan Magrath, commercial director of PC World, who said the floppy had largely been superseded by USB sticks and that the chain would not be refreshing its stocks when they ran out.

The fact that people now transfer files by broadband rather than swapping disks also contributed to the floppy flopping.

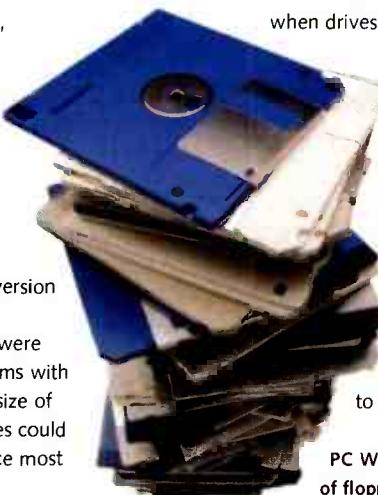
The disk was born to IBM in 1969, when it was read-only, eight inches in diameter, and stored just over 80KB. It became ubiquitous in a 5.25in format when personal computers went mainstream in the early Eighties and it stored 360KB.

The disks were bendy, which is how they got their nickname. Most software was sold on floppies, and sometimes several were needed to load the larger suites. The relatively low capacity was adequate before graphical interfaces came in because files were smaller.

Rigid 3.5in disks came out in 1984 with a capacity of 720KB. There was, apparently, a trend in South Africa for calling these stiffies, a term open to misunderstanding. So the name floppy stuck.

The capacity rose to 1.44MB in 1987, and that remains the most common format, although a 2.88MB version was introduced in 1991.

By the late-Nineties, PCs were beginning to burst at the seams with the amount of data and the size of programs. Hard disk capacities could not keep up, at least at a price most people could afford.



### OBITUARY THE FLOPPY DISK

Manufacturers tried to compensate with the 1997 introduction of the LS-120 'superfloppy' drive, which used disks with a capacity of 120MB – and double that a year later. Sony even tried at one point to promote its mini-drive as a floppy replacement.

But this higher-capacity removable-storage market had already been seized by Iomega's Zip drives, and just about all PCs still used the cheap standard floppy drive.

By the millennium, the capacity and cost of hard disks began to match market needs, and the floppy had a new rival. PCW spotted its first USB drive, the Trek Thumb, in late 2000, on an obscure stand at the now-defunct Comdex show in Las Vegas. The device cost nearly £50 for 8MB and our review concluded that the format could be a winner when prices dropped. Crucial now sells a 2GB USB drive for just under £26, inc Vat.

PC World's announcement should serve as a warning to people with a lot of files on floppies: the data won't last for ever and the time will come when drives capable of reading them will become scarce, as is already the case with 5.25in drives.

You could pack the contents of something like 500 floppies onto a single CD, but it will take a long time and remind you just how slow floppy drives are in operation. However, there are occasions when a floppy disk will be useful; loading SATA or RAID drivers on an XP machine, for instance. So you might do well to keep a stash, just in case.

PC World will not be replenishing its stock of floppy disks when they run out

## Flash memory prices plummet

Spot prices for flash memory dropped by nearly a quarter over Christmas because supply outstripped demand. The 24.5 per cent fall was the worst setback for the industry in two years, according to a report from analysts at Nomura Securities.

Prices are expected to continue to fall because manufacturers are still investing heavily in expanding

capacity. Toshiba and Sandisk announced last month that they have jointly developed a 56nm 16GB module with a highest-yet bit density. Sandisk says it will start producing a 1GB chip this quarter, and a 2GB one by summer.

The supply glut is expected to be short-lived as new applications emerge. Samsung and Sandisk are both shipping

32GB solid-state disks (SSDs) capable of replacing hard disks.

Hard disk manufacturers are responding by producing hybrid drives packing flash memory that offer a similar performance.

Analysts point out that SSDs are still too expensive to make an impact – but so were USB drives when they first came out (see above). *Simon Burns in Taipei*

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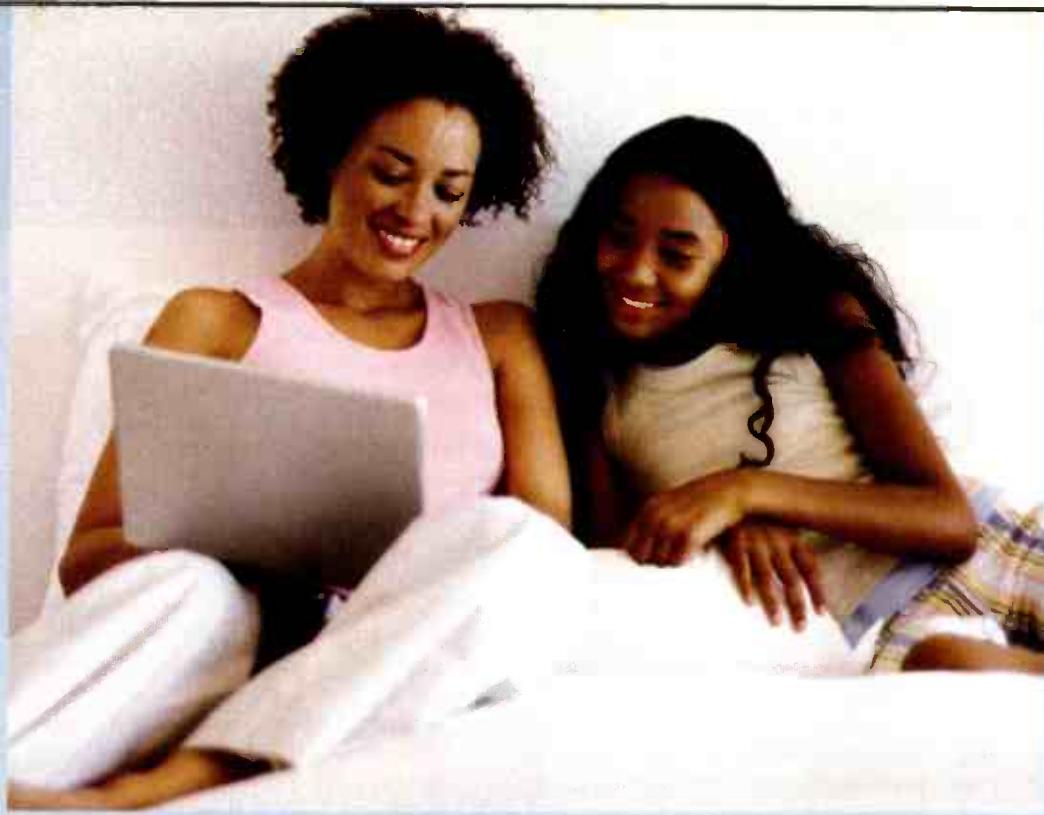
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# INTERACTIVE

## IN THIS SECTION

### 26 LETTERS

### OPINION

31 Gordon Laing  
34 Barry Fox  
51 Guy Kewney

# LETTERS

### LETTER OF THE MONTH

## School's out

I have read with interest the various letters and articles concerning the Government's and society's demand for children to have increased use of IT in education on the grounds that it will help them learn more and faster. With more than two decades experience in IT before becoming an English teacher, I believe there is a problem with the desire for all students to have access to IT. The immediate problem is, of course, the internet. Whether it is used for copying whole chunks of writing for essays (often complete with US spelling, which tends to give the game away), as "research" (always on YouTube for some reason), or accepting that the content in the first link on Google is completely true, the internet is causing problems that it was intended to solve.

Time and again students ask as soon as they walk into a lesson: "Are we using the computers today?", and appear to be most disappointed when told they will be writing or reading instead. When we do go to the IT suite, they often try to email each other (even when sitting side



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by side), log onto the various social sites, such as MSN and Bebo, and generally do only half the work they are supposed to. Meanwhile the teacher is vowing to cut out IT from lessons forever since so much time is spent chasing kids to do work. Suggestions as to how we can stop them accessing irrelevant sites would be appreciated – even when the local authority spends thousands on web-filtering software and employing people to maintain banned lists, it is still a struggle.

So, do we cut off internet access altogether or carry on trying to stop the kids wasting time and taking the position that half a lesson's work is better than nothing? For my part, I now give detailed briefs, remind them regularly as to what I expect from them, and remove privileges should they not stay on target. Conversely, if they do work hard and produce the necessary work, they are allowed a few minutes 'relaxation' near the end of the lesson.

And finally, can someone please set up a RatemyPupils website? After all, pupils can post messages that are often libellous, distressing, and sometimes really evil about teachers who cannot defend themselves on RatemyTeachers.co.uk (although I am happy with my 'awesome' grading, thank you).

Rant over. Back to my lesson on Jabberwocky using IT, role play, visual and audio aids and a large green hat. Name and Address Supplied

Kelvyn Taylor replies: We'd be interested to hear from all sides on this topic. Should students be 'protected' from the internet or educated on how to use it safely? Are IT lessons a waste of time? If you're a student, teacher or parent who has an opinion on this subject, drop us an email at [letters@pcw.co.uk](mailto:letters@pcw.co.uk)

Many pupils use IT lessons to get onto social websites, such as MSN and Bebo, and email friends

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.

## I WANT MY WEB 1.0

I have spent more than two years trying to resolve the lack of broadband in my area, with no success. For large downloads, such as anti-virus and critical Windows updates, I rely on my Surftime dial-up connection. Avanti satellite was also a possibility, but the signal was too weak from the base station and there needs to be a line of sight.

To my horror, I received a mailshot from BT stating that from 31 March, its Surftime dial-up service was being withdrawn, and I would have to pay per minute for an inferior connection. Also, to add insult to injury, it stated I may wish to consider broadband.

The infrastructure in my village cannot take a broadband signal, unless the fibre optic cables already in the BT cabinet are put to use (at present one is used for the primary school, leaving three idle). My service is being downgraded at a time when users in most localities are benefiting from faster connection speeds.

BT has offered no help. Can you offer any advice?

**Pete Clough**

*Kelvyn Taylor replies: We'll be looking at the state of broadband again in one of our regular updates in the next issue, including a look at the options for those, such as yourself, who still can't get a connection.*

## LOVELY LINUX

Thank you very much for including the Austrumi Linux distro on February's cover disc; it is the best mini distro I have come across.

The Enlightenment window manager looks good and comes with useful no-frills software. I have tried many distros and this is one of only two that has worked with my dial-up modem and other hardware without a problem. Setting it up to connect to my Lan and the internet was easy. The inclusion of a remastering suite and virtual machine is very clever. I also liked the way the distro is loaded into Ram and the CD ejected so that the drive is available for burning your new version.

My Latvian improved no end after an hour or two of use, but you can select English if you want. The other distro I liked was Xandros Desktop; a much bigger OS that beats the more popular distros hands down.

**Chris Cox**

## MANY A SLIP 'TWIXT SERVER AND IPOD

Gordon Laing's recent media server articles have prompted me to write in. I've been using Windows Media Center 2005 for about 10 months. It is a fantastic bit of kit, but there is one glaring hole in the world of media-sharing at home.

I have a fairly well-specified PC running MCE 2005 with large hard disks. I also have another desktop and my wife has a laptop. If I put music on any of the three machines, MCE adds it to its media library, thanks to the 'monitor folders' feature. So far, so good. However, this central library is not accessible from the other two machines because it sits on the MCE machine, and you can't have a shared central library

file. Along comes Windows Media Player 11 with the feature to share libraries, but I can't get it to work on XP.

Next, my wife wants a portable music player, and no matter how much I try to persuade her, she insists on an iPod nano, which only works on iTunes.

But hang on, iTunes can share music libraries over a network, however it won't let you copy said library onto an iPod.

I then heard about J.River Media Center software, which supports everything, but it turns out it doesn't work very well, and I'll need to reset the iPod.

So the age-old problems of incompatible file formats, devices, software and stubborn technology companies mean there is no way to have one central repository of music that can be playlisted onto multiple devices (I use a Windows Mobile Device) and kept in sync. The closest I've got is using the iTunes Library Updater (<http://itlu.ownz.ch/wordpress>) and a batch file scheduled to run once a day to try and keep the MCE library updated. This is a clumsy fix that should not be needed in this day and age. While Apple has the market share in digital music and players and Microsoft's operating systems dominate, I feel that never the twain shall meet.

**Alan Roy**

## HOME TRUTHS

I suspect a number of parents purchased new PCs for their children at Christmas. "Whoohoo" cried the kids and off they went, straight onto the internet without a thought about security and the dangers that may lie beyond their cosy (and generally messy) bedrooms.

Installing anti-virus software is a fairly simple task; most PCs come with 12 to 18 months of protection, and when that runs out, switching to a good, free piece of software is child's play. The problem lies in the content available for them to view.

My daughter has had a PC for a couple of years and runs an old copy of Cyber Sentinel that shuts anything down on the computer if a certain keyword is found. This does create a problem when she's writing emails to her friends and tries to sign with three kisses. Also, these days, it is a little simplistic and only partially successful.

The question is, what other software can do the job more effectively, and at what cost? Working in IT, I have implemented some enterprise solutions such as Websense and Web Marshall, but not on a home PC to protect my nearest and dearest.

Can you, in a future issue, test filtering software for home use? I am sure parents such as myself would welcome this along with a reminder of the dangers out there.

**Mark Smith**

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For more information, visit [www.terratec.co.uk](http://www.terratec.co.uk).

## CLARIFICATIONS & AMPLIFICATIONS

**In the review of Tesco Internet Security (Winter 2006/7 issue, page 76) we published the incorrect screenshot. Here is the correct one ([www.pcw.co.uk/2168679](http://www.pcw.co.uk/2168679)).**



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# Gordon Laing



gordonl@pcw.co.uk

## There's still life in the old display yet

*The delay in activating HDCP security is great for consumers who can enjoy HD content on displays with analogue outputs*

I know I promised to wait until the whole Blu-ray versus HD-DVD situation resolved itself, but at Christmas time I crumbled and bought an HD-DVD player. Don't get me wrong, I don't necessarily believe HD-DVD will win the war. I bought purely on the sheer value of the player and the fact I could enjoy HD material on my ageing projector after all.

Not so long ago we understood that future set-top boxes and players would demand a secure digital connection to the display using high-bandwidth digital content protection (HDCP) before they'd unleash HD content in its full glory. It was a real knock-back for early adopters who had invested in a display with sufficient resolution to view future HD material, but which predicated digital inputs supporting HDCP security. We were told future HD devices would output a

This is great news for anyone with an older HD set, but how long will the situation last? That's the big question and one made all the more intriguing by the release of a new HD-DVD player by a major manufacturer that only has analogue outputs.

The manufacturer is none other than Microsoft, whose HD-DVD drive for the Xbox 360 games console was launched at the end of 2006 at the bargain price of £130. This external drive equips the Xbox 360 with the ability to play HD-DVD movies, despite the console currently having no secure digital outputs. Simply use the analogue component or VGA cables and you could be enjoying HD-DVD movies on non-HDCP displays right now.

Tempted? I couldn't help myself. That's a cheap point of entry for a new technology, especially if you already own the console. It's even possible to connect the drive to a PC and play HD-DVD movies (see [www.pcw.co.uk/2170703](http://www.pcw.co.uk/2170703) and next month's Hands On Performance column).

Before you get too excited, it should be noted that the Xbox 360, like all HD-DVD and Blu-ray players, will downgrade the resolution over its analogue outputs should a title have an ICT flag. But since Microsoft currently only offers analogue video options for the console, surely it's confident the situation is unlikely to change.

Microsoft said it was unclear if or when the studios would start setting the ICT flag, but several had already stated they wouldn't do so until 2010 or 2011. Microsoft may not have ruled out a future HDCP option for the Xbox 360, but owners of analogue HD displays have a good few years left before they need to upgrade – and remember, their existing collection of non-ICT movies should always work.

Coincidentally, at the time of writing, the cracking of HD-DVD's encryption, soon followed by the ripping and posting of movie *Serenity* on BitTorrent, made a mockery of copy protection schemes, and it's unknown if this will accelerate the use of ICT flags.

While anyone buying a new display for video should ensure it supports HDCP, at least today's commercial HD content can be enjoyed on older high-resolution displays with analogue inputs. **PCW**

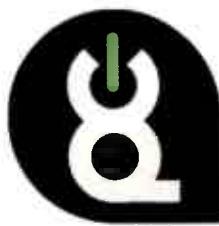
## 'If there is an ICT flag on a disc, the player will be forced to downgrade the resolution'

downgraded signal through their unprotected analogue outputs because of piracy fears.

BSkyB was the first to do a U-turn. After initially announcing that users would need a display with HDCP to view its forthcoming Sky HD broadcasts, it realised a number of potential customers would be alienated. So the service was launched with a set-top box that also output HD over its analogue outputs. How long this will last is another matter, but at least it works today.

Then as the first HD-DVD and Blu-ray players emerged, they too output HD over their analogue outputs. I can't speak for all players, and of course there are benefits to using the digital connection, but at least there's an option for owners of HD displays with analogue inputs.

It's important to realise, though, that it's not the players allowing this – it's the content. HD-DVD and Blu-ray support the use of Image Constraint Token, or ICT flags. Should a studio include the ICT flag on a disc, the player will be forced to downgrade the resolution on its analogue outputs for that title. As far as we know, this feature is on all HD-DVD and Blu-ray players, but the content providers have not yet activated it on any discs.

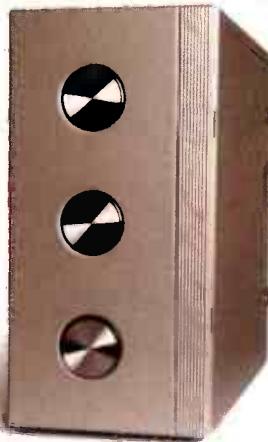


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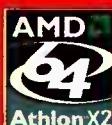
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# Barry Fox



barryf@pcw.co.uk

## Just say "no"

*The Microsoft PR machine has done its bit to make us all run out and buy Vista. Barry Fox, however, remains unconvinced*

**M**any thanks to Microsoft's press officers and their PR agency. I can now, with confidence, say "no" to Vista for a while.

I stay sane and meet writing deadlines by running two Windows XP PCs, networked with a KVM switch that lets them share the same keyboard, mouse and display. When a PC crashes or is rebooting after one of the endless software updates they both insist upon, I can switch to the other.

When I want to listen to music while waiting for my PCs to behave, I flick a switch on a standalone CD player. To catch up with the news, I flick a switch on my TV.

XP is, by far, the most stable version of Windows yet. After five years I know its quirks and foibles. When it starts running slow, I go to

### 'Unhappily for Vista, the launch was hijacked by the Super Casino award to Manchester'

Start, Run, type Msconfig, Click on Startup and disable all the many start-up processes that have self-installed. If something vital then does not work, there is a good chance it will self-heal; or I can sort it with a few Msconfig clicks.

I've seen Bill Gates demonstrate many times fancy Vista graphics that need more memory than most people can afford. Then he boasts about support for blue laser discs. But blue laser media has nowhere near the capacity needed to make an unattended backup of a full hard disk. Most software programs still come on 650MB CD-Roms, rather than 4.7GB or 9GB DVDs. We certainly don't need 25GB or 50GB HD-DVD or Blu-ray discs for program installs. And if I want to watch HD-TV, I certainly won't be doing it on a desktop monitor with piddling speakers.

Press releases proudly announce the availability of Vista-ready stuff. So this is a warning that a lot of today's software is not ready for Vista. Upgrading an XP PC to Vista will involve a lot of other upgrading as well; and every upgrade brings its own problems – the service packs that are essential for XP security still mess up the installation of Bluetooth adapters.

It's not the price of new software that matters, it's the time and energy that needs to be taken to learn it, and make it do what it says on the tin. When anyone from Microsoft demonstrates Vista, the demo PC is not just very powerful, it is 'clean', with no third-party stuff onboard. This is not a real-world situation, which doubtless explains why, after many months of reminders, I am still waiting for Dell's PR spokeswoman to answer my simple question: has she ever actually set up a Dell PC out of the box without IT help?

Magazines and reviewers have dedicated PCs for trying new software. Independents such as myself, however, run a huge risk when we install something new on a tool-of-the-trade PC.

That's why I bought a Vista-ready PC, with enough power and memory to handle the new system. Fate, or more accurately, Microsoft's press people, then took a hand.

In the run-up to the Vista launch, many independent journalists heard nothing from Microsoft. One person I know was under such pressure from his editor that he had to grovel for an invitation.

I went through the motions of confirming my interest and offering to attend briefings or try a copy on my Vista-ready PC. Microsoft referred me to its PR company which told me that with so many TV news crews attending, there was no room for people like me.

The event was more like a pop or fashion show, than a technology launch. Unhappily for Microsoft, the news agenda on launch day was hijacked by the Super Casino award to Manchester and the enterprising lady who used the internet to promise 'happy days followed by love', and then fleeced the men who lined up. Newspaper coverage for Vista was generally lukewarm.

I now have a rock-solid excuse for waiting at least six months for the bugs to crawl out, service packs to shake down and Microsoft's HD-DVD evangelist Kevin Collins to berate me for not enthusing over HD-DVD.

For anyone buying a new PC, there may be little chance of avoiding Vista. That seems like a pretty good reason to me to hold back for a few months: exactly the opposite of what Microsoft and its PR machine set out to achieve. **PCW**

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#### New

- 1&1 SMS Manager ✓

#### 1&1 WebStatistics

#### 1&1 WebElements

#### 1&1 Newsletter Tool

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#### New

- 1&1 Blog (Linux only) ✓

#### 1&1 Dynamic Content

#### 1&1 WebsiteBuilder

#### 1&1 Photo Gallery

#### 1&1 DynamicSiteCreator

#### 1&1 PDF2Web Converter

#### Personal Merchandise Shop

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#### Free

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#### Ready-to-run CGI library

#### ASP Scripting supported

#### PHP3, 4 & 5, Perl & Free CGI's

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#### Spam Filtering

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<b>Boosted</b>	■ FTP access accounts	10
<b>Boosted</b>	■ Monthly Traffic included	40 GB
	■ 1&1 Control Panel	✓
	■ Unlimited amount of websites	✓
	■ 1&1 WebspaceExplorer/Webfiles	✓
	<b>MARKETING TOOLS</b>	
<b>New</b>	■ 1&1 Traffic Booster worth £250	✓
<b>New</b>	■ 1&1 RSS Creator	✓
<b>New</b>	■ 1&1 Site Checker	✓
<b>New</b>	■ 1&1 SMS Manager	✓
	■ In2Site Live Dialogue	✓
	■ Chat Channels	5
	■ 1&1 WebStatistics	✓
	■ 1&1 WebElements	✓
	■ 1&1 Newsletter Tool	✓
	■ 1&1 WebDatabase	✓
	■ Customisable Forums	✓
	<b>WEBSITE BUILDING TOOLS</b>	
<b>New</b>	■ 1&1 Blog (Linux only)	✓
	■ 1&1 Dynamic Content	✓
	■ 1&1 WebsiteBuilder	25 pgs
	■ 1&1 Photo Gallery	✓
	■ 1&1 DynamicSiteCreator	18 pgs
	■ 1&1 PDF2Web Converter	✓
	■ Personal Merchandise Shop	✓
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	■ Full Version Software worth £400	✓
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	■ Ready-to-run CGI library	✓
	■ ASP Scripting supported	-
	■ ASP.NET, .NET Framework	-
	■ PHP3, 4 & 5, Perl & Free CGI's	✓
	■ Database	2 MySQL
	<b>DOMAIN NAMES</b>	
	■ Included .co.uk domains	3
	■ Sub-domains	300
	■ Complete DNS Management	✓
	<b>E-MAIL</b>	
<b>Boosted</b>	■ IMAP/POP3 e-mail accounts	1,000
	■ Auto-responders/e-mail aliases	✓
	■ 1&1 Webmail	✓
	■ Virus scanning for accounts	10 Acc.
	■ Spam Filtering	✓
	<b>SECURITY FEATURES</b>	
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	■ Daily backups	✓
	■ Password protection	✓
	■ Shared SSL or optional dedicated SSL Certificate	✓
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	■ 1&1 WebspaceExplorer/Webfiles	✓
	<b>MARKETING TOOLS</b>	
<b>New</b>	■ 1&1 Traffic Booster worth £300	✓
<b>New</b>	■ 1&1 RSS Creator	✓
<b>New</b>	■ 1&1 Site Checker	✓
<b>New</b>	■ 1&1 SMS Manager	✓
	■ In2Site Live Dialogue	✓
	■ Chat Channels	10
	■ 1&1 WebStatistics	✓
	■ 1&1 WebElements	✓
	■ 1&1 Newsletter Tool	✓
	■ 1&1 WebDatabase	✓
	■ Customisable Forums	✓
	<b>WEBSITE BUILDING TOOLS</b>	
<b>New</b>	■ 1&1 Blog (Linux only)	✓
	■ 1&1 Dynamic Content	✓
	■ 1&1 WebsiteBuilder	25 pgs
	■ 1&1 Photo Gallery	✓
	■ 1&1 DynamicSiteCreator	25 pgs
	■ Personal Merchandise Shop	✓
	■ 1&1 Multimedia Archive	✓
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	■ FrontPage Extensions supported	✓
	■ Ready-to-run CGI library	✓
	■ ASP Scripting supported	-
	■ ASP.NET, .NET Framework	-
	■ PHP3, 4 & 5, Perl & Free CGI's	✓
	■ Database	8 MySQL
	■ (8x MySQL, MS Access/2x MS SQL)	8 MySQL
	■ SQL Import	-
	■ Cron Jobs	✓
	<b>DOMAIN NAMES</b>	
	■ Included .co.uk domains	5
	■ Sub-domains	1,500
	■ Complete DNS Management	✓
	<b>E-MAIL</b>	
	■ IMAP/POP3 e-mail accounts	1,500
	■ Auto-responders/e-mail aliases	✓
	■ 1&1 Webmail	✓
	■ Virus scanning for accounts	20 Acc.
	■ Spam Filtering	✓
	<b>SECURITY FEATURES</b>	
	■ Protected by up-to-date Firewall	✓
	■ Daily backups	✓
	■ Password protection	✓
	■ Shared SSL or optional dedicated SSL Certificate	✓
	■ SSH Access	✓
	<b>EXPRESS SUPPORT</b>	
	■ 24/7 Express Support (inc. e-mail)	✓
	■ Step-by-step online guides	✓
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The screenshot shows a web-based application for creating RSS feeds. At the top, there are tabs for Home, Purchase, Rent, Special Offers, and Contact. Below this is a section titled 'Ask Us About Exclusive Buyer Services!' with links for 'Buying Property', 'Home Improvements', 'Hot Property News', and 'Webstats'. The 'Hot Property News' section lists several items, each with a thumbnail image, title, and a brief description. For example, one item is 'Flats In North London to £500K' and another is 'Properties In South West London to £1million'. The 'RSS' section shows a preview of the generated RSS feed, which includes the same news items with their titles and descriptions.

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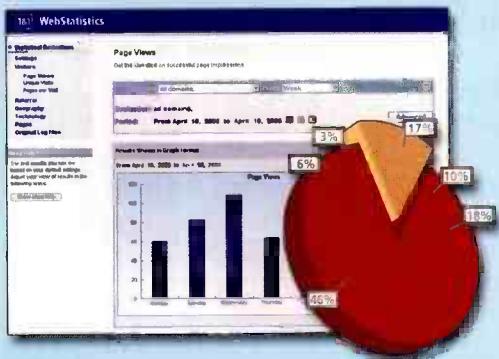
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New ■ 1&1 Site Checker

New ■ 1&1 SMS Manager

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■ Chat Channels

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■ 1&1 WebDatabase

■ Customisable Forums

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■ Included SSL Certificate	1
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per month  
£293.74 inc. VAT

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- 600 item product catalogue
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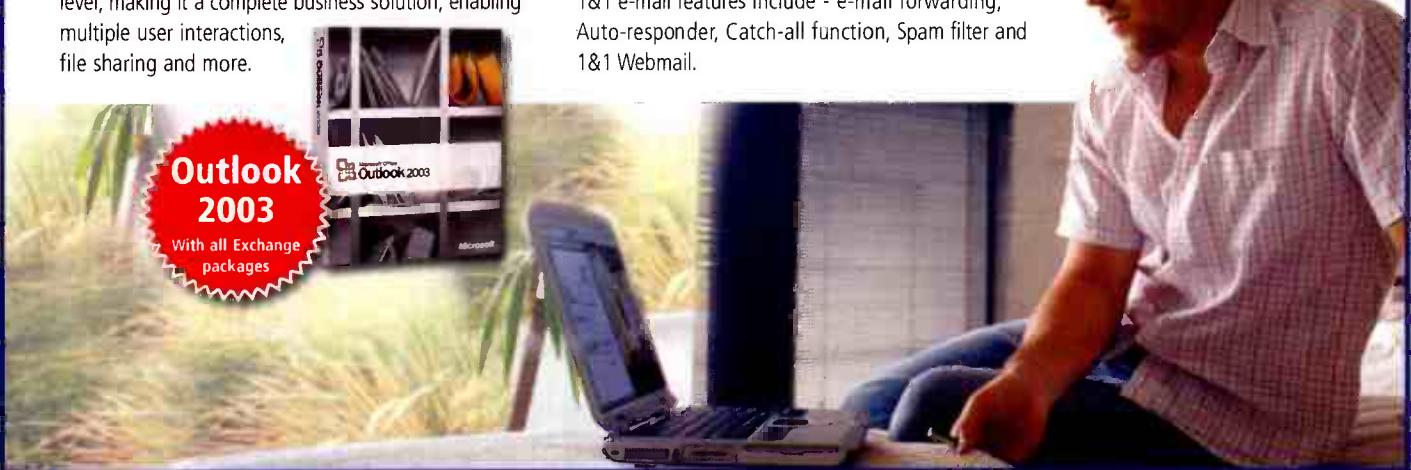
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# Guy Kewney



guykewney@gmail.com

## Wirelessly challenged

*Intel's alternative to Wifi solves the problems of unlicensed wireless, but will it create just as many new problems?*

One of my ancestors used to make steam railway engines. You can still find some of them chuffing their way around parts of South America, with 'Kewney' stamped into the cast iron. However, one of the irritating parts of the business was the need to make a completely different engine for each country, where the distance between the rails was a local standard.

So I sympathise quite a bit with Intel. Right now, it has a good deal going with the Centrino wireless brand. It adds perceived value to a mobile computer, without the cost of extra components. This is possible because of Wifi – which is a worldwide standard. Well, not exactly a standard as there are a few types: the original 11Mbits/sec 11b standard – now beefed up to 11g and running a great deal faster; the 11n, which is

### 'If you find your neighbours all using channel 6, you can't do anything to avoid congestion'

just about to appear and is faster still; and the 802.11a for the 3GHz bands. These standards face serious problems in the long term.

I've touched on this before, but the problem with Wifi is that it uses the licence-exempt spectrum at 2.4GHz – a frequency band that anyone can use for whatever they like. Users have to restrict the power with which they broadcast with, but if you find six of your neighbours all using Channel 6, there's absolutely nothing you can do to avoid the congestion. And it makes the wireless slow and unreliable.

When this system becomes really unmanageable, Intel hopes to have the alternative ready to roll out: Wimax. This system has been talked about for many years and is now, finally, shipping. Sort of. It will be licensed, so we won't have any of this 'anybody can set one up' rubbish and, because of Intel's propaganda and lobbying, the same frequency will be available around the world. This means every Centrino machine will work on public wireless in any country.

For my great grandfather, of course, it really didn't matter if a Brazilian steam engine

wouldn't fit on English rails, because no one would bring their engine over to London for a holiday. For mobile PCs, the equivalent standard matters a great deal, especially if you take your PC to a country where it's illegal to broadcast on the only frequency that you can use at home.

OK, does that mean all is beautiful in the future Wimax garden? Not really. The problem with licensed wireless is that someone has to pay to install it. You have to buy a licence, which isn't cheap, unless it's for a service that won't make any money (in which case, the licence won't be issued). And you have to pay for people to climb lamp posts and walls and plug in the transceivers.

Proxim, which has just announced one of the cheaper Wimax solutions, reckons that in London, you'd need a lot of masts. Per square mile, probably about 60 masts, possibly more. Each unit would cost a minimum of £500, plus there's the charge of personnel. And that's assuming you don't need planning permission, which is assuming a lot.

Will that work? Perhaps. It's not mobile phone technology; it assumes that you're sitting still most of the time. There is a mobile Wimax standard (802.16e) but it has a nasty secret, which you can find out about if you read about 802.20.

The 802.20 standard is very much like Wimax, except that it has a solution to the problem of 'hand-off' (what happens when a moving terminal moves out of range of one cell, into the next cell). Cellular phones do this very well. Wimax doesn't.

So the first Wimax equipment, sadly, won't be in western cities. It may well (believes Proxim) be used to bring cheap internet connections to remote African and Asian villages, where Wifi phones can connect – this is probably why Proxim's solution includes Wifi as well as Wimax. However, this leaves Intel with a real problem. Having a PC with a universal wireless standard sounds great – but one that doesn't work in London or New York does look like something of a problem, don't you think? **PCW**

# The ultimate PC tune-up

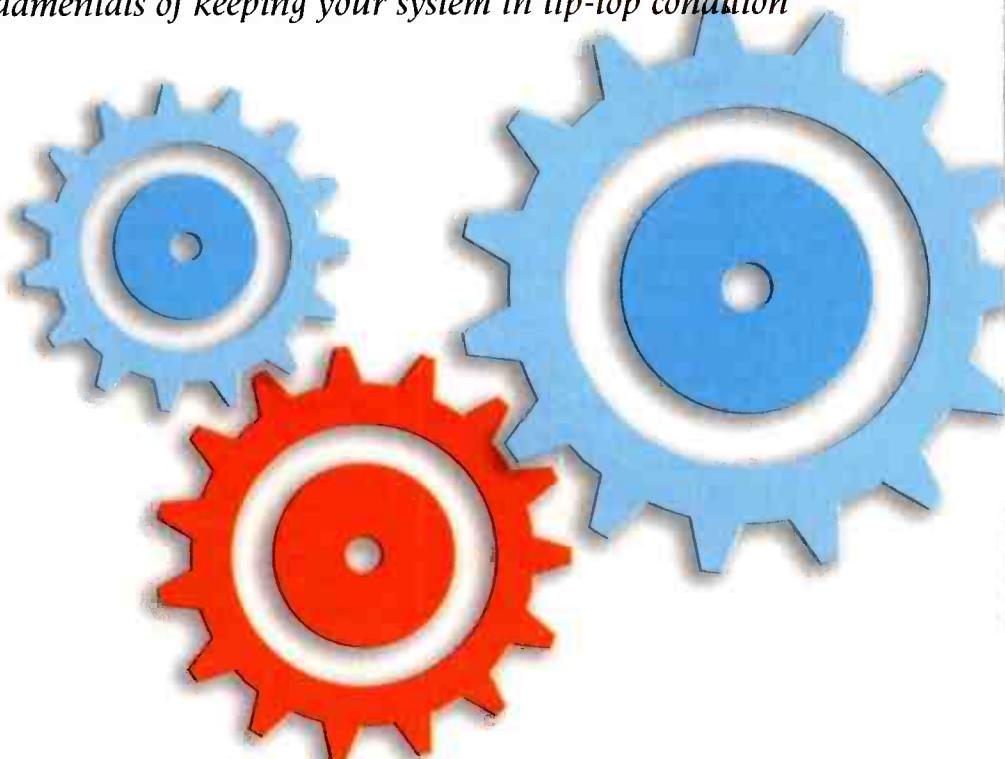
*Just like a car, your PC can benefit from a tune-up to keep it operating at peak performance. Peter Jackson explains the fundamentals of keeping your system in tip-top condition*

**A**lthough Microsoft promotes Windows as a seamless package for all your computing needs, it has more in common with a stately home that has been extended and renovated by various owners over the years. The basic house is still there somewhere, but there are so many added wings, turrets, outbuildings and decorative frills that it's hard to see the original design. And, inevitably, there are forgotten rooms and corridors that don't lead anywhere.

You can see this during any Windows installation, as the system copies hundreds of strangely named files to various locations with no indication of what they do when the machine starts. There's always a feeling that underneath the smooth exterior, there is a mass of mysterious work going on that users are not meant to concern themselves with.

But Windows' attempts to conceal its inner workings and save users trouble can backfire over time. A typical PC will have software installed, uninstalled and modified; it will download pages and files from the internet, and will handle various types of media with different presentation and editing utilities. On top of that, Windows itself will download updates, security fixes and service packs, without even asking you if – as Microsoft advises – you have Automatic Updates turned on (see screen 1). And while all these activities are essentially benign, the way Windows works means that the traces they leave behind may affect the apparent performance and storage capacity of your PC over an extended period of use.

Of course, if your PC starts to boot slowly, opens applications slowly, and generally begins to be sluggish and unresponsive, the first reaction is to suspect infection by viruses, Trojans or browser hijackers. But assuming you are using some kind of internet firewall, up-to-date anti-virus software and an adware cleaner, then perhaps it's time to have a closer



look at your system and clean up some of the debris that Windows and its applications have left behind.

#### Too much history

A major part of the problem is Microsoft's constant attempts to make users' lives easier. For example, when you install any Windows upgrade, service pack application or security patch, the system automatically backs up the previous configuration in obsessive detail, so that you can remove the new software and return the machine to its previous state. This is fine, but as the number of updates and patches increases, your PC becomes clogged with unnecessary rollback data. In principle, you could go back in time and remove all the updates to return to any point in software history. In practice, once an update has been installed and is working successfully, all this data just clogs up the hard disk.

And this works independently of the System Restore utility, which itself periodically backs up the state of the system so you can return the PC to a known condition should the machine become unstable or even unusable.

Other system-clogging activities involve various types of caching, where the system stores copies of frequently required information so that repeated access becomes faster. For example, Windows caches parts of applications as you load them using a folder called Prefetch. This means the next time you boot the PC, Windows preloads these components so that if you use the same applications again, their load time is reduced. However, over time, the Prefetch folder fills up with stuff that you may only use rarely, and yet still loads automatically at boot time.

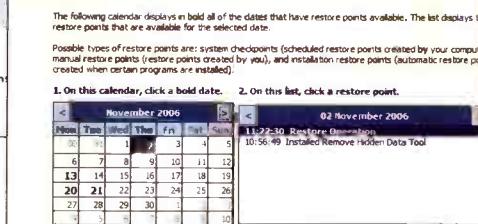
Another cache is used to store a list of documents you have recently opened, so that



Left: Automatic updates keep you safe, but also add clutter to the hard drive

SCREEN 3

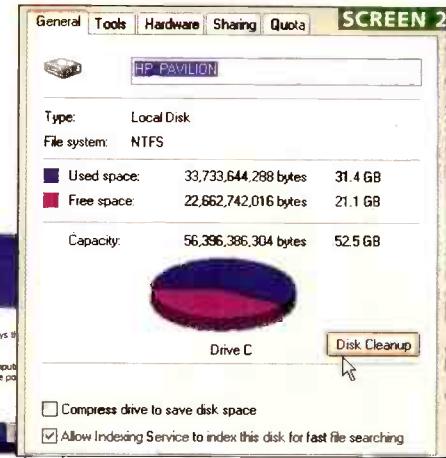
## Select a Restore Point



System Restore is a useful tool – but do you really need every restore point it keeps?

well-behaved when it comes to installation and deletion, and often leave parts of themselves in the system. These can be hard to track down without some tedious work in Windows Explorer or by running Find for the rogue folder names and deleting them manually. This is often not worth the effort for the amount of disk space saved, and bits of software do not take up processor cycles if they are not loading at start-up.

Other traces of supposedly deleted applications can also be found in the Windows Registry. Every Windows operation refers to the Registry at frequent intervals, and any errors or glitches here can make a PC useless. It's worth taking a closer look to see what it does and how it does it, and whether



or not there's anything you can do to improve the performance and stability of this system bottleneck.

## Registry basics

The Registry was first seen in its current form in Windows 95, and was intended to act as a single repository for system and application configuration data. Before this, applications stored their configuration data in their own Ini or Pif files, which could be dotted anywhere around the disk and were hard to track. As time went by the Registry was extended to cover things such as personal settings for multiple users, network policies and other system management information.

An application has to store its initial configuration, directory locations, file associations and other data in the appropriate places in the multiple Registry databases – called 'hives' – before it can run successfully.

Of course, Windows also keeps all of its own system configuration settings in the



A dust-choked fan is not only a fire hazard, but it also can damage your PC

## Physical clean-up

However clean you think your house or office is, your PC will show a different story. Users are often shocked by the amount of dust and fluff that builds up inside a PC's case, and there are two simple reasons for it: cooling fans and static electricity. The fans suck air in from outside the case, and anything that is in the air gets sucked in too, and deposited inside the box; dust is attracted by the small amounts of static electricity inside any electrical equipment.

The best tools for cleaning the insides of a PC are cans of compressed air, soft small paintbrushes to clean tricky corners and the gaps between expansion slots, and a selection of clean cotton cloths for wiping down. You should remove expansion boards, drive cables and rear panel blanking slots to give your air blasts some free space to work in, although if you're uncomfortable taking PCs to bits, it is still useful to clean what's easily accessible,

particularly the blades and any filters on the cooling fans of the power supply, the processor, and the video card if it has separate cooling.

You can use a small handheld vacuum cleaner to remove any accumulations of loose fluff, but don't be tempted to use a domestic vacuum; the power is too high, and the static build up on the nozzle can cause damage.

Never use liquids inside a PC case, and ensure all mains power is disconnected before you start. Be reassured that you can't do too much harm with compressed air, paintbrushes and cotton cloths. And a dust-free PC will last longer than one clogged with debris.

you can more easily re-open them when needed. The last 15 of these are displayed in the My Recent Documents folder in the Start menu, but the actual folder that stores the entries may have many more in it than that.

The largest cache in any online Windows system is used for temporary internet files. The amount of temporary internet data on a PC might surprise you; since every component of every page is a separate file, and all of them are cached, you can easily find thousands of files on your hard disk that refer to pages you might have looked at once, months ago.

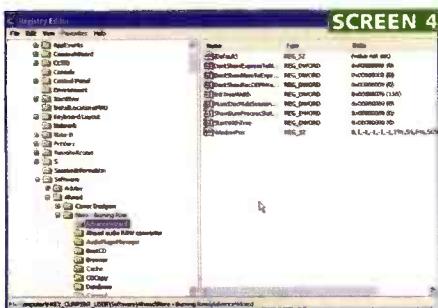
## How clean is your disk?

Microsoft provides a tool called Disk Cleanup that can help reclaim some of the disk space that these well-meaning, but often unnecessary, routines occupy (see screen 2). The utility will analyse the contents of the disk, which might take a while depending on its size, and then suggest various options to free up space. For example, you can delete downloaded ActiveX and Java files as well as cached web files, remove all System Restore points apart from the most recent one, remove Windows components and installed applications that you don't use, and delete backup copies of previous operating system versions.

Of course, it's not only Windows that hogs disk space and processor clock cycles. System boot and overall performance are also slowed by applications and utilities that can be obtrusive. Many applications insist on loading themselves at start-up and putting icons in the System Tray, often for no good reason. They can all be accessed by another route, and removing them from start-up can substantially improve system boot times.

Another source of system clutter is old demos, obsolete utilities and software you installed because you thought you'd use it more. If there are names you don't recognise on your Start menu, or programs whose purpose you're not sure of, clear them out.

There can be some problems with Add/Remove Programs, as some applications – particularly shareware utilities – are not



The Registry may end up with lots of unused entries – but they don't have a major impact on performance

Registry, and the result is a complex array of mysterious names, keys, and hexadecimal values. You can have a look at the Registry by going to Start, Run and typing 'Regedit', but it's inadvisable to change anything without a full backup and

## 'Orphan entries can be left by applications that do no uninstall properly'

considerable knowledge about what you're doing – many PCW readers will be intimately familiar with the Registry, but it's easy to become blasé.

As the central point of reference for all Windows system software and applications, the Registry grows over time. And, as we've seen, there can be orphan entries left by applications that do not uninstall properly, or which do not have uninstallers.

There are many cheap 'Registry cleaners' available, all of which claim to improve performance and stability by removing unnecessary and unused Registry entries. However, there are some doubts about how useful these are. In the caching examples above, there were two reasons for clearing

## Vista heralds change

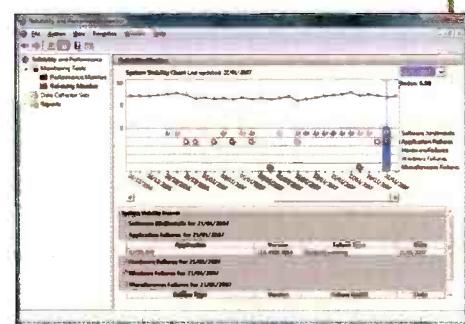
Windows Vista includes new features that are meant to save users from having to clean up and maintain their own systems.

Boot times have been improved by loading more services and login routines in the background, for example, so that you get back control of the machine faster. There is now more detailed background performance monitoring, to detect deteriorating performance and retune operations, as well as to diagnose error conditions and either repair them automatically or lead the user through a recovery process. And there is an Automatic Recovery tool that can diagnose major crashes and restore the system, either on its own or by prompting the user through a detailed troubleshooting recovery procedure.

Microsoft claims that new features such as fast resume, the ability to restore application states after a reboot, and the avoidance of reboots wherever possible during application installation and system reconfiguration, will make Vista feel faster and more responsive.

But if the history of Windows has taught us anything, it is that there will still be some need for users to clean up their systems and optimise the way they work, so that they better match their needs. There will inevitably be a need for Vista tune-up guides, too.

Paid-for Microsoft tools, such as the Windows Live OneCare package, include system maintenance extras that regularly clean out the digital gunge; but using the improved Windows Task Scheduler you could easily set up a similar regime yourself.



Windows Vista keeps a close eye on your system's performance and reliability

the cache data. The first was to save hard disk space, and the second was to prevent a problem that occurs with a poorly organised cache: search time becoming too long.

But the Registry is not a badly organised cache; it's a highly efficient binary tree database. There is no time-saving in removing unused entries (unless your Registry has grown to a stupendous size), and the only benefit to removing them is some improvement in reliability, although that is almost impossible to measure on an individual

PC (see screen 4). In general, the best advice is to leave the Registry alone unless you know precisely what you are doing and have a detailed strategy for reviving the machine should you get it catastrophically wrong.

### Fragments of data

Another way to tune Windows is disk defragmentation, which reorganises the files on your hard disk so they occupy contiguous regions rather than segments dotted over the disk surface. When a disk stores a file, it uses the first available space in its directory. If that space is not big enough, it is split into parts, which are stored in different disk locations. On a highly fragmented disk the read/write heads of the drive must make a lot of physical movements to fetch a particular file, slowing things down. A disk defragmenter collects the scattered parts of each file and restores them in contiguous blocks for faster access.

In modern high-speed, high-capacity drives, with built-in buffers and sophisticated data-seeking logic, fragmentation is not the performance restriction it used to be. However, there may be some benefit to defragmenting the disk after an extended period of use, particularly if multiple applications have been installed and removed or you have been storing, moving and deleting a large number of files. The improvement may not be that great in terms of performance, but there may also be

## Some helpful tools

While most Windows users will be able to clean up their own systems manually, there are some well-rated free or shareware software tools that can help automate the process. While these are not the only ones available, they have strong support from users and the shareware community. We also regularly include such tools on our cover discs, either as part of the Resources library or as featured full versions, so have a look there first. There's also our massive online downloads library at [www.pcw.co.uk/downloads](http://www.pcw.co.uk/downloads).

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<http://personal.inet.fi/business/toniarts/ecclean.htm>

Steve Gould's Cleanup  
[www.stevengould.org/software/cleanup](http://www.stevengould.org/software/cleanup)

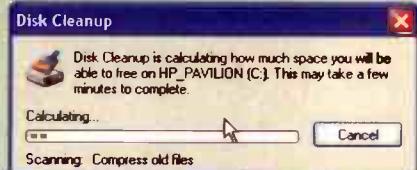
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## Tune-up - step by step

To start clearing up your disk, turn to Microsoft's own Disk Cleanup utility. You can access it from the Start button, under Programs, Accessories, System Tools, or by right-clicking on the disk you want to clean and choosing the Disk Cleanup option on the Properties/General tab. Disk Cleanup does not affect the Prefetch folder, but you can empty it manually. It's stored in the Windows

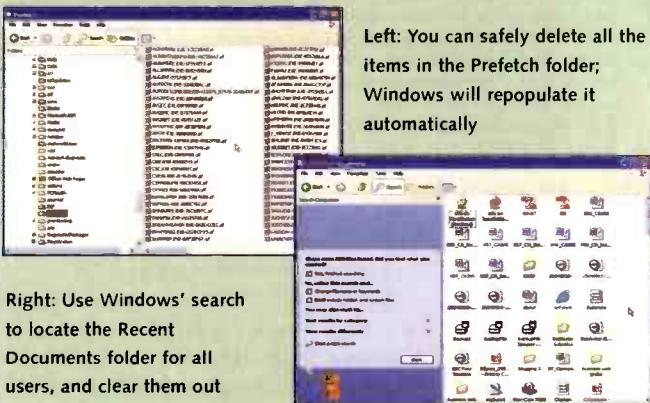


Left: Disk Cleanup will give you an estimate of how much space can be saved on your hard drive

Right: Choose which items you'd like to remove as part of your clean-up

folder; just open it with Explorer and delete everything it contains. Note that since Windows also uses Prefetch for its own system components, the first reboot after deletion will be slow, while the Prefetch cache is repopulated.

Now, search for 'Recent' to locate the My Recent Documents folder, and delete its contents too. To see what's loading at start-up, click on Start, Run, type Msconfig and choose the Startup tab.



Right: Use Windows' search to locate the Recent Documents folder for all users, and clear them out

some improvement in terms of hard disk reliability and your ability to recover data in the event of a hard disk crash. The less physical movement that a disk's heads have to make, the longer the drive will last; and contiguous files are much easier to recover from a crashed drive than files with segments dotted all over the place. Windows XP has its own defragmenter and, although the makers of other utilities criticise its performance, it is good enough for the average user.

Other speed-up techniques for Windows are less fundamental, but can have a substantial effect on day-to-day work. One thing that irritates just about every Windows user at some time is the way that the system

will suddenly become unresponsive. The culprit here is often automatic disk indexing, which is meant to speed up searching files by their contents. And even if you do search often, the Windows Find command will do it without the index, but it just takes longer.

Another thing that can slow down the system is a large number of fonts, which must be loaded at boot time, be listed in the Registry, and then be loaded by every application when it starts. Fonts are attractive, but too many of them can cause problems.

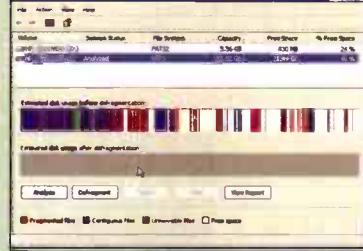
Other apparently cosmetic changes can also affect performance. Animations in menus, the Active Desktop, and other visuals add little to functionality but in Windows XP

Uncheck everything that isn't essential, which often includes such things as video driver controllers, toolbars, instant messengers you don't use, and so on.

From the Control Panel, choose Add, Remove programs, and remove applications that you don't use any more; if you can't remember the function of

some of them, a quick internet search will help you find out.

After removing programs, it's time to defragment. You can find the Windows defragmenter at Programs, Accessories, System Tools; remember to allow plenty of time – a good idea is to set it running overnight, or at the weekend, when you probably don't need to use the PC. To boost performance further, you can disable disk indexing by right-clicking on the hard disk

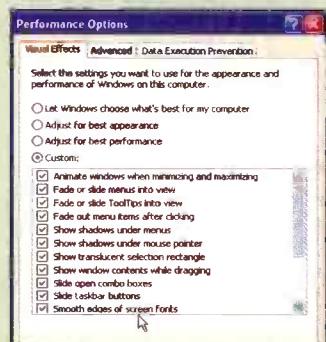


Windows' own disk defragmenter may not be the fastest, but it will do the job adequately for most users

icon, then choose Properties, and uncheck the box that says 'Allow Indexing Service to index this disk'. To switch off unnecessary visual effects, open the System icon in Control Panel, click on the Advanced tab, and choose the Settings button under Performance.

You can select the 'Adjust for best performance' here, or customise settings to find the best compromise.

You can let Windows adjust settings, or choose the best compromise



have heavy penalties in terms of processor cycles, so it's another area ripe for tweaking.

There's no doubt that the major threat to the speed and stability of Windows systems comes from external sources, via the various forms of malware. Before attempting any kind of routine Windows maintenance and clean-up, all these have to be blocked and erased. But if your system is secure, then all you need to do is make a few simple changes, and do some file and disk clean-up at intervals; we've collected our tips together in the box above, so you can follow them easily, and shouldn't suffer the usual Windows slowdown over long periods of use. PCW

# Computer CSI



PCs are increasingly becoming a vital source of clues for solving today's high-tech crimes, as computer forensics expert Ian Kennedy explains

**T**hink of a TV programme with a crime scene and there are usually some common components – a body, a bloodstained weapon and a couple of glasses covered in fingerprints for a murder, perhaps. But what of the computer sitting in the corner? Could this contain evidence of contact between the victim and their killer? Increasingly, you'll see the computer bagged as evidence too, in shows like *CSI* or *Without a Trace*.

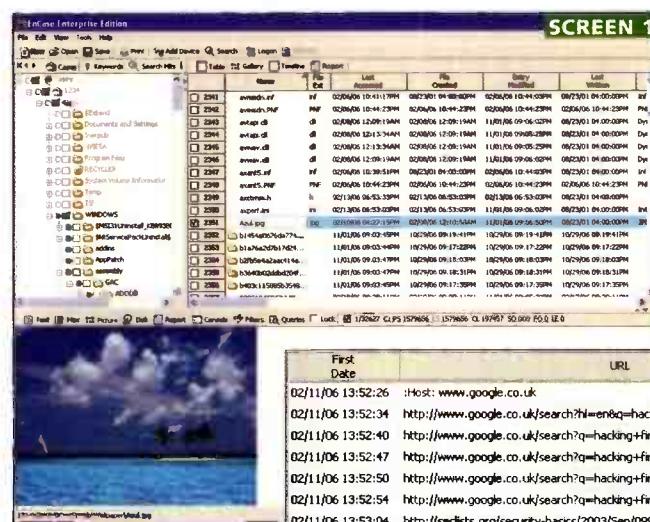
The relatively new field of computer forensics is, like other forensic sciences, becoming a popular area for study at the moment, and not just because of the TV. With virtually everyone using a computer, demand for forensic analysts and the availability of post-graduate courses for those who want to learn about computer forensics are both on the increase.

The use of forensic evidence from computers and other digital devices has become a common feature in investigating many crimes. No longer are computers simply seen as tools to commit a crime such as fraud; they can now bear witness to events leading up to other crimes, such as research and planning, or email exchanges between the suspect and victim.

## Convicted by complacency

One of the most prolific serial killers in the world, Dr Harold Shipman, was outwitted by a combination of ignorance and arrogance. During his interview, Shipman told police: "I'm sorry I'm smiling, you have no concept of general practice." Of all the evidence stacked against him, it was the compelling forensic computer evidence unearthed by detective sergeant John Ashley that was to prove the most damning to his case.

In an attempt to cover his tracks, Shipman had backdated and fabricated medical records stored on his practice



SCREEN 1

Left: EnCase software can produce a complete copy of a hard disk

First Date	URL	
02/11/06 13:52:26	:Host: www.google.co.uk	AdamW
02/11/06 13:52:34	http://www.google.co.uk/search?q=host%3Dwww.google.co.uk	AdamW
02/11/06 13:52:40	http://www.google.co.uk/search?q=hacking+firewalls&hl=en&q=hacking+firewalls&hl=en&rls=8&start=10&sa=N	AdamW
02/11/06 13:52:47	http://www.google.co.uk/search?q=hacking+firewalls&hl=en&rls=8&start=20&sa=N	AdamW
02/11/06 13:52:50	http://www.google.co.uk/search?q=hacking+firewalls&hl=en&rls=8&start=30&sa=N	AdamW
02/11/06 13:52:54	http://www.google.co.uk/search?q=hacking+firewalls&hl=en&rls=8&start=40&sa=N	AdamW
02/11/06 13:53:04	http://seclists.org/security-basics/2003/Sep/0994.html	AdamW
02/11/06 13:54:08	http://insecure.org/nmap/index.html	AdamW
02/11/06 13:54:13	http://insecure.org/nmap/download.html	AdamW
02/11/06 13:54:39	http://download.insecure.org/nmap/dist/nmap-4.1.1-setup.exe	AdamW
02/11/06 13:54:53	http://insecure.org/nmap/install/windows.html	AdamW

SCREEN 2

Below: A suspect's internet history can provide proof of a guilty mind

## The digital post-mortem

In a criminal investigation, procedure and documentation are the two most important factors that determine how an examination is conducted. The forensic analyst works methodically through a process that can be split into four broad stages – acquisition, identification, evaluation and presentation.

Acquisition is concerned with the forensically sound capture and preservation of digital and physical evidence, which is paramount for the investigation. The computer and its hard drives are crime scenes in their own right and must be secured and preserved, so once the computer has been seized, every sector of the hard disk has to be captured to produce a forensically sound copy.

You can't just rush in and connect the disk from a seized computer to a forensic computer to examine it – Windows may write data to the drive as soon as it detects it. The problems don't stop there either; as soon as you access files or folders on the disk their associated Last Access dates and times will be updated, potentially destroying valuable information. Even if this sort of mistake is avoided, there is a good chance virus checking software on the forensic computer will almost certainly try to check the disk, quarantining any suspect files it finds. To sidestep these difficulties, forensic examiners use a piece of equipment called a hardware write-blocker, which is designed to stop all write

## Tripped up by time zones

"The biggest military computer hack of all time." That's how the US Government described the allegations against Glasgow-born Gary McKinnon, who was accused of bypassing the security of what should be among the most sophisticated computer systems on the planet. These belonged to the US Department of Defense, Nasa and other high-profile organisations.

For all his care and planning in moving around the networks, McKinnon slipped up as a result of a simple mistake. "I got caught because I was using a graphical remote-control tool, and I forgot what time zone I was in," McKinnon said. "Somebody was in the office when I was moving the mouse around."

commands reaching the hard disk, effectively rendering it a read-only device.

There are several forensic software tools available that can produce a complete copy of the disk in a series of files. Some products, such as Encase (see screen 1) from Guidance Software ([www.guidancesoftware.com](http://www.guidancesoftware.com)), and the FTK Imager from Accessdata ([www.accessdata.com](http://www.accessdata.com)) generate and embed a Message Digest 5 (MD5) hash – a sort of digital fingerprint – into these files. This can be regenerated at any subsequent time, and used to validate the integrity of the copy being examined, showing that it has not been tampered with.

Assuming acquisition goes smoothly, the next stage of forensic examination is identification. This is largely about placing facts into context. For example, at a physical level, a note is made of how many hard disks are present in the computer and which was configured as the boot disk. At the logical level, the partitioning arrangement on the disks and the file systems on them can perhaps reveal the level of knowledge possessed by the computer's owner. Identifying the file system is also important in interpreting the layout of the disk and the behaviour of files as they are created, moved and deleted.

The evaluation stage of the process is concerned with locating and evaluating evidence. Here, the strategy used by the forensic analyst will depend on a number of factors, including the alleged crime, the number of exhibits and whether the suspect is in custody, on bail or not yet arrested.

For a forensic computer analyst undertaking work for a criminal prosecution, the presentation stage of the work is ultimately destined for an audience of lay people in a court of law. Much of the data found on a computer is stored in a raw format, and interpreting the information will usually be beyond the technical knowledge and experience of the jury and other people in court. A key task for the analyst, then, is to interpret the data and present it without opinion, using only facts and probabilities to



McKinnon hacked into US Government systems

add weight to any significant evidence. A forensic scientist must be prepared to be questioned and defend their findings in court, in addition to explaining them clearly.

### Inside the criminal mind

To prove a person's guilt under UK law, many offences require evidence to show that they both committed the act of which they are accused and intended to do so. In legal terminology, this distinction is known by the Latin terms *actus reus* meaning a guilty act and *mens rea*, a guilty mind. These are terms you may have come across if you've done jury service. Computer forensics can help prove both.

For example, imagine that a business has recently been hacked and the police have identified a suspect from the IP addresses in the firewall logs, tracing the IP address back, via the ISP, to a particular person. Now, suppose confidential company files are found during an examination of the suspect's computer. This provides evidence of *actus reus*. By investigating the suspect's internet history on the computer, a forensic analyst discovers a number of Google searches that were carried out just prior to the offence, using the search phrase 'hacking firewalls' (see screen 2).

The analysis also shows that the user went through a further four pages of results from Google, before visiting the site <http://insecure.org> and downloading the file nmap-4.11.setup.exe. This website and tool are network security related, so the activity is indicative of their thinking process, or *mens rea*.

### Future forensics

Everything we've looked at so far has taken place on a static snapshot of the computer. Conventional practice advocates that if a computer was powered on at the time of seizure, it should be powered down to prevent any changes to the data. But what evidence can you potentially lose by doing this? And is there another way to analyse the system?

Encrypted file systems, for example, are becoming easier to implement, and harder to crack. The Bitlocker technology built into Windows Vista (see PCW, December 2006 and [www.pc.co.uk/2166361](http://www.pc.co.uk/2166361)) is Microsoft's response to the growing problem of lost or stolen laptops containing sensitive data. It provides a high level of security, even preventing data being read when a disk is transferred to another computer. And, of course, it may not be possible to persuade the computer's owner to hand over the recovery key, even if they can be found. So, what better way to bypass this technology than to simply analyse the computer while it is still up and running – an emerging area called 'live forensics'. Another benefit is the potential capture and study of volatile data in memory – for example, a suspect might have a command-line history full of incriminating commands and IP addresses.

Of course, this is not a pure forensic approach; even with minimal contact, small changes will be made to the computer's memory. Crucially, though, the impact of such analysis can be predicted and minimised, usually by using specific tools that are made up of static rather than dynamically compiled code, minimising any potential changes to the system being observed.

As computers develop, with ever more security built in, forensic analysis will adapt too, whether by live analysis or in other ways, to make sure that vital evidence can be preserved and examined. Much of what you see on TV – such as the perfect enhancement of reflections on a pair of spectacles in a digital photo – may be fanciful, but computer forensics are an increasingly important and effective tool in the fight against crime. PCW

## Forensic principles

In the UK, the Association of Chief Police Officers (ACPO) has laid down four principles to be followed by everyone involved in computer forensic examinations:

- The data held on an exhibit must not be changed.
- Any person accessing the exhibit must be competent to do so, and explain the relevance and implications of their actions.
- A record of all processes applied to an exhibit should be kept and must be repeatable to an independent third party.
- The person in charge of the investigation has responsibility for ensuring that the law and these principles are adhered to.



# Goodbye XP, hello Vista

*It's almost time. Vista is here at last, and many XP users are thinking of making the switch. Artur Hoffmann and Jörg Geiger explain the upgrade process*

Judging by the number of letters and emails that the PCW office has been receiving, it's clear that many of our readers have questions about Vista. Should we switch? What are the big advantages? How do we manage migration in a business environment?

Whatever you decide, one thing's clear – before you rush into installing Vista, you ought to draw up a migration plan.

Obviously, Vista has ease-of-use advantages compared with XP, as well as better built-in security mechanisms and up-to-date functionality. This means that XP users can upgrade with a clear conscience. In spite of this, we recommend that you wait at least a few weeks before you switch.

## Dual boot first

We went through the full rigmarole of installation to see what you can expect if you don't get Vista with a new PC. The best, and the most secure, solution is to run Windows XP and Vista on a dual-boot system. This will allow you to try out the new operating system without disturbing the existing one. The only requirement is that you have a free NTFS partition with at least 15GB of free space. If you don't want to install Vista onto a production machine right away, you can run it using a virtual machine (see box, page 60).

It is, of course, possible to update your existing XP installation to Vista, but our tests showed that this can cause

problems, some of them fairly serious. The applications most affected are those that work close to system level, such as firewalls and virus scanners, and they can cause Windows Vista to crash. In some cases the incompatibilities can be so severe that Vista dies after your computer blue-screens.

Our testers found another stumbling block when they went to export files using Vista's Windows Easy Transfer tool. The export process only succeeds if you restrain its enthusiasm. If you follow Vista's suggestions it will copy huge numbers of irrelevant files to the new system, leaving erroneous links and programs that don't work.



### Moving your data to Vista

Microsoft has decided to help users make the switch by including a tool for moving data. If you're switching to new hardware at home, or on a small-business network, you must first install Vista on the new computers and then start the data transfer from the XP system. The Windows Easy Transfer tool copies, among other things, user accounts, files, folders, and program settings as well as email settings, contacts and messages (see screen 1). However, you will get the best results if you copy just those elements that are essential. If you decide to copy all the data from the C: drive, it could result in incorrect Desktop links, non-functioning programs and user folders that end up containing a mish-mash of XP and Vista files.

### Getting ready in XP

Insert the Vista installation DVD into the drive, open the support folder and copy the 26.5MB migwiz directory to the partition containing Windows XP.

Before running migwiz.exe close all other programs, select the correct drive and, optionally, specify a password. Next, decide which files and settings you wish to transfer. By default, the wizard suggests transferring all user accounts, files and settings. When migrating from an XP-only computer to a Vista machine, this makes sense as it creates an image of the whole system. However, it can't be recommended for multi-boot environments where only the content on the C: drive needs to be transferred. In our test, the wizard stupidly suggested transferring all 1.19TB of data from our Raid system.

To specify which data you want to use under Vista, click on Advanced Options and deactivate all other partitions under 'Files in other locations'. Copy only the most important items from the original C: partition. These could include Favorites, My Pictures and My Music. Desktop and Windows Settings, however, should not be copied.

Well intentioned, but littered with traps: Windows Easy Transfer helps you to move personal data

choosing the link option is recommended. The wizard will then list all the files and settings to be transferred.

### XP and Vista in parallel

PCW recommends installing Vista in conjunction with XP to start with, to ensure your eventual changeover is as smooth as possible. Dual-boot systems have several advantages. The main one is that it's possible to retain your working system and the PC is ready to use. Therefore, you can try Vista free from stress and carry out a smooth migration. If you're already using XP on a dual-boot system then Vista can be easily set up as a third option. As a rule of thumb, XP should be installed before Vista.

To use both Vista and XP on one computer, all you need is an NTFS partition with at least 15GB of free space. Unlike XP, Vista does not need to be installed on the first partition of a drive – an obvious advantage. The new system does not touch existing folders on the target drive, so you can continue to make use of the data. However, you can't install Vista on external USB or Firewire drives.

The installation is fast and easy, usually taking about 30 minutes: all you have to do is boot the computer from the DVD, enter the serial number and select 'User defined (Advanced)'.

If you install Vista on a partition other than the C: drive – which will be the case for a multi-boot system on which Windows XP is already installed – the new operating system will amend the drive letters automatically. If, for example, you install Vista on E: then under Vista this drive will be designated as C: and all other drive letters will be amended accordingly.

### The Vista boot loader

Vista has a new boot loader, which is different in many respects to its predecessor in XP, Boot.ini. To offer better security, the Vista boot loader is a binary file that can't

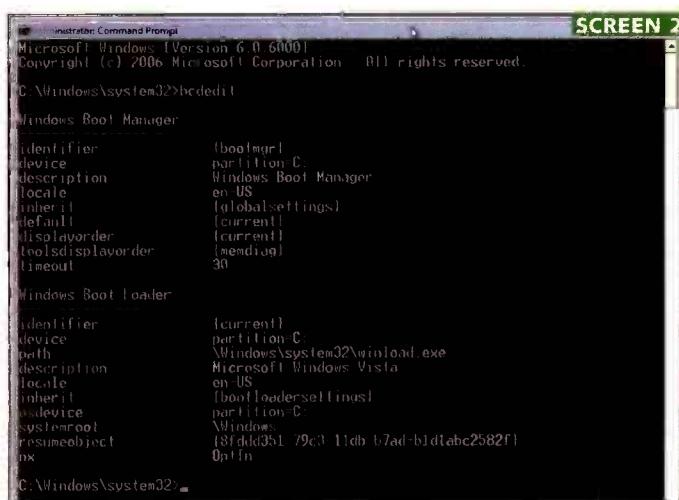
The next step is to deselect the programs you don't wish to use under Vista in the Application settings. Click on Exclude folder in the Migration wizard and enter the path to the relevant directories. By following these instructions, all but 15MB of our original 1.19TB was excluded.

To copy the data that the wizard has saved onto your Vista PC, start Windows Easy Transfer, select 'Continue started

## 'The best, and most secure, solution is to run Windows XP and Vista on a dual-boot system'

transfer', and click on 'No, I have already copied files and settings to CD, DVD or removable media'. After selecting 'To an external hard disk or to a network path', enter the path to the file SaveData.MIG. The program will initially want to know whether to create a new user account with the details from the C: drive or link it to the one created under Vista. If you are using the same username under Vista,

Vista's boot loader can no longer be edited with a simple text editor. Use the bcedit command line tool instead





simply be edited with a text editor. The boot configuration data store (BCD) is concerned only with Vista's start-up information. As before, Boot.ini is responsible for Windows XP start-up. You can test this for yourself. Click on Start, Programs, Accessories, Run, enter msconfig, then click 'Continue' in User Account Administration.

In the System Configuration dialogue box, click on the Start tab, which has only one entry: Microsoft Windows Vista (C:\Windows): Current Operating System; Standard Operating System. This means that you can no longer select which operating system is to be loaded by default – annoying if you still use XP.

## Vista upgrade gotcha

There's an awful lot of confusion around the Vista retail upgrade versions, caused by Microsoft changing the way upgrades are performed. If you buy an upgrade version, which is much cheaper than a full version, you need to start the Vista setup routine from within your existing XP installation to check that your system is eligible for the upgrade. Once done, the system reboots and you can then choose whether to do an in-place upgrade or a clean install (your old installation is moved to a Windows.old folder).

This means you can't do a barebones reinstall from your Vista upgrade DVD without installing and activating XP first. As not all Vista versions come with Vista's disk-imaging feature, this will annoy a lot of people, and create a challenge for others on how to slim down an XP installation to a bare minimum. Tools such as Nlite (see our feature at [www.pc.co.uk/2154232](http://www.pc.co.uk/2154232)), may suddenly become very popular.

## Vista on a virtual machine

If you want to get a feel for Windows Vista without having to install it on a production machine, one option is to set it up on a virtual machine.

Microsoft's Virtual PC 2004 doesn't support Vista, but Virtual PC 2007 is now in free public beta ([www.microsoft.com/windows/virtualpc/default.mspx](http://www.microsoft.com/windows/virtualpc/default.mspx)) until 30 March 2007, so you have a choice between this and the free VMware Server, which will be a free download when it is released. We've tried both these programs and they worked pretty well. However, you don't get DirectX 9 functionality in either, so you can't

**Don't burn bridges:** Vista works fine under Virtual PC 2007 beta

experience the Aero Glass Desktop theme. The installation procedure is exactly the same as on a real system; we recommend that you allocate at least 512MB of memory to the virtual machine.



To edit the BCD stores you need to use the bcdeedit.exe utility, which is stored in the Windows\System32 folder (see screen 2). The quickest way to access the Start file configuration editor is via the Run dialogue box. Enter cmd and hold down Ctrl and Shift when you click on OK to open an administrator or 'root' command prompt. From here you can access bcdeedit. Vista then shows a list of boot parameters.

If you want to save the current BCD store as Boot-Backup1 in the existing D:\Boot-Backups folder, enter the command **bcdeedit /export "D:\Boot-Backups\Boot-Backup1"**

(Key: ↵ code string continues) The command to restore it is similar: **bcdeedit /import "D:\Boot-Backups\Boot-Backup1"** This reinstalls the previously saved boot loader. View more possibilities by entering bcdeedit /? at the command prompt.

The information listed under Windows Legacy Operating System-Loaded Programs and Windows-Programs loaded at start-up is interesting. The first section relates to the XP boot loader, while the others belong to Vista. If you want to make Windows XP the default OS, enter the command **bcdeedit /default {legacy}**

Always make a backup of the BCD store before you edit it.

## Adding missing drivers

If you're installing Windows Vista on a relatively new computer, the setup routine will, in most cases, automatically recognise all of the hardware in use and install the appropriate drivers. However, the hardware recognition is not infallible; on one of our test computers, the Vista Device Manager (which can be accessed by selecting Start, Control Panel, Classic View) highlighted four components with a yellow exclamation mark:



Most missing drivers can be found using the Windows Update facility

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*Custom PC magazine, March 2007*

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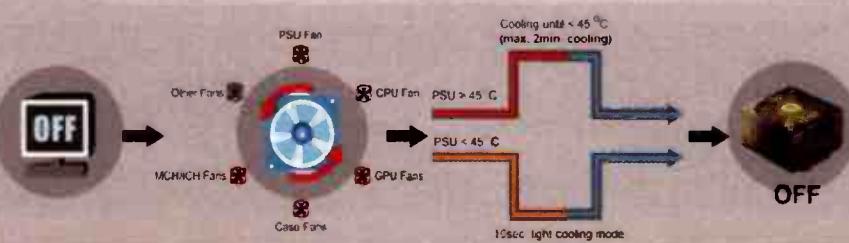
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the soundcard, network adapter, game port and onboard Raid controller. As the soundcard was working fine, our testers ignored the error message.

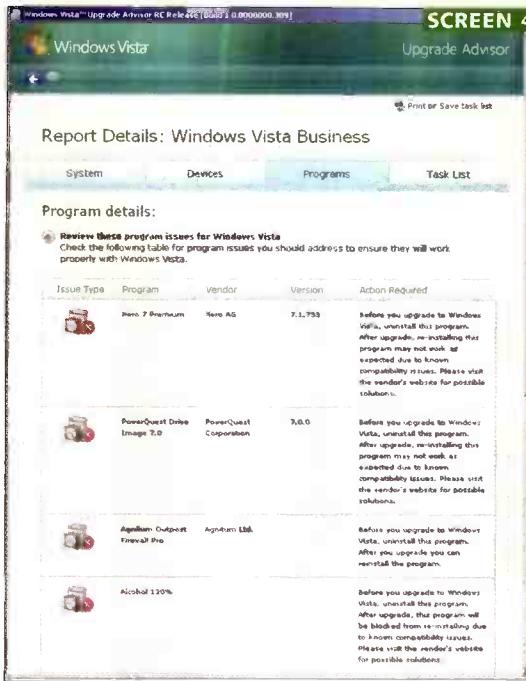
The easiest way to add missing drivers is via the Windows Security Center. First, select 'Windows Update', and then 'Search for updates'; then click on 'Display available updates' (see screen 3). If suitable drivers are found, the devices will be listed in the Windows Vista section. Select the drivers you want and confirm your choice by clicking on 'Install'. We successfully got the game port and network card to run using this method.

A second option makes use of drivers already installed for Windows XP. In the Device Manager, right-click on the problem device, select 'Update driver software' and choose 'Search for driver software on this computer'. In the next step, tell the program to look on the XP partition – normally the D: drive. This was enough to get our Raid controller working.

#### Using programs on both systems

If you already work with a dual-boot system and two XP installations, then you'll know from experience that sharing

**'You don't have to do a fresh installation when moving to Vista – but a simple upgrade from XP can cause problems'**



The Windows Upgrade Advisor checks whether or not your system is suitable for Vista

programs between installations doesn't always go smoothly. The same is true for the combination of XP and Vista.

While Paint Shop Pro 9, installed under XP, can be started under Vista with no problems, Winamp 5.12 states that the file PX.dll is missing. The program still runs, however, but the player is unable to initialise its database. Adobe Acrobat 6 Professional refuses to start at all because it can't find a valid serial number. Adobe Photoshop Elements 4 tries to start, but Vista blocks it and pops up the program compatibility wizard. This pointed out that there were known problems with updating Adobe Photoshop Elements. A click on 'Search for solutions online' resulted in

## Vista power tips

### Quick access to commands

Power users can customise the Start menu so that the Run command is always visible on the menu.

Right-click on the Windows button, choose Properties from the context menu and select the Start menu tab. Click on Customize to open the Customize Start Menu dialogue box, and check the box next to the Run Command option.

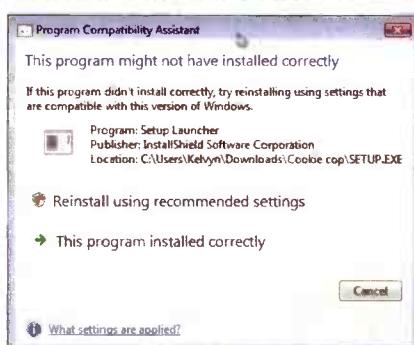
### Partition sizes

Vista has a utility that enables you to manually adjust the size of partitions. To start, use the Windows key and R to open the Run dialogue box, enter diskmgmt.msc, then click OK to confirm. In the File Management section, right-click on the partition that you wish to reduce, then select Reduce volume size. Enter the new size in the next dialogue box and confirm by clicking on OK. Usefully, this works even on the Vista boot partition.

To make a partition bigger, select 'Increase volume size' and enter the information requested by the wizard. This only works for partitions in front of the free disk space.

### Admin rights

If an 'Access denied' message appears on the screen after entering the bcdedit command in a Vista command prompt, then you do not have the necessary privileges. To solve this, go to Start, All Programs, Accessories, right-click on Command Prompt and choose Run as Administrator.



Use the Compatibility Assistant to ensure Vista can run your software

## Quick tips for a smooth transition

### Incompatible programs

It's pointless to copy program-specific files to Vista if the software needed to open them won't even run under the new operating system. You can use the Windows Upgrade Advisor to check this. Another source of information is the Windows Vista Software Compatibility List Wiki ([www.iebeta.com/wiki/index.php/Windows\\_Vista\\_Software\\_Compatibility\\_List](http://www.iebeta.com/wiki/index.php/Windows_Vista_Software_Compatibility_List)).

### Save everything first

If you intend to upgrade from Windows XP to Vista then you must save all your personal data. The easiest way is to copy all the folders that will still be needed to another partition. Besides any folders that you have created yourself, the Documents and Settings folder is the most important one. Vista takes the data in this folder over, but in the real world it's important to have an independent backup of this directory, in case anything goes wrong.

### Vista to Vista copying

Using Windows Easy Transfer, it's also possible to move data from one Vista system to another. In this case it is a lot simpler than doing an XP-to-Vista move, as both partitions already have the same directory structure.



SCREEN 5

Upgrading to Vista from XP can take twice as long as doing a fresh installation

[windowsvista/getready/upgradeadvisor/default.mspx](http://windowsvista/getready/upgradeadvisor/default.mspx)). Click on Windows Vista Upgrade Advisor to begin downloading the 6.4MB file. You also need to download and install – if they're not already installed – the MSXML XML services from the Microsoft download pages, followed by the Upgrade Advisor (see screen 4). You must make sure that the desktop firewall allows the program to access the internet, otherwise it won't work. Begin the system check by clicking on Start Scan. Be patient – it can take some time to complete; when it has finished, click on the 'See Details' button.

## Hardware

The Windows Upgrade Advisor gets straight to the point: if your system is suitable for Windows Vista, then you'll see a message saying 'Your computer can run Windows Vista'. It will also suggest the most suitable version of Vista, usually Windows Vista Business, as long as your computer does not have a TV card. Far more interesting than the recommended version is the information listed under Devices and Programs. System requirements only comes into play if the Upgrade Advisor judges your system to be unsuitable for Vista.

You can see how many problems Advisor has found with hardware and peripherals by clicking on the Details button. On a test PC in our labs, the

**'The number of potential issues means that we only recommend an upgrade in a few instances'**

a box advising to download a patch – not terribly helpful. As these examples show, you'll have fewer problems with a fresh installation.

### Upgrading to Vista

You don't have to do a fresh installation when moving to Vista, but a simple upgrade from XP can cause problems. If you're considering an in-place upgrade, the first thing you need to know is that you can't upgrade every version of XP to any version of Vista; the table below

shows which ones can be upgraded; and you can't upgrade from Windows 2000 at all.

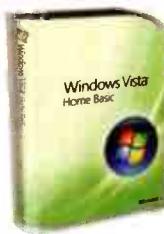
If you want to upgrade an existing XP installation to Vista, you need to start installing the new operating system under XP and have at least 8GB free on the system partition. If you don't, the setup program won't offer the upgrade option. In practice, the number of potential issues means that we only recommend carrying out an upgrade in a few instances, for example, if you have recently installed Windows XP and the system is not full of application data.

If you want to upgrade, the first thing you need to do is check the compatibility of the installed applications.

Insert the Vista DVD and on the first screen select 'Check compatibility online'; this will connect to the Windows Vista Upgrade Advisor website ([www.microsoft.com/](http://www.microsoft.com/)).

## Upgrade paths from Windows XP to Vista

This table shows you the upgrade matrix from various versions of XP to the different Vista editions. 'New installation' means that you will need to reinstall your applications.



### WINDOWS XP VERSIONS

Windows XP Home Edition	Upgrade possible
Windows XP Professional Edition	New installation required
Windows XP Tablet PC Edition	New installation required
Windows XP Media Center Edition	New installation required
Windows XP Professional Edition x64	New installation required

### WINDOWS VISTA HOME BASIC

Windows XP Home Edition	Upgrade possible
Windows XP Professional Edition	New installation required
Windows XP Tablet PC Edition	New installation required
Windows XP Media Center Edition	New installation required
Windows XP Professional Edition x64	New installation required

### WINDOWS VISTA HOME PREMIUM

Windows XP Home Edition	Upgrade possible
Windows XP Professional Edition	New installation required
Windows XP Tablet PC Edition	Upgrade possible
Windows XP Media Center Edition	New installation required
Windows XP Professional Edition x64	New installation required

Vista Upgrade Advisor found four problems – the same four devices that were marked with a yellow exclamation mark during the fresh installation we described earlier.

The Action Required column tells you what you need to do. In this instance, for three of the devices you should use Windows Update to load new drivers after installing Vista. The Upgrade Advisor said that the Raid controller, running in IDE mode in our test PC, wouldn't work under Vista. As we already had this hardware running successfully under Vista, we ignored this tip.

In the 'Cannot find information on these devices section', the tool lists any unrecognised components. In our test, the routine did not recognise the Canon Fax-LT290, the AVM-NDIS driver or the VMware Virtual Ethernet Adapter.

#### Incompatible software

Click the Programs tab to see information about the software that the Advisor found on your system. Applications that won't run under Windows Vista are listed first; in our example, the Advisor is indicating that Nero OEM and Alcohol 120% will have to be uninstalled before carrying out the upgrade. According to the Upgrade Advisor, Nero will run under Vista. However, this is not the case.

Be careful with applications listed in this category. You can expect problems – including crashes – if you run them

# Troubleshooting Vista

#### Problem solving

The Windows Vista Upgrade Advisor is useful to run before performing a fresh installation of Vista. It will allow you to identify any applications that will not run, or do not work properly, under Vista.

Run the Windows Vista Upgrade Advisor and make a note of the programs that it complains about. This will save you a lot of time later and help you to avoid installing incompatible software – such as Alcohol 120% – that causes Vista to crash or others, such as older versions of Trillian, that will stop the Aero Desktop working.

Note, however, that the Vista Upgrade Advisor only supports the 32-bit versions of

Windows XP and Vista. If you use Windows XP Professional x64, you will have to keep your fingers crossed and install Windows Vista without prior system analysis.

#### Triple boot

As well as a fresh installation or using a dual-boot option to run Vista and XP in parallel, there is a third strategy for migration. As Vista has a new boot loader, different to XP's, there is nothing to stop you having a triple-boot system running Vista, XP and your favourite flavour of Linux. It's too complex to cover briefly, but a tutorial for hardcore users is available at <http://tinyurl.com/ymkegv>.

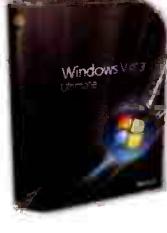
#### The long march to Vista

Click on Install now, and in the next step let the computer search for new updates. Then, enter the serial number, click on Next and select Upgrade. The installer will refresh and display a list of any system components that might not run under Windows Vista. The installation will begin, with the copying of the files. An Upgrade takes about 90 minutes, three times longer than a fresh installation. However, you will be saved the trouble of transferring your files and settings.

The first system restart will take you back to the Vista Desktop. All the shortcuts that you had on your XP desktop, as well as all your programs, will be visible. However, in our experience, the Windows Vista Upgrade Advisor does not identify all programs, which can cause problems. For example, trying to start Acronis Disk Editor causes a blue screen, and Vista abandoned an attempt to open Partition Magic 8, referring to known compatibility issues. So, this is another good reason to uninstall all system-related programs before you begin the upgrade process. All our other applications, including Microsoft Office 2003, Paint Shop Pro and Winamp, ran without any problems; the same was true of our network connections, shared folders, favourites and even the right-mouse button context menu.

Hardware fares much better. A look in the Device Manager showed that even the components that the Windows Vista Upgrade Advisor complained about were working fine – only the Canon Laser-Fax/printer is marked with a question mark.

At this point, you should have a working Vista system – but check all your critical applications to make sure there's nothing that has been overlooked. Welcome to Vista. **PCW**



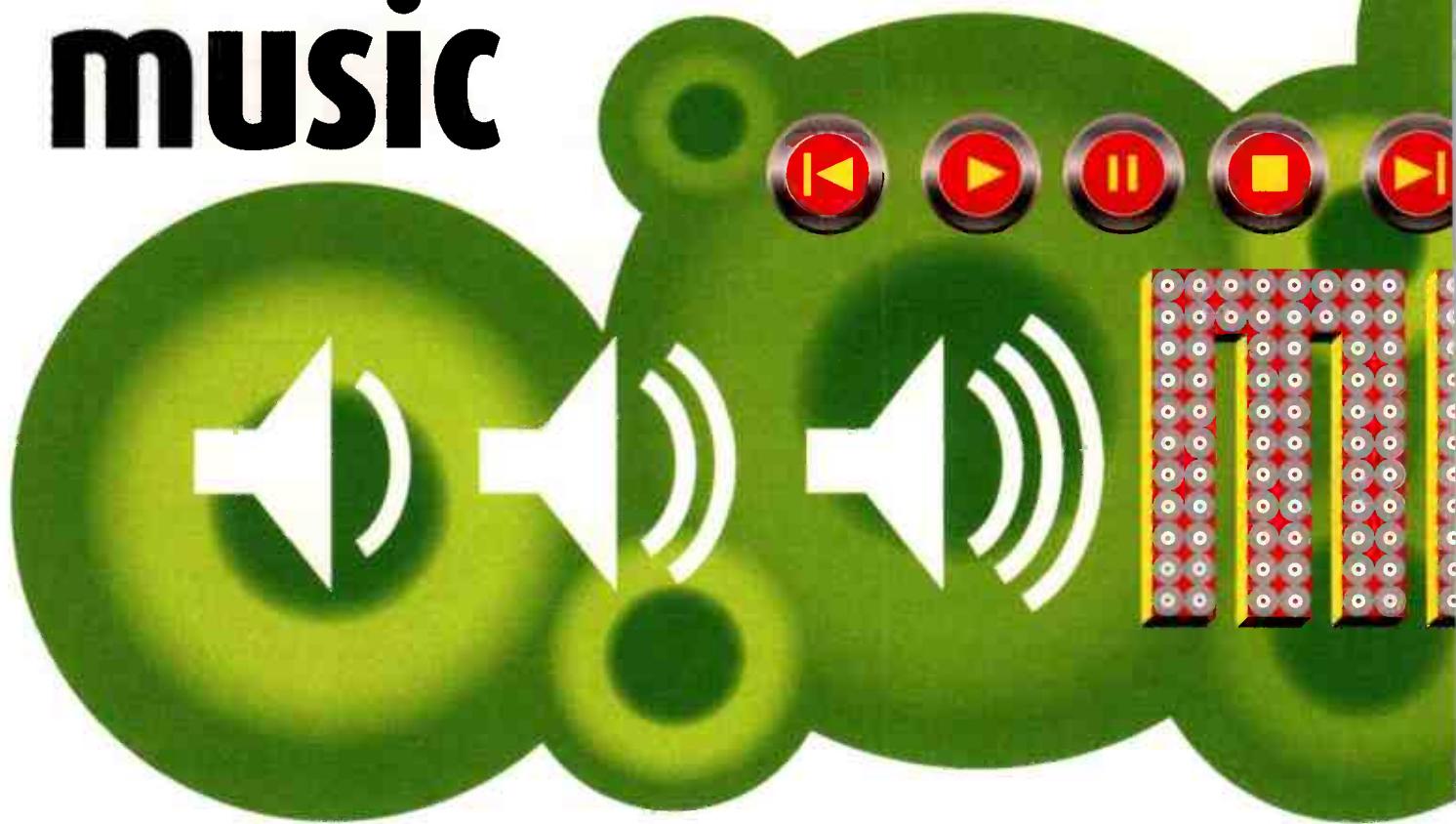
#### WINDOWS VISTA BUSINESS

- Upgrade possible
- Upgrade possible
- New installation required
- Upgrade possible
- New installation required

#### WINDOWS VISTA ULTIMATE

- Upgrade possible
- Upgrade possible
- Upgrade possible
- Upgrade possible
- New installation required

# Mastering your music



*Is the music collection on your PC bursting at the seams? Does it take longer to find a track than it does to listen to it? Christian Lanzerath and Manuel Masiero show you how to store your audio efficiently and bring order to sound file chaos*

**T**he larger the music collection on your hard disk, the more difficult it becomes to manage. It may even get to the point where you no longer recognise the titles of the albums you've stored on an individual CD or DVD. If your audio collection includes hundreds of records, keeping it organised can start to look like a hopeless task.

But help is at hand – we've put together a collection of utilities to take care of the work. With our selection of tools, you can manage large numbers of music files with just the press of a button.

#### Use metadata

Utilities such as The Godlather can bring order to a chaotic collection of audio files. Using tools such as this enables you to not only find albums on your hard disk, but

also – more importantly – label tracks with matching metadata (or tags).

Tags are labels stored in the music file and contain information, for example, about the track's source album, genre and date. A tag can also contain an album cover image or lyrics – items that can be displayed when a track is played back with audio players such as Winamp or Foobar2000.

The most important requirement for keeping your music archive in order is to make it quick and easy to administer. So, it's helpful if you have all of your favourite music in one place. Archiving your CD collection on the PC – also known as ripping – offers many advantages; thousands of pieces of music can fit onto DVDs or hard disks, be annotated with tags and have value added with cover artwork images and lyrics. Gradually, you can build up a virtual CD shelf on your PC screen.

For most people, mp3 is synonymous with music downloaded from the internet or copied to a mobile player. Mp3 isn't the only format though; codecs such as Vorbis (Ogg) or Musepack (Mpc) have learned from the technology and improved on it, offering sound quality that is just as good for the same or smaller file sizes. To keep your music files sounding as close as possible to the original, the Ape, Flac or Shn codecs are also worth a look. There's an overview of different compression formats and their space requirements in the box 'Choosing the right audio format' on page 68.

#### From CD to hard drive

Converting audio files is particularly easy using the freeware DBPoweramp. All you have to do is select the music file to be



converted, access DBPoweramp from the context menu, choose the target format and the conversion will start.

The Lame mp3 encoder is already integrated (see box, page 68) and more than 40 others, both well known and lesser known, can be downloaded free from [www.dbpoweramp.com](http://www.dbpoweramp.com) as plug-ins. The codecs come as a .exe file; double-clicking installs

the codec in the program, and it can then be selected from the context menu.

Another useful tool for copying whole CDs is EAC (Exact Audio Copy). The big advantage over other programs is its Secure mode, which spots and warns of errors in the copying process (see screen 1).

To get started, specify which codec you prefer to use for ripping via the EAC/Compression settings menu, then select the destination and naming method for the music files from the EAC/EAC Settings menu and use EAC/Drive settings to calibrate your CD/DVD drive – there must be an audio CD in the drive during calibration.

Start the copying process by selecting the tracks to be copied in the main window and then choose Actions, Copy selected tracks and Compressed. Among EAC's useful functions is a normalisation function, which can be used to equalise the volume of selected audio tracks.

#### Organising your music collection

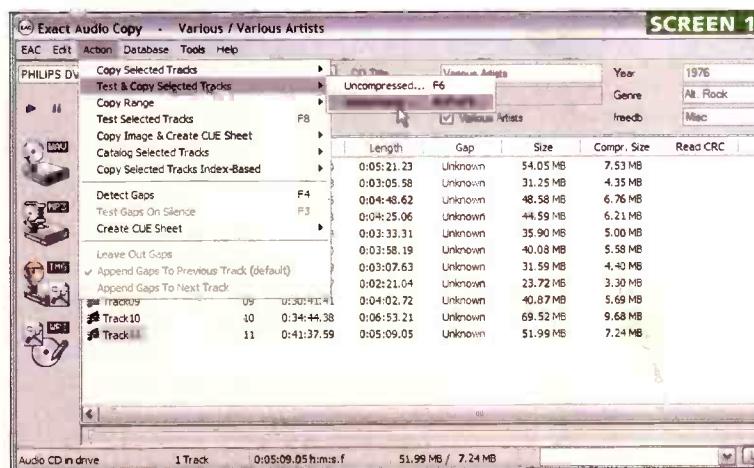
From writing on cassette labels to metatags and folders, organising music has changed dramatically, but it's still the key to being able to find your way around the collection months or years later.

To make sure that you'll be able to navigate around your collection properly, it is not only important to name the files correctly but also to append the right metadata.

These bits of data – tags – contain additional information such as the track title, artist, album name or genre and are stored in the audio file. Both hardware and software players can read and display these tags. This means that you will always know which song is being played without having to pack all of the information into the file and folder names. In addition, you can include the album cover and song lyrics in the tags.

#### Filename comes first

In Windows Explorer, filenames are the main way of seeing what's what. How you name your music files is up to you; many



**Exact Audio Copy (EAC) copies audio tracks to the hard disk and can use mp3, Flac and other encoding systems**

people create a folder for each artist and then put each album in a separate sub-folder. The sub-folders then hold the tracks, playlists and CD covers.

You can set up the right directory structure and file-naming convention when ripping a CD using EAC. To do this, select the Filename tab from the EAC/EAC Settings menu. In the Naming conventions field use placeholders to create a rule that lays down how EAC should name the files. EAC gets information about which audio CD is in the drive from the FreeDB online database. By clicking on Database, and 'Get information about CD from internet', FreeDB fetches the relevant descriptions from the internet.

The freeware Foobar2000 Tag Editor adds metadata to audio files that are not already tagged. It's more than just a good tag editor; it is also an excellent audio player, which

## 'Utilities, such as The Godfather, can bring order to a collection of files'

supports the Aac (Adaptive Audio Codec), Flac, mp3, Mpc and Ogg formats. Further formats can be added as plug-ins.

To import audio files, either select them individually after choosing File, Add Files or use Add Directory to add all the files in a directory at once. The selected files are then listed in the program window. Right-click on a file in this list and choose Properties from the context menu. If you downloaded the tracks from the internet – say from iTunes or Napster – or if they have been ripped by EAC with access to FreeDB, the files will already have their own metadata, which you can view on the Metatags tab. The way in which the tags are allocated depends on

## Bit rates explained

The bit rate of a recording isn't necessarily a mark of the quality of an audio file. It shows, instead, how much space it requires, expressed in kilobits per second (Kbits/sec). In a constant bit rate recording (CBR), the data is encoded at a constant rate over the whole length of the track, while for a variable bit rate recording (VBR) the storage space is dynamically adjusted for the different parts of the music. The more complicated sections can be encoded at a higher bit rate than those where there is only a single note to be heard, so the overall compression can make more efficient use of storage space.

## Choosing the right audio format

Whether you want lossless copies of CDs or space-saving music files, there's a suitable audio format and conversion tool for every purpose.

Despite the wide range of audio formats, the best known remains mp3. From a technical standpoint, it's outdated, but because it is so well known and widely supported by both software and hardware players, it's still very popular. The best-known mp3 codec is Lame, which is particularly suited for files to be used on mobile music players. Musepack (Mpc) and Ogg Vorbis (Ogg) files, compared with mp3, are smaller and have better quality for a given bit rate. However, hardware manufacturers have hardly taken any notice of the Musepack codec yet, although some do support Ogg. Windows Media Audio (Wma), on the other hand, is widely supported by hardware players, although not usually in its lossless form. Its lossy codec gives acceptable quality at bit rates as low as 64Kbits/sec but cannot match the performance of Vorbis and Musepack in other areas; it's best considered an alternative to mp3/Lame as a solution for users who require very small files.

### Lossless codecs: Ape, Flac and Shn

The codecs we've mentioned so far are all lossy, which means that the copy is not as good as the original – to save space during the encoding, information that the codec thinks doesn't matter is thrown away, making it impossible to recreate the original audio exactly.

If you value sound quality rather than compact storage size, then we recommend that you use another codec, such as Free Lossless Audio Codec (Flac), Monkey's Audio (Ape), Shorten (Shn) or Wma 9 Lossless (Wma) instead. Using one of these codecs, files are about two-thirds of their original size and quality is much better than their lossy counterparts. Ape, Flac and Shn files are all bit-precise copies that do not lose any data; some audio hardware such as the Neodigits Helios X5000 ([www.pcw.co.uk/2169843](http://www.pcw.co.uk/2169843)) already supports Flac. Wma Lossless is less widely supported in hardware but can provide small file sizes with its 2:1 maximum compression.

### Audio codecs compared

For our tests, we compressed a track ripped from an audio CD using various codecs at their respective default settings. The results are shown in the table below.

The original track was four minutes long, with a bit rate of 1,411Kbits/sec, taking up about 41MB on the hard disk. If you have enough hard drive space and are not prepared to compromise on sound quality or tolerate loss of information, you should choose one of the lossless formats. In terms of compatibility with players though, the mp3 output from the Lame codec is still streets ahead.

## Audio codecs compared

Codec	WAV	LAME/MP3	VORBIS	MUSEPACK	WMA 9	AAC	FLAC	SHN	APE	WMA 9 LOSSLESS
Lossless	Original file	✗	✗	✗	✗	✗	✓	✓	✓	✓
Size in MB	41	5.9	5.4	5	7.6	5.2	29.5	31.7	28.8	20.5
Bit rate Kbits/sec	1411	207	189	175	257	180	1033	1106	1006	940

the files' source. You can alter them to fit your own preferences by clicking on a field and entering new details.

### Playing tag

There are different formats for music file metatags, of which the best known is ID3. Version 1 only has seven data fields: title, performer, track number, album, year, genre and comment. Its successor, ID3v2, can have dozens of fields, although there are few players that can display them all.

## Other tag formats

As well as ID3 there are several other tag formats used on music files. Apev2 – developed for the Mpc and Ape audio formats – allows you to add and fill as many data fields as you like, and include duplicates. Unlike ID3v2, in which the details are encoded, ape saves them in plain text in the audio file header. The Vorbis Comment Format can be used with Ogg Vorbis and Flac, and is not very different from Apev2. Both Foobar2000 and Mp3tag work out which format to use, based on the audio codec that encoded a particular file.

## 'There are different formats for music file metatags, such as ID3'

However, for managing the collection on your PC, information about the language, label and subtitles can be useful. If you wish to complete fields that are not yet saved in the file, you can use the Add New Field command from Foobar's Properties context menu dialogue box. Details of fields available in the ID3v2 standard can be found at [http://wiki.hydrogenaudio.org/index.php?title=Foobar2000:ID3\\_Tag\\_Mapping](http://wiki.hydrogenaudio.org/index.php?title=Foobar2000:ID3_Tag_Mapping). See the box 'Other tag formats' (left) for information about other types of tagging.

Instead of entering all the metadata by hand, you can use the folder and filenames as a template. To do this, highlight all of the tracks in the main window and right-click to open the Properties dialogue box. Using the Metatags context menu tab, select Fill Values from File Names. In the Patterns field, enter the actual directory structure and file-naming convention in the form of placeholders. For example, if the path is Artist/Album/CD number/Track number/Filename, then the pattern would

be %artist%\%album%\%discreumber%\%tracknumber%.%title%, which extracts all of the data from the path and saves it in the corresponding data fields.

It works the other way round too, so you can create filenames from Tags. To do this, select File Operations, Move, Rename or Copy Files from Foobar's playlist context menu. All the necessary settings are made from this dialogue box. Using the same method as before, enter a pattern for the renamed files into the Output file name format field. This time, the Tags serve as sources for the filenames and their data fields are referred to with placeholders such as %album%, %artist% or %tracknumber%. This means you can create a complete directory structure by placing a backslash between the placeholders. You can also find similar functions in programs such as Prograce's MP3 Sorter ([www.prograce.com](http://www.prograce.com)), provided your tracks have been tagged.

### Enhance your archive

Once you have filled the most important tags with accurate details and named the files as you want, only the finishing touches remain. Many music fans like to save the album cover artwork and lyrics as well as the basic details. You can use the Album



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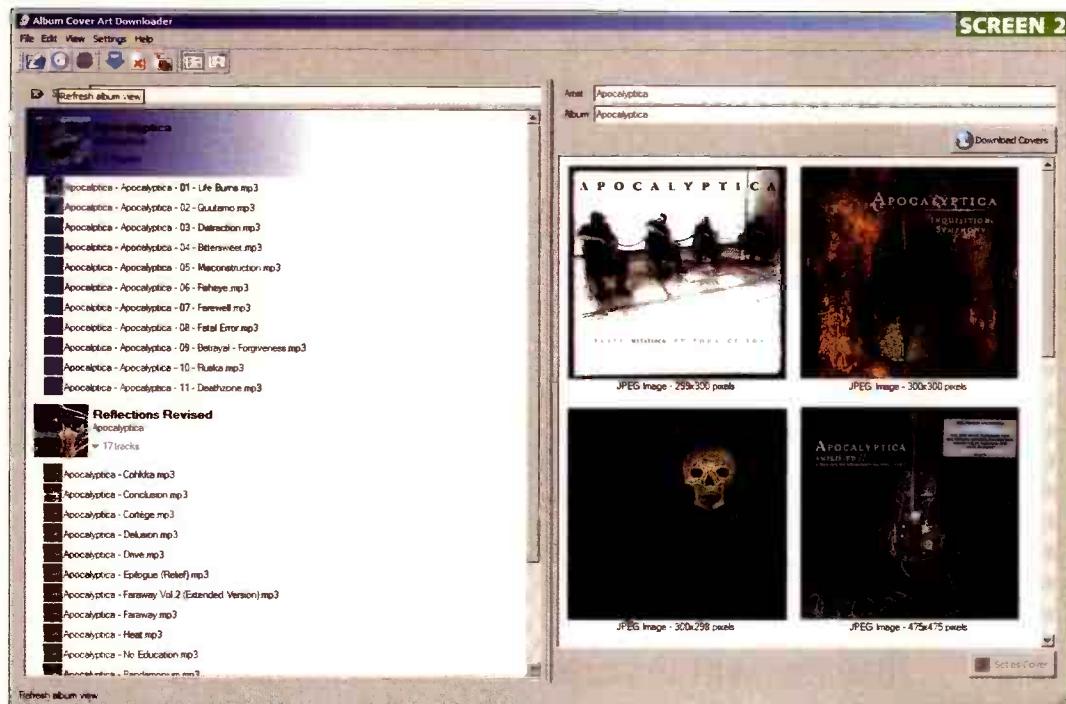
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# ORGANISE YOUR AUDIO COLLECTION



Cover Art utility to trawl the internet for the relevant images for whole albums or individual songs (see screen 2). The main source for album cover images is Amazon, but you can also make the program use the Yahoo, Buy.com and Walmart websites.

Click on the Folders icon in the toolbar to browse for the folder where the audio files are stored. The program will automatically list all the sub-folders and the music they contain in a tree structure. Clicking on an entry will copy the Artist and Album Tags as search terms to the right of the program window. Click on Download Covers to start the search for the corresponding covers.

If it is successful then Foobar displays all the matching images under the heading of Album Cover Art. Select the album or track to which you wish to allocate a cover, select a picture by clicking on it and then on

the 'Set as cover' button. If an entire album is selected as the target then the image is not only written to the relevant tag for each track, but will also be saved in Jpeg and Png format in the corresponding folder.

## Saving lyrics

Lyrics can also be saved in an mp3 file. The Foobar Mini Lyrics plug-in is handy for this. If it is installed, the plug-in starts automatically at the same time as Foobar 2000. As soon as a track is played, Mini Lyrics searches for the corresponding lyrics. If it finds more than one set, you can choose which one to use, before they're displayed.

Foobar highlights the line being sung, just like a karaoke machine; if you want to save the lyrics with the mp3 file, click on the Menu button – this only appears when you move the mouse over the Mini Lyrics

‘Foobar highlights the line being sung, just like a karaoke machine’

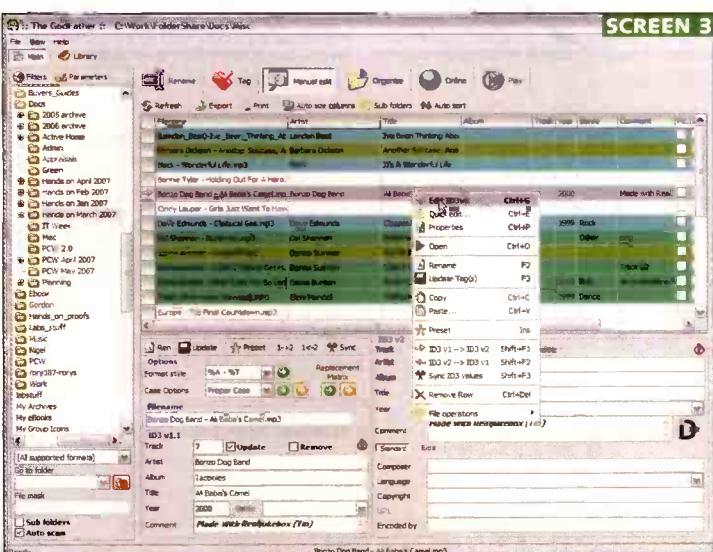
window. Select File, then Save Lyrics to mp3 files. Alternatively, you can save the lyrics as a Txt or Lrc file, which can be recognised and displayed by some mp3 players when the song is played.

## The Godfather

One of the most powerful programs for music management is The Godfather (see screen 3). It is particularly suitable for music that does not originate on an audio CD but has found its way on to your hard disk as an encoded file.

The Godfather offers numerous music management features, but in spite of this only plays back mp3s. For tagging and renaming files though, it supports all of the important and well-known music file formats from mp3 to Ape. The program's main disadvantage is that beginners are often overwhelmed by the sheer number of functions.

On the left of the program's window is an Explorer-like tree, which you can use to browse through the drives and directories on your computer. What is displayed on the



The Godfather is a little awkward to use, but is ideal for organising larger audio collections

## Backup media compared

DVDs are the cheapest backup media, with 1GB of storage costing as little as four pence. External hard disks are more expensive, but faster and offering more capacity. And don't overlook good old streaming tape, either.

### Backup media prices

	CD-R	CD-RW	DVD-R	DVD-RW	DVD-RAM	DVD-DL	USB HARD DISK	STREAMING TAPE
Capacity (GB)	0.7	0.7	4.7	4.7	4.7	8.5	Up to 750	36
Typical price (£)	0.10	0.22	0.20	0.26	1.41	0.92	Depends on size	10
Price per GB (£)	0.14	0.31	0.04	0.06	0.3	0.11	0.22 - 0.75	0.28
Transfer rate in Mbytes/sec	up to 8.2	up to 4.7	up to 21.6	up to 10.8	2	up to 5.4	Up to 60	3

Disc prices in £ based on media from [www.svp.co.uk](http://www.svp.co.uk), including Vat

right depends on which button is pressed in the toolbar. Using Rename you can create filenames from the details in the Tags, in a similar way to Foobar 2000. To do this, use File Options, then Rename to make a template consisting of placeholders in the Use Variables field. The Tags section is normally used to change the metadata of multiple files. For example, if you put a tick in front of Artist, enter a description of your choice and confirm it by clicking on Update, then the Artist tag for all the selected tracks will be overwritten with the new data. If you prefer to work track by track and fill in the Tags individually then select Edit by Hand.

If all that is too much, you can use The Godfather in automatic mode: the program

## 'The Godfather offers numerous music management features'

will try to find album information from the FreeDB database. Click on the Online button to connect to the database, then activate FreeDB and click the button with the magic wand symbol. To start the search, click on the Search Freedb button. The program displays the entries found under the heading of Result. If the right one is there, go to Transfer Album and then to Rename and Update. If the album you are looking for is not in the results list, then you can search FreeDB manually, clicking

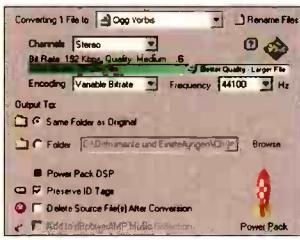
on the relevant symbol to activate a text search. You can then specify the artists and albums to look for.

### Creating playlists

The Godfather can also generate M3u and Pls format playlists, which can be imported to player software such as Winamp or Foobar 2000. All that the lists contain is information to say which tracks should be played and in what order.

Click the Organize button to access this function; to generate a playlist, select the folder containing the tracks from the file tree on the left. The individual tracks will then be shown in the lower-right window and you can use Add selected to add songs to the list in the main window.

## Software round-up - top mp3 tools



DBPoweramp

**DBPoweramp**  
Music files that are already stored on your hard disk can be converted to other formats very easily using DBPoweramp. There are more than 40 codecs available for download from the DBPoweramp website, and files can be converted from the right-click menu.

### Mp3tag

If you're looking for a simple but powerful tag editor, then



Mp3tag

Mp3tag fits the bill. It supports 13 audio formats and, like Foobar2000, is capable of adding user-defined tags, and can be linked to the FreeDB CD database. It will also generate playlists for you.

### iTunes

Apple's program isn't just for managing your iPod. It also has a very capable music manager: you can use iTunes to organise songs as you wish, annotate them,



iTunes

specify genres and create playlists. The program's repertoire also includes a burning function and a CD ripper, which can store CDs in Apple's own lossless format.

### Media Monkey

If your music is scattered all over your hard disk, then Media Monkey can put it in order. It scans all your drives for audio files and then sorts them, using the tags, into categories such as



Media Monkey

title, artist, album or genre. You can rate your tracks and make a playlist or audio CD with your favourite tunes, based on these ratings. The built-in audio player recognises the mp3, Ogg, Mpc, Wma, Ape and Flac formats; external player programs can also be integrated.

### Amok Playlist Copy

Music can be copied to many mobile audio players easily using Windows Explorer or with



You can use tracks from different folders in a playlist – it doesn't matter where the tracks are stored. After putting the list together, click on the Playlists button and then on Save. Give the list a name and select the format in which you want it saved.

### Backup copies

Like digital photos, your collection of audio files can soon add up to several gigabytes. If a lightning strike brings your computer to a halt, your digital music collection could be toast too – unless you have a backup.

The larger the archive, the more effort and more tiresome making a backup becomes. However, you should resist the temptation to do without a backup. If, for example, all your music files are stored on a single hard disk then your entire collection will be lost if the disk fails – and if you've spent hours tagging files and adding lyrics or artwork, that's a lot of work to lose.

And remember that it doesn't have to be something dramatic like a lightning strike; it's

more likely to be a mechanical failure caused by wear and tear. So, keeping backup copies of all your audio files is a sensible precaution.

A small music collection of, say, a few hundred megabytes to a couple of gigabytes, can be backed up cheaply: it will fit easily on a few CDs or DVDs. However, the more your collection grows, the more unmanageable this process can become. Working out which tracks are stored on which disk often requires a printed list, and a lot of head-scratching.

If you're using CDs or DVDs as your backup media then remember to handle and store them carefully. Ageing and scratches on the surface can cause data loss. Thankfully, utilities such as DVDisaster (see

### 'If you're using CDs or DVDs as backup, handle and store them carefully'

box below) can be used to create error correcting data, stored in a file roughly 15 per cent of the size of the original data. This information can be used to read bad sectors on the disc. It's important to note that the error-correction file has to be generated while the disc is still working normally – ideally, right after making the backup.

As with much else in computers, when it comes to storage, you get a lot for your money these days, and easy-to-use

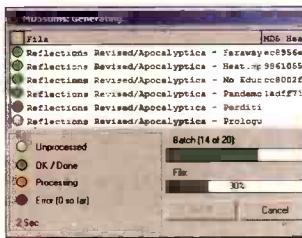
portable USB hard drives can be bought quite cheaply. Particularly easy to use are portable USB2 hard disks – you can buy a 160GB drive for about £60; cheaper still are Pata or Sata hard disks in removable caddies. The main advantage of hard drives over optical media is the higher data transfer rate, and the additional capacity removes the need to constantly swap media (see box, page 72). If the hard disk is used simply as a backup device then the time consumed by read/write cycles is reduced too. If you decide to save your music archive on a second hard disk, using a synchronisation tool such as Synchronise It makes the job even easier. This utility compares source and target folders and keeps them both in the same state, which means that you don't have to make copies by hand and can be sure that you won't forget any files.

Another reliable backup solution is a Raid 1 (mirroring) disk configuration, which means that Windows saves all files simultaneously on two internal hard disks. Every action on drive 1 is simultaneously carried out on drive 2, creating a backup automatically.

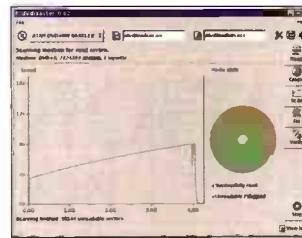
Whichever backup solution you choose, be prepared for a lengthy process the first time you make a complete copy of your library; it'll be quicker in future, if you just copy the files that have changed. And while you're waiting, why not listen to some music? PCW



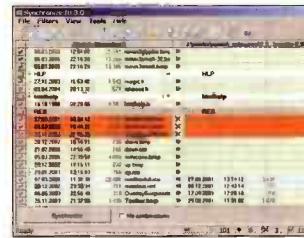
Amok Playlist Copy



Md5 Summer



DVDisaster



Synchronise It

bundled software. However, it's worth taking a look at Amok Playlist Copy. This utility loads up an mp3 player based on a playlist. It reads the playlist and then copies all the songs that it contains to the player or to a directory on your hard disk – even if the source mp3s are distributed among various folders.

### Md5 Summer

This program uses checksums to test how successful a backup

was. Md5 Summer generates Md5 unique hashes – a sort of electronic fingerprint – from the original file and the copy. This tool's big advantage is that it creates checksums for whole directories at once and saves them as an Md5 file. You can then compare the two files using CSDiff, which shows you any differences between the Md5 files, so that you know which – if any – audio files were not backed up correctly.

**DVDisaster**  
This useful piece of freeware generates error correction information for CD and DVD data. If read errors occur, for example, because the media has aged or been physically damaged, you still have a good chance of rescuing all your music using this utility. DVDisaster tries to read as much data as possible from a damaged disk, and then reconstructs unreadable

portions of data from the previously generated error correction information.

### Synchronise It

This is a practical tool that compares the contents of two drives and synchronises them. This is ideal, for example, if one hard disk is being used as the backup medium for your music files that are stored on another drive.

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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, Oték 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.



# Bluetooth

TM

### 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



Windows Vista is now available to all and sundry, but how quickly people will upgrade remains to be seen. The majority of Vista purchases will be as part of a whole new system – and we've reviewed various Vista PCs this month.

Evesham plumped for the Home Premium edition of Vista with its £999 Solar Creation desktop PC, while Hi-Grade has gone for a budget laptop for less than £500, running the cut-down Home Basic edition. If neither of these takes your fancy, be sure to check out our group test of Vista-certified PCs.

Alternatively, you could go about building your own ultimate Vista system, with the latest graphics card from ECS a tempting, if expensive, component for your shopping list. It is based on Nvidia's latest 8800GTX chipset and will set you back more than £400, but it's the fastest available at the moment – read a review on page 81.

## CONTENTS

### HARDWARE

- 76 Evesham Solar Eclipse
- 77 Hi-Grade Notino W5600
- 78 Packard Bell iPower 7650

### PERIPHERALS

- 80 Evesham iPlayer
- 81 ECS N8800GTX-768MX
- 82 AVM Fritzbox Fon WLAN 7140
- 82 CTX W1961A
- 84 Sony NW-S706
- 90 iHome iH19
- 90 Viamichelin X-980T
- 91 Panasonic BL-PA100KT
- 91 Fujifilm Finepix F31fd
- 92 Nikon Coolpix S9

### COMPONENTS

- 95 CMS ABSplus Notebook Backup
- 95 Antec Fusion
- 95 Trendnet 621 PC Card
- 95 Asus Silent Knight

### SOFTWARE

- 96 E-Frontier Anime Studio 5
- 97 Navicore 2007 Personal
- 98 Xara Xtreme Pro
- 99 Incomedia Website X5

### GAMES

- 101 Race: The WTCC Game
- 102 UFO Afterlight
- 103 Europa Universalis III
- 104 How we test

### GROUP TEST

- 107 £999 PCs
- 117 HD-ready projectors



Prices include Vat unless otherwise stated

## OUR SCORING

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

## OUR AWARDS

**Editor's Choice:** The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.

**Recommended:** A product that combines great features, usability and value for money.

**Great Value:** Not the best in class, but a product that has superior features and performance for the price.



Editor's Choice



Recommended



Great Value

**'The card takes the honour of being the fastest single card we've ever tested'**

Read the review on page 81

## VISTA PREMIUM PC

# Evesham Solar Eclipse

A fast system that will show off Microsoft's new operating system well



**M**icrosoft's Vista operating system is now upon us and Evesham's Solar Creation aims to appeal to those who want to experience everything it has to offer without spending a small fortune.

The Solar Eclipse system itself is a little bit uninspiring to look at. The grey, square-edged case certainly doesn't go hand in hand with all the razzmatazz surrounding Vista.

Evesham has opted for the Home Premium version of Vista. Along with the features of Home Basic (such as advanced searching and other tools), Home Premium brings with it features such as Vista's snazzy new Aero interface and Media Center. Those interested in the latter will have to buy a TV card since the Solar Eclipse doesn't ship with one as standard.

If you want to find out more about Vista, read our full review ([www.pcw.co.uk/2173721](http://www.pcw.co.uk/2173721)) and our feature in this issue (see page 76).

As we expected, the 2.4GHz Intel ([www.intel.com](http://www.intel.com)) Core 2 Duo E6600, combined with a sensible 2GB of Ram, managed to show Vista Premium in all its glory. Aero's Flip 3D runs smoothly, as do the live preview windows displayed along the taskbar.

Our Sysmark 2004 SE benchmark isn't Vista compatible (we're expecting an update soon), but in PCmark05 it clocked up a respectable 5,864.

An ATI X1950 Pro graphics card with 256MB of Ram will run the latest games. It's not quite as fast as Nvidia's 8800GTX (see review at [www.pcw.co.uk/2172970](http://www.pcw.co.uk/2172970)), but in our tests it still clocked up a 3Dmark05 score of 10,189, which indicates it will be more than capable of playing the latest 3D titles without having to cut down on detail.

Evesham ships a 19in TFT with this system, which will disappoint gamers since – like almost every other 19in and 17in monitor – the native resolution is 1,280x1,024. That said, including a 20in screen would have pushed the price well over the £1,000 mark.

Other components include a 320GB hard drive, dual-layer DVD writer, DVD-Rom and a set of 2.1 Creative speakers.

The Solar Eclipse is a solid Vista Premium PC but by keeping it under £1,000, Evesham has clearly had to cut a few corners. The lack of a TV tuner is disappointing considering Media Center is included as standard with Vista Premium, while the 19in TFT won't endear this system to hardened gamers.

Having said that, Evesham has done a good job on the core specifications. Although it is not the fastest Intel processor, the 2.4GHz E6600 is more than capable of powering Vista Premium, while 2GB of Ram is plenty for the time being.

Of course, if you're thinking of buying a new PC, you might want to stick with good old XP, which Microsoft will be supporting until 2011. Despite the many advantages Vista has over its predecessor, there are reasons to hold off from buying into Microsoft's latest operating system at present. If you've got a stack of hardware that you'll want to hook up to this PC, be sure to check on the manufacturers' sites for Vista drivers – despite the Business version of Vista being launched in November last year, many manufacturers are dragging their heels when it comes to updating device drivers.

All in all, the Solar Eclipse from Evesham is a decent Vista Premium PC, but at this price, you're always going to have to make sacrifices in certain areas. *Will Stapley*

## Performance

PCmark 2005 **5,864**



3Dmark05\* **10,189**



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

## Details

**Price** £999

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Evesham

[www.evesham.com](http://www.evesham.com)

**Specifications** Intel Core 2 Duo

E6600 (2.4GHz) • BTC 19in TFT

- 2GB Ram
- 320GB hard drive
- Dual-layer DVD writer
- DVD-Rom
- Gigabit Lan
- Creative I-Trigue 3220 (2.1 speakers)
- Logitech Internet Pro Cordless Desktop
- Microsoft Windows Vista Home Premium

## Verdict

**Pros** Runs Vista well; 2GB Ram; fast

**Cons** Would benefit from a 20in TFT

**Features**



**Performance**



**Value for money**



**Overall** If you want a desktop that runs Vista Premium without a hitch, the Solar Creation from Evesham delivers the goods



VISTA HOME BASIC NOTEBOOK

# Hi-Grade Notino W5600

A sub-£500 portable that doesn't show Vista in its best light



**A**t first glance, a Vista laptop for less than £500 seems like a terrific bargain. The most basic laptops have been more than powerful enough to handle everything but gaming for years now, and an update to Vista should just improve the situation.

Sadly, the Vista installed here is Home Basic. This is a massive blow since Home Basic is, frankly, not very exciting and we don't think it's really worth the effort to upgrade from XP. It lacks Vista Home Premium's DVD playback, Media Center and the now-famous Aero interface. What's more, at the time of writing, the OEM version of Vista Premium is selling for £73, just £8 more than Home Basic version, but this low-spec notebook wouldn't cope with the Aero effect.

The chassis and keyboard are solid and, with the power supply, the laptop weighs a reasonable 3kg. Four USB2 ports, a VGA out and headphone/mic-in sit on the chassis' sides. The system lacks a card reader, audio line input, Firewire and Bluetooth but wireless hasn't been forgotten and 802.11a/b/g WiFi is included.

The 15.4in widescreen LCD is bright and evenly lit, although its resolution of 1,280 x 800 limited our excitement. Software isn't too impressive, with Hi-Grade bundling three months of BullGuard virus protection and Sonic for DVD burning and playback.

The single-core Celeron M 1.6GHz processor is backed by 512MB of DDR2 Ram, but you are only left with 446MB to play with, since 64MB is apportioned to the Via Chrome 9 integrated graphics. The 100GB hard disk is generous, but the spindle speed is 4,200rpm, when most other modern laptops have 5,400 or 7,200rpm drives. It scored 823 in PCmark05, which is dire – lower than most laptops in our recent sub-£500 group-test (see [www.pcw.co.uk/2171114](http://www.pcw.co.uk/2171114)).

The system has a base score of 1.0 in Vista's inbuilt benchmarking tool, the Windows Experience Index. This is the lowest score possible and one that Microsoft says is enough to do most general computing tasks, such as run office applications and browse the internet.

The low Windows Experience Index score was reflected in our experience when trying to play back a DVD – we were shocked to see the system stuttered violently and frequently lost frames during the movie. We went further and tried to play back a simple Mpeg4 movie file and again, frames were lost.

Vista's high processor usage has a bad effect on battery life. Hi-Grade sent us a four-cell battery for testing, which gave a DVD run-down time of 55 minutes. But Hi-Grade says laptops will ship to customers with six-cell batteries, which should correspond to one hour, 22 minutes of battery life – just about enough to watch a short film.

When first booting into Vista and without anything else installed or running, the system reported 65 per cent Ram usage. The lack of Ram and incredibly poor graphics chipset – vital now that Vista's graphical interface is rendered on the graphics card – are the most likely cause of our DVD playback issues.

In short, this laptop lacks the grunt to handle Vista and the result is an incredibly slow system that can't be used for any kind of video playback. If you plump for this notebook, we'd recommend you ask for it with XP.

However, this machine adheres to Microsoft's minimum requirements for Vista Basic, so we can't be too harsh on Hi-Grade in that respect. But it serves as a warning that just because a notebook is labelled Vista Capable, it doesn't necessarily mean it will run the new operating system smoothly.

Emil Larsen

## Performance

PCmark 2005 823



## Details

Price £441

Best price [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

Contact Hi-Grade [www.hi-grade.com](http://www.hi-grade.com)

**Specifications** Mobile Intel Celeron M 420 (1.6GHz) • 100GB hard disk (4,200rpm) • 512MB DDR2 400 (2 x 256) • DVD writer • 15.4in screen (1,280x800) • Integrated graphics • Express card slot • VGA out • 4 USB2 ports • 56K V 90 modem • Ethernet port • Microsoft Windows Vista Home Basic (32-bit) • 358x263x36mm (wxhxd) • 3kg • One-year collect-and-return warranty

## Verdict

**Pros** Clear and bright screen; good chassis; cheap

**Cons** Poor performance; slow processor; not enough Ram

**Features**



**Performance**



**Value for money**



**Overall** Slow and pointless. The screen and chassis are good, but it's an excellent example of where not to install Vista



## GAMING PC BASE UNIT

## Packard Bell iPower 7650

A snazzy case and SLI graphics, but ultimately let down by outdated components



The front grille projects the iPower logo

If anyone thought the acquisition of Packard Bell by Emachines founder Lap Shun Hui ([www.pcw.co.uk/2166542](http://www.pcw.co.uk/2166542)) would usher in a new era of cheap and cheerful computers from the brand, they'd be mistaken.

The black metal case gives a feeling of quality. The front grille and two large rear fans have LEDs projecting the iPower logo. On the front, a weighty door swings open to reveal a card reader and dual-layer DVD writer. There is a lock on one side of the case but it will only help to slow down thieves, since the opposite panel can easily be unscrewed.

At the heart of the system lies a Socket 939 AMD Athlon 64 X2 4600+ ticking along at 2.4GHz. This CPU is almost two years old and, while it is still common in budget systems, we would expect a high-end Core 2 Duo model at this price. Socket 939 processors have also been superseded by AMD's dual-core AM2 and Quad FX F1207 sockets. AMD says there will be no new processors designed for 939-pin sockets, so you'll need a new motherboard if you want to upgrade.

A score of 5,480 in PCmark05 isn't great for a gaming system at this price. We would expect more than 7,000 points, but the score reflects the low-end equipment. During testing, we noticed the CPU cooler made a fair amount of noise when the system was put under full load, and the iPower certainly wasn't quiet.

Plugged into a Gigabyte K8NUSLI motherboard is 2GB of DDR400 Ram. It's made up of two sticks, so the system runs in optimal dual-channel mode. But once again, this is old technology; DDR Ram has been superseded by DDR2.

Two identical hard disks are installed in a Raid 0 setup for data striping, which speeds up data reads and writes. Bizarrely, Packard Bell has used two 200GB

7200rpm Barracuda hard disks to do this. Seagate rightly brands these hard disks as entry-level models and Packard Bell would have been wise to install a single, bigger and faster disk at a similar cost as two 200GB Barracuda models. Not only would this allow for an upgrade at a later date to Raid 0, but a single hard disk is also a quieter and more energy efficient option.

Graphics are handled by two Nvidia Geforce 7600GT cards in SLI (scalable link interface) mode, each with 256MB of Ram. However, this is hardly ideal, since in SLI mode the motherboard's PCI Express lanes slow to x8 links instead of the x16 links the cards are capable of. Again, a quieter, more upgradable and energy efficient option would have been a single ATI X1950XT or Nvidia 7900GT. Nevertheless, the 3Dmark05 score came in at 10,385, which means the system is well able to cope with the latest games.

The 400W power supply is worryingly small when you consider it has to run two graphics cards and two hard disks. Packard Bell has also skimped on audio by relying on Realtek '97 onboard sound.

Logitech's most basic wireless keyboard and mouse are included, while the software includes Sonic RecordNow for DVD burning and Microsoft Works 8. Windows XP Home is shipped as standard and, surprisingly, no free Vista upgrade is offered.

You could buy the components of this system for less than £800, but we wouldn't recommend following Packard Bell's lead in opting for two 7600GTs, nor the hard disk combination. Also, a much faster Core 2 Duo costs the same as a Socket 939 X2 4600+.

With no monitor or speakers, this system is available for £1,199 in Curry's Digital, but we find it hard to recommend.

## Performance

PCmark 2005 **5,480**



3Dmark05\* **10,385**



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

## Details

Price £1,199

Best price [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

Contact Packard Bell

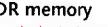
[www.packardbell.co.uk](http://www.packardbell.co.uk)

Specifications AMD Athlon 64 X2 4600+ • Gigabyte GA-K8NUSLI socket 939 motherboard • 2GB DDR400 Ram • 2 Nvidia Geforce 7600GT 256MB • 2 200GB hard drives • Dual-layer DVD writer • Windows XP Home Edition

## Verdict

Pros Case; good gaming performance  
Cons No free Vista upgrade; old motherboard and CPU; DDR memory

Features



Performance



Value for money



Overall A year ago this would have been a good system, but today Packard Bell's choice of components doesn't represent good value



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## HD PVR

# Evesham iPlayer

Watch and record high-definition Freeview broadcasts



**A**fter successful trials in the summer, you can now look forward to free high-definition content through your aerial, hopefully later this year. The Evesham iPlayer pre-empts the rush to supply the 1.4 million HDTVs in the UK with a signal.

To the rear of the rather ugly unit you will find outputs including two Scart, an HDMI, RF in and loop-through, Ethernet, an optical digital audio socket and a standard 3.5mm audio jack. On the side is a USB2 port and a smartcard slot for Topup TV broadcasts.

The iPlayer doesn't have wireless built in. Instead Evesham recommends Ethernet over mains and has also included a 10m Ethernet cable.

An obvious disadvantage is the lack of a second tuner. Evesham tried to counter our disappointment by saying most people with an HDTV will already have a digital tuner in built, but we feel this is not acceptable in a £300 product.

We received the HD test signal from the Crystal Palace Freeview transmitter and the results were good. Even on a standard-definition TV the picture looked better than normal Freeview due to the higher bit rate and Mpeg4 encoding.

Evesham states retail units will not be able to view the Freeview HD trial because of a licensing issue; however, it will be compatible with any final Freeview HD service through a firmware update.

When we connected the iPlayer to our standard-definition TV we found it wouldn't output any audio. After a few reboots we occasionally got audio, but eventually we resorted to the Aux Scart. This connection outputs sound at a set level and gives you no control to change the volume via the remote.

When hooked up to a 32in HDTV via an HDMI cable (not included) we thought the HD picture looked excellent. However, the Freeview upscaling is an average affair and increases compression artefacts and jagged edges as well as anything else.

A 14-minute recording took up 2GB of hard disk space, which means you can only record nine hours of high-definition content on the 80GB hard disk – however, you can back up recordings to a PC. There are no compression options to reduce the file sizes.

Netgem, the manufacturer of this box, says its seven-day electronic programming guide (EPG) is the

best in the business. The EPG was very good, but not perfect. For example, thanks to it shortening the channel names, you can't tell the difference between any of the BBC or ITV channels.

At one point, when we stopped recording a program and turned off the box, we lost some of our recordings. This only happened once but is a worry and suggests the recording software isn't bullet-proof.

The hard disk is constantly recording live content. This means you can always rewind everything you've seen for several hours which, as anyone who has Sky+ will testify, is an incredibly useful feature. However, after a week's usage we noticed occasional stuttering when watching live TV. In a diagnostic test we noticed the entire hard disk was full with automatically recorded content, suggesting the stuttering came about due to fragmentation and the continuous freeing up of space.

It's not possible to set it only to record a specific period, but you can turn it off completely or manually delete the history to free up hard-drive space.

The USB2 socket on the side of the device allows you to connect external hard disks, USB sticks and keyboards. We plugged in a 1GB USB stick and accessed the stored video and music without a problem. We had less success with a 40GB external hard disk, although we quickly realised this is because the iPlayer doesn't support NTFS.

Evesham is keen to stress the benefits of viewing photos on the iPlayer since the content is output at a very high resolution of 1,920x1,080. However, photo viewing was slow, even via a USB2 memory stick.

By connecting the unit into a router and plugging a wireless keyboard into the USB port, it's possible to browse the internet from your sofa. But it's not something you'd want to do for any length of time since the formatting consistently went awry.

Meanwhile, selecting the TVmax option lets you listen to radio and podcasts. This worked well except when we used it on the HDTV; there were problems with blurred text when Freeview HD was previewed, making navigation difficult.

The iPlayer is a good product, but until Freeview HD arrives there is little point in buying one. Minor flaws and the lack of a second tuner means most people will be best off waiting for a better box.

Emil Larsen

## Details

**Price** £299  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Evesham  
[www.evesham.com](http://www.evesham.com)  
**Specifications** 80GB hard disk • HDMI • 2 Scart • RF in • USB2

## Verdict

**Pros** HD Freeview-ready; upcales standard content; easy to stream and back up

**Cons** Poor Scart output; occasional stuttering and wiped recordings; single tuner

**Features**   
**Performance**   
**Value for money** 

**Overall** A good option for early adopters, everyone else should wait for a more refined box



## GRAPHICS CARD

# ECS N8800GTX-768MX

The fastest graphics card we've tested, but you'll need a similarly fast CPU



The N8800GTX-768MX is based on Nvidia's fastest processor to date, the 8800GTX. Along with the 8800GTS, this GPU is the first to support DirectX 10, a standard for Vista that improves the visuals in compliant games. The graphics card ships with two DVI-I-to-VGA dongles and both S-video and composite video leads.

The card's core is clocked at 575MHz. While this isn't ground-breaking the card has 128 unified pixel pipelines, which gives performance a huge boost. The 8800GTX can calculate upwards of 500Gflops (thousands of floating operations per second). This is much higher than Nvidia's previous fastest single GPU, the 7900GTX, which can only calculate 250-300Gflops.

The card has 768MB of GDDR3 Ram clocked at 1.8GHz and running on a 384-bit bus. This gives it another moderate boost over the 7900GTX, which ticked along at 650MHz with 512MB of Ram running at 1.6MHz on a 256-bit bus.

Using our old testing setup, comprising a 3.73GHz Pentium 4 Extreme Edition and 1GB of Ram, the graphics card scored 9,795 in 3Dmark05. With our updated kit (an Intel Core 2 Extreme X6800, Asus P5W DH Deluxe motherboard and 1GB Ram) scores increased by 68 per cent in 3Dmark05 to 16,490.

This reflects the need for a high-end processor to accompany the graphics card. Without the latest CPU in your system, the 8800GTX won't perform much better than older cards at low resolutions.

The card takes the honour of being the fastest single card we've tested; beating the 7950GX2 in all games at all resolutions. In Half-Life 2, Doom 3 and Unreal Tournament 2004 it beats 7900GTX Nvidia SLI setups by a small margin, but gets beaten by two

Radeon X1950XTXs in Crossfire mode in most games, by between zero and 17 per cent.

The N8800GTX-768MX wasn't affected in the slightest by turning on 4x AA (anti-aliasing), which smoothes edges in games. In fact frame rates hardly dropped as we cranked up the resolutions too. With 8x AA and 6x AF (anisotropic filtering) turned on to enhance long-distance image quality and cranking up the resolution to 1,600x1,200 we achieved 128fps in Far Cry, 103fps in Half-Life2, 81fps in Fear and 120fps in Doom 3, comfortably thrashing everything but our pair of X1950XTXs. Only Doom 3 showed a significant drop at this resolution compared to 1,024x768 – an average decrease of 39fps.

To get this kind of performance, the card requires more power than a PCI Express slot can provide. You must therefore plug two six-pin molex connectors into the top of the card or four normal four-pin molex (splitters are provided) if your power supply unit (PSU) doesn't have the six-pin connectors. For a single 8800GTX Nvidia recommends a hefty 450W PSU. What's more, you might not be able to fit it into your PC. At 27cm, it's the longest card we've ever tested.

Although it is the fastest card out there, £411 is a high price to pay and you might be wise to wait for ATI to join the DirectX 10 party, which should force prices down. It's also difficult justifying this card when the 8800GTX's little brother, the 8800GTS, can also manage frame rates above the magical 60fps mark (where flickering isn't detected) at all resolutions.

ATI launches its R600 DirectX 10 card in March, but until then the ECS N8800GTX-768MX will remain among the fastest on the market, ideal for ultra high-resolution gaming.

Emil Larsen

## Performance

3Dmark05\* 16,490

0 10,000 15,000 20,000 25,000 30,000

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

## Details

Price £411

Best price [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

Contact ECS [www.ecs.com.tw](http://www.ecs.com.tw)

Specifications 768MB GDDR3 Ram

- 384-bit memory interface • 575MHz core • 900MHz memory (1,800MHz effective) • Dual DVI-I • PCI-Express

## Verdict

**Pros** Lightning fast; quiet

**Cons** Might not fit smaller cases; must have fast CPU to accompany it; power hungry

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★☆

**Overall** The fastest graphics card we have tested by some margin

★★★★★

## ADSL ROUTER

## AVM Fritzbox Fon WLAN 7140

Save money on your phone bills with this easy-to-use device



**N**ot content with housing an 802.11g wireless and an ADSL2+ modem and router, the Fritzbox Fon WLAN 7140 also connects to your existing phone line, allowing you to save money on bills. What's more, you can keep your current telephone and use it for both normal and IP calls.

Up to 10 SIP-based (Session Initiation Protocol) VoIP (Voice over IP) accounts can be configured and up to two telephones directly connected with different numbers and/or extensions assigned to each. If you

make a large number of calls abroad, you can capitalise on low international rates offered by VoIP providers.

This latest version of the Fritzbox incorporates an upgraded CPU and memory and replaces the ISDN ports of the previous high-end model with extra 10/100Mbit LAN ports. AVM also regularly adds new features to its Fritzbox products with free downloadable firmware updates.

As well as being a very powerful product, the Fritzbox is easy to install and the manuals and software are clear and informative.

Advanced users may notice a lack of more complex functions, even when the Expert Mode is enabled. However, there are many hidden features that will allow you to set these options, although they're not officially supported by AVM.

Also new in the 7140 is a USB 1.1 host port. This allows you to connect and share USB printers by plugging them directly into the back of the router. Alternatively, you can use it to add USB storage, which can be accessed via a built-in password-protected FTP server over the LAN and, optionally, over the internet.

This latest ADSL router manages to cram in a heap of features. And with the advanced VoIP tool, it could save you money on your phone bill. *Paul Monckton*



## Details

**Price** £129  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** AVM [www.avm.co.uk](http://www.avm.co.uk)  
**Specifications** Wireless modem/router • ADSL2+ support • 802.11g • VoIP PBX with multiple extensions • SIP internet telephony • 2 analogue phone ports • USB 1.1 host port • Maximum 125Mbps/sec • 4 LAN ports

## Verdict

**Pros** Very easy to use; excellent range of features

**Cons** Some advanced features are hidden

**Features**   
**Performance**   
**Value for money**

**Overall** A powerful product that's easy to use and can save you money on phone bills



## MONITOR

## CTX W1961A

A good entry-level screen for multimedia and Vista



**T**he W1961A has removed all frills, and has a single analogue VGA input – therefore avoiding the tax that's put on DVI screens. There are no conveniences such as USB ports, and it's supported by a basic tilt-only stand.

It's a very neat-looking monitor with a subtle embossed fabric texture and a rubber grip to hold your cables securely out of view. Also hidden from view are the three control buttons situated on the back of the monitor. Using only three buttons means

you can keep your hand in one position while using the menu – no need to fumble for the right switch. A pair of stereo speakers is hidden in the lower part of the bezel – they're there if you need them, but you won't notice them at all if you don't.

At this price, you're not going to get the most accurate colour reproduction, but the W1961A produces a decent image. An automatic colour enhancement mode adjusts the picture controls in response to what's being displayed.

Helped by its 700:1 contrast ratio and 300cd/m<sup>2</sup> brightness, it's capable of displaying a punchy picture. It has a quick 5ms response time, so it's great for games and multimedia. Not all games are compatible with widescreen displays, so the W1961A uses aspect-ratio scaling to ensure 4:3 image resolutions are in proportion.

As monitors age, the backlight fades and the image dims; this process is accelerated by frequent turning on and off of the display. CTX's power-saving mode is kinder on the backlight, turning it on and off gradually. This, according to CTX, will enable your monitor to last up to 30 per cent longer than other displays.

The W1961A is backed by a three-year on-site warranty and is excellent value for money for an entry-level 19in screen. *Paul Monckton*

## Details

**Price** £139  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** CTX [www.ctxeurope.com](http://www.ctxeurope.com)  
**Specifications** 19in TN panel • Widescreen 16:10 aspect ratio • 1,440x900 native resolution • 300cd/m<sup>2</sup> brightness • 700:1 contrast ratio • 5ms response time • 2 1W stereo speakers • TCO 03 • 449x180x380mm (wxhxd) • 4.2kg • Three-year on-site warranty

## Verdict

**Pros** Price; cable management; attractive design

**Cons** No DVI; lacks a USB hub

**Features**   
**Performance**   
**Value for money**

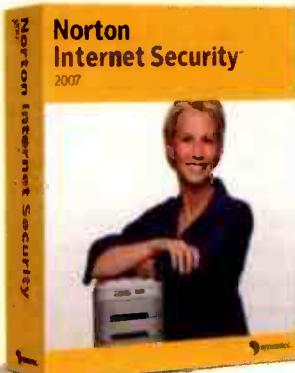
**Overall** Excellent value for money and good performance – a good entry-level purchase



THREAT	RELEASED	DECEASED	THREAT	RELEASED	DECEASED	THREAT	RELEASED	DECEASED
W97M.Kukudro.C	8/14/06	8/15/06	Trojan.Gobrena.B	7/18/06	7/18/06	SymbOS.Dampig.D	6/30/06	6/30/06
Backdoor.Ranky.X	8/14/06	8/15/06	Trojan.Clagger.B	7/18/06	7/18/06	OSX.Exploit.Launchd	6/30/06	6/30/06
W32.Mocbot.B	8/12/06	8/13/06	ACTS.Spaceflash	7/18/06	7/18/06	W32.Areses.P@mm	6/30/06	6/30/06
W32.Wargbot	8/12/06	8/13/06	SWF.Spaceflash	7/18/06	7/18/06	Trojan.Zlob.L	6/30/06	6/30/06
Trojan.Resobon	8/11/06	8/11/06	Trojan.PPDropper.C	7/17/06	7/18/06	SymbOS.Cdropper.I	6/28/06	6/29/06
W64.Bounds	8/9/06	8/10/06	Trojan.Riller.F	7/17/06	7/18/06	SymbOS.Cdropper.G	6/28/06	6/29/06
W32.Bounds	8/9/06	8/10/06	Trojan.Frozzie	7/15/06	7/15/06	SymbOS.Cdropper.K	6/28/06	6/29/06
W32.Bound	8/9/06	8/10/06	Perl.Raumoni	7/14/06	7/14/06	SymbOS.Cdropper.F	6/28/06	6/29/06
W32.Sality.U	8/8/06	8/9/06	Backdoor.Bifrose.F	7/13/06	7/13/06	SymbOS.Cdropper.J	6/29/06	6/29/06
W97M.Kukudro.B	8/8/06	8/9/06	Trojan.Relindec	7/12/06	7/12/06	Trojan.Clagger	6/29/06	6/30/06
Bloodhound.Exploit.75	8/8/06	8/8/06	W32.Doovic	7/12/06	7/13/06	W32.Resik.A	6/29/06	6/29/06
W32.Shufa@mm	8/7/06	8/8/06	Backdoor.Haxdoor.N	7/12/06	7/13/06	Trojan.Bookmarker.K	6/29/06	6/29/06
W32.Munialinf	8/5/06	8/5/06	Trojan.PPDropper.B	7/12/06	7/12/06	Backdoor.Graybird.S	6/29/06	6/29/06
W32.Munia	8/5/06	8/5/06	W32.Looked.P	7/12/06	7/12/06	W32.Sality.T	6/29/06	6/29/06
Infostealer.Presnet	8/4/06	8/4/06	Infostealer.Corepias	7/11/06	7/12/06	W32.Sality.S	6/28/06	6/29/06
Infostealer.Bzup	8/3/06	8/4/06	W32.Looked.O	7/11/06	7/12/06	Infostealer.Jianghu	6/28/06	6/29/06
W32.Hoggal							06	6/28/06
Trojan.Emco							06	6/28/06
W32.Chamb							06	6/28/06
Trojan.Emco							06	6/28/06
W32.Draggd							06	6/27/06
Trojan.Agirv							06	6/27/06
Trojan.Agirv							06	6/26/06
Trojan.Firna							06	6/26/06
Firnavo.Expl							06	6/26/06
W32.Dbit							06	6/26/06
Backdoor.Tri							06	6/26/06
W32.Kelvir.L							05	6/24/06
Trojan.PPDr							06	6/23/06
Trojan.Acdrq							06	6/24/06
Backdoor.Mu							06	6/23/06
W32.Mulim.A	7/26/06	7/26/06	Trojan.Lodeight.C	7/5/06	7/6/06	W32.Kidala.E@mm	6/23/06	6/23/06
Backdoor.Scarycrow	7/26/06	7/26/06	Backdoor.Rustock.B	7/5/06	7/5/06	Backdoor.Pahador	6/23/06	6/23/06
Infostealer.Snfula	7/25/06	7/26/06	Infostealer.Svcstor	7/5/06	7/5/06	Trojan.Kuserv	6/23/06	6/23/06
Downloader.Traus	7/25/06	7/26/06	W32.Sondia	7/4/06	7/5/06	Downloader.Booli.B	6/23/06	6/23/06
W32.Amirecivel.H@mm	7/25/06	7/26/06	Trojan.Hongmosa	7/4/06	7/5/06	Downloader.Guguteg	6/23/06	6/23/06
W32.Darjen	7/25/06	7/25/06	W32.Esbott.E	7/4/06	7/5/06	W32.Kidala.e@mm	6/23/06	6/23/06
Trojan.Agentdoc.C	7/25/06	7/25/06	SymbOS.Doomboot.W	7/4/06	7/5/06	Backdoor.Rajump	6/23/06	6/23/06
Backdoor.Sanovn	7/24/06	7/25/06	SymbOS.Doomboot.V	7/4/06	7/5/06	SymbOS.Cardtrp.AG	6/22/06	6/23/06
Backdoor.Tervserv	7/24/06	7/25/06	W32.Audio	7/4/06	7/5/06	SymbOS.Dropper.A	6/22/06	6/23/06
Backdoor.Haxdoor.O	7/23/06	7/24/06	W32.Gatt	7/2/06	7/3/06	W32.Kraze	6/22/06	6/23/06
Fer.Kruel	7/23/06	7/24/06	SymbOS.Cdropper.Q	7/2/06	7/3/06	Trojan.Flemex	6/22/06	6/22/06
VBS.Asplux	7/22/06	7/23/06	W32.Sixem.C@mm	7/2/06	7/3/06	W32.Amirecivel.E@mm	6/22/06	6/22/06
MSH.Czybrosks!int	7/21/06	7/22/06	W32.Amirecivel.F@mm	7/2/06	7/3/06	W32.Beagle.FG@mm	6/21/06	6/22/06
MSH.Cibyz!int	7/21/06	7/22/06	Trojan.Deoplive	7/1/06	7/2/06	SymbOS.Romride.F	6/21/06	6/22/06
Backdoor.Glupzy	7/21/06	7/21/06	Trojan.Emcodec.E	7/1/06	7/2/06	SymbOS.Romride.H	6/21/06	6/22/06
JS.StartPage.B	7/20/06	7/21/06	SymbOS.Cdropper.R	6/30/06	7/3/06	SymbOS.Romride.G	6/21/06	6/22/06
Trojan.Schoeberl.B	7/20/06	7/20/06	SymbOS.Cdropper.S	6/30/06	7/3/06	Trojan.Rootserv	6/20/06	6/20/06
Trojan.Mdropper.L	7/20/06	7/20/06	SymbOS.Cdropper.P	6/30/06	7/1/06	Infostealer.Nailmews	6/20/06	6/21/06
W32.Stong.A	7/18/06	7/19/06	SymbOS.Cdropper.O	6/30/06	6/30/06	Infostealer.Orcu	6/20/06	6/21/06

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## MP3 PLAYER

## Sony NW-S706

Total audio control with breathtaking looks and undeniable quality



Few mp3 players make you sit bolt upright in today's market, but Sony is a competitor that often manages to produce something that little bit special.

We have lasting memories of the excellent A1200 and the others from this range, partly for the design, but mainly for the total control it gives you over your music. This is something that hasn't been done as well by any other manufacturer, and it's a quality that Sony brings to its new NW-S706, along with a host of extras.

The design is stunning. It's a little larger than your thumb and includes a multifunctional shuttle switch, which allows you to either browse and skip individual tracks or move through audio via sort categories. This worked extremely well and is a very quick and effective way to navigate around tracks.

Everything we liked about the A1200 is also here, including the intelligent shuffle control that finds your favourite tracks, songs from a specific era or the most recent additions and creates random playlists in an instant.

There's also a cleverly conceived equalizer that allows you to configure two custom audio modes to your favourite genre or custom setting, along with environment adjustment and ambient sound removal. The sound removal feature is barely needed – one of the highlights of the player is the high quality bud earphones supplied as standard, which really do get the most from the already excellent audio, particularly in emphasising thumping bass.

Getting your tunes transferred to the player isn't as straightforward as we'd hoped; you can use the device as a portable hard drive with drag and drop, but your music won't show up in the track list unless you use the Sonicstage software supplied to transfer it. This is something Apple iPod users will be all too familiar with (iPods require the iTunes software to be installed in order to transfer music), but we'd prefer an option to simply drag a heap of audio files over and have them appear in the music library on the NW-S706.

But to get the most from the NW-S706, you'll want to do this since the software automatically checks ID3Tags and can retrieve missing information for you by searching online. It's a pretty painless process that only takes a few seconds per track, and you'll certainly benefit from these comprehensive ripping and transfer features when using the advanced shuffle functionality on the player.

In addition to audio support, you'll find an FM radio included as standard. The shuttle switch makes it easy to find and store stations in the preset list and audio quality here is very impressive.

One of the many big selling points that must be mentioned is the 50-hour battery life. While you'll need to encode tracks to Sony's Atrac format to get



close to this sort of stamina, this is again handled well through the Sonicstage software.

The fade-to-black screen offers a range of display modes, each of which shows off the classiness of the player. The clock display, in particular, looks great.

With an RRP of £179.99 for the 4GB player, the Sony isn't cheap, but look around online and you'll find it for a lot less. When you consider the overall quality of the package, with its excellent audio control, great usability and seriously classy looks, even the standard RRP looks pretty reasonable.

This is a great mp3 player that offers total control with almost no compromises over audio. It has just about every rival beat in the most important areas and is highly recommended for anyone looking to get the most from their music.

Paul Lester

## Details

**Price** £180  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Sony [www.sony.co.uk](http://www.sony.co.uk)  
**Specifications** File support: Atrac, Mp3, Wma • 4GB capacity • 50 hours max battery life • 27x17x88mm (wxhxd) • 47g

## Verdict

**Pros** Superb sound; high quality bud earphones supplied; stylish design; great usability; total audio control  
**Cons** You need two hands to use the shuttle switch effectively; not the cheapest

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** With the NW-S706, Sony has the big boys beat in terms of looks, usability and performance

★★★★★

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RECOMMENDED  
UPGRADE > £100

- Intel® Core™2 Duo Processor E6400 (2.13GHz, 2MB cache, 1066MHz)
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- 320GB Serial ATA 7200rpm hard drive with 8MB buffer
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- Multi Format Dual Layer DVD Writer (18x) / CD-RW (40x) drive
- Dual DVB-T TV Tuner including remote and receiver
- Creative i-Trigue 3330 2.1 speakers
- Xpider or Sleek midi tower case (453x222x495mm) 420w PSU, 6xUSB2.0 & 10/100/1000 LAN
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- Multi format dual layer DVD writer (18x) / CD-RW (40x) drive
- Mini tower case (352x180x365mm) with 300w PSU 4xUSB2.0 & 10/100 LAN
- Logitech keyboard & optical wheel mouse
- Bronze 1 year warranty

Home Installation service add £99.99

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UPGRADE > £50**

- AMD Athlon 64 processor 3500+
- Genuine Windows Vista™ Home Premium
- 250GB Serial ATA 7200rpm hard drive with 8MB buffer
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### Low price Core 2 Duo



### Solar XS

**£499** inc VAT (£424.68 ex VAT)

- Intel Pentium D processor 820 (2.8GHz, 2x1MB cache, 533MHz)
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- 19" flat panel TFT display
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- 160GB Serial ATA 7200rpm hard drive with 8MB buffer
- Multi Format Dual Layer DVD Writer (18x) / CD-RW (40x) drive
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- 512MB DDR 2 RAM 533MHz
- 160GB Serial ATA 7200rpm hard drive with 8MB buffer
- Multi Format Dual Layer DVD Writer (18x) / CD-RW (40x) drive
- Xpider or Sleek midi tower case (453x222x495mm) 350w PSU, 6xUSB2.0 & 10/100 LAN
- Logitech keyboard & optical wheel mouse
- Silver 3 year warranty



**RECOMMENDED  
UPGRADE > £100**

- AMD Athlon 64 X2 processor 4200+
- Genuine Windows Vista™ Home Premium
- 256MB NVIDIA 7600 graphics with TV-out & DVI
- 19" widescreen flat panel TFT display with built-in speakers
- 1GB DDR 2 RAM 667MHz (2x512MB)
- 250GB Serial ATA hard drive with 8MB buffer

**RECOMMENDED  
UPGRADE > £100**

- Intel® Core™2 Duo Processor E4300 (1.8GHz, 2MB cache, 800MHz)
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ADVENT (PC WORLD)	★★★★★	★★★★★	★★★★★	★★★★★
DELL	★★★★★	★★★★★	★★★★★	★★★★★
<b>EVESHAM TECHNOLOGY</b>	★★★★★	★★★★★	★★★★★	★★★★★
FUJITSU SIEMENS	★★★★★	★★★★★	★★★★★	★★★★★
HP	★★★★★	★★★★★	★★★★★	★★★★★
LENOVO	★★★★★	★★★★★	★★★★★	★★★★★
MEDION	★★★★★	★★★★★	★★★★★	★★★★★
MESH	★★★★★	★★★★★	★★★★★	★★★★★
PACKARD BELL	★★★★★	★★★★★	★★★★★	★★★★★

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- 320GB Serial ATA 7200rpm hard drive with 8MB buffer
- Multi Format Dual Layer DVD Writer (18x)/CD-RW (40x) drive
- On-board audio
- Mini tower case (352x180x365mm) 4xUSB2.0 & 10/100 LAN
- Logitech Internet Pro cordless keyboard and mouse
- Bronze 1 year warranty



**Solar Storm**

**£999** inc VAT (£850.21 ex VAT)

- Intel® Core™2 Duo Processor E6400 (2.13GHz, 2MB cache, 1066MHz)
- Genuine Windows Vista™ Home Premium
- 256MB GDDR3 NVIDIA GeForce 7900 GS graphics with TV-out & DVI
- 20" Viewsonic VG2030W DVI TFT display
- 1GB DDR 2 RAM 667MHz (2x512MB)
- 320GB Serial ATA 7200rpm hard drive with 8MB buffer
- DVD-ROM (16x) drive
- Multi Format Dual Layer DVD Writer (18x)/CD-RW (40x) drive
- Dual Boot TV Tuner including remote and receiver
- Creative I-Trigue 3220 2.1 speakers
- Xpider or Sleek midi tower case (453x222x495mm) 350W PSU, 6xUSB2.0 & 10/100/1000 LAN
- Logitech Internet Pro cordless keyboard and mouse
- Gold 3 year Parts & Labour warranty



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- 256MB GeForce 6100 graphics (\*64MB TurboCache)
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- 1GB DDR II RAM, 667MHz
- 80GB SATA 5400rpm hard drive
- DVD/CD-RW/Dual Layer DVD-RW drive
- Wireless Mini PCI 802.11bg (54Mbps) LAN
- 4 in 1 card reader (SD, MMC, MS/Pro)
- 6 cell Li-Ion battery (life up to 3 hours approx)
- 4xUSB2.0, Firewire, VGA, PCMCIA, Express Card & 10/100/1000 LAN
- Weight - 3.5kg Dimensions - 395x278x34.9mm
- Silver 3 year warranty

RECOMMENDED  
UPGRADE > £200

- AMD Turion 64 X2 Mobile Technology TL-56
- Genuine Windows Vista™ Home Premium
- 256MB NVIDIA GeForce 7600 graphics
- 17" WXGA X-Bright widescreen display (1680x1050)
- 1.3M Pixel camera
- 100GB SATA 5400rpm hard drive



## Quest A425

**£869** inc VAT (£739.57 ex VAT)

- AMD Turion 64 X2 Mobile Technology TL-50
- Genuine Windows Vista™ Home Premium
- 256MB NVIDIA GeForce Go 7600 graphics
- 15.4" WXGA X-Bright widescreen display (1280x800)
- 1GB DDR II RAM, 667MHz (2x512MB)
- 100GB SATA 5400rpm hard drive
- DVD/CD-RW/Dual Layer DVD-RW drive
- Wireless Mini PCI 802.11bg (54Mbps) LAN
- 1.3M Pixel camera with rotation
- 4 in 1 card reader (SD, MMC, MS/Pro)
- 6 cell Li-Ion battery (life up to 3 hrs approx)
- 4xUSB2.0, Firewire, VGA, TV-out, DVI, PCMCIA, Express Card, IR, 10/100/1000 LAN
- Weight - 2.9kg Dimensions - 358x259x33mm
- Gold 3 year Parts & Labour warranty

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UPGRADE > £100

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- Fingerprint reader
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- Silver 3 year warranty



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- Wireless Mini PCI 802.11bg (54Mbps) LAN
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- 4xUSB2.0, VGA, Express card, & 10/100 LAN
- Silver 3 year warranty

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- 1GB DDR2 RAM 667MHz (2x512MB)
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- Built-in media card reader (MS/Pro, MS Duo, MMC, RSMMC, SD, Mini SD)
- 8 cell Li-Ion battery (life up to 2hrs approx)
- 4xUSB2.0, Firewire, Serial, S/PDIF out, TV-out, Express Card & 10/100/1000 LAN
- Weight - 3.8kg Dimensions - 397x294x44mm
- Gold 3 year Parts & Labour warranty

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UPGRADE > **£150**



- Intel® Centrino™ Duo Mobile Technology
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- Wireless Mini PCIe 802.11abg (54Mbps) LAN
- 6 cell Li-Ion battery (life up to 3hrs approx)
- 4xUSB2.0, VGA, Express Card & 10/100 LAN
- Weight - 2.8kg Dimensions - 359x255x34mm
- Silver 3 year warranty

RECOMMENDED  
UPGRADE > **£200**

**Voyager C530RD**  
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- Intel® Core™ 2 Duo processor T7200 (2GHz, 4MB cache, 667MHz)
- Genuine Windows Vista™ Home Premium
- 256MB ATI Mobility Radeon X1600 graphics



## PORTABLE SPEAKERS

**iHome iH19**

Speakers suited to iPod owners, although not the most portable solution around



There are more than a few portable speakers available that provide extra security for your mp3 player in the form of a protective case. We looked at Kensington's excellent FX300 last year and were impressed at the level of functionality offered for a very reasonable price.

iHome is another manufacturer who has offered a similar, albeit more powerful solution, with twin speakers mounted. The iH19 is similarly hard-wearing and water resistant, although we would be extremely wary of splashing around with it in a pool.

Unlike the FX300, this unit is intended primarily for iPod users. Although it also includes a standard

3.5mm jack plug, which can be used with any player, you'll only be able to take advantage of the exterior track control if you use the iPod connection supplied.

Inside the toughened exterior is the main speaker unit and a protective foam casing. There's not a lot of room here, though, and anything much larger than a standard iPod was a tight squeeze. In fact, it's not quite the portable solution you'd expect it to be; the speaker unit is bulky and is more like a mini ghetto blaster than a slimline travel solution. Sound quality was fairly impressive from the twin 3W built-in speakers, but the bass sounded rather muffled and not quite as loud as we would have liked.

Inside the box you're provided with a mounting strap to attach it to sports or gym equipment, but quite why you'd want to do this we're not sure. The device is powered by either four AAA batteries or the mains adapter supplied, and comes with a carry strap.

We liked the styling and convenience of the iH19, but everything from the dedicated controls and carry space for a player points it towards iPod owners. If you don't have one of Apple's players, you might consider the price a little too much for the limited functionality.

Paul Lester

## SATELLITE NAVIGATION

**Viamichelin X-980T**

A solid set of features, but not the easiest to use



Viamichelin's latest entry into the GPS market is the X-980T, the most feature-packed in its range. In addition to standard navigation, you get subscription-free traffic information, thanks to the provided FM receiver, speed camera locations and exclusive content from Michelin Guides, including hotels, restaurants and tourism throughout the UK.

There's a voice feature that provides text to speech for road names and locations, while Bluetooth

navigation is available for your phone and full maps of Europe are included. These are pretty good features, but nothing particularly unusual for a high-end device.

Startup and GPS fix times were very good, and setting destinations is easy, thanks to an intelligent alphabet display that quickly narrows down your search. However, the menu structure is pretty awkward to navigate once you're on the move. Dedicated controls take you to navigation options, history, points of interest or traffic data, but returning to the main map involves navigating back through the whole menu.

The onscreen buttons were fairly small, despite the generous 4.3in display. The map is clear and accurate but not particularly easy to adjust, mainly consisting of full-screen bird's eye-view or map/waypoint display.

The X-980T is also particularly bulky, resembling a rather ungainly slab of black metal. The suction mount is similarly large and very awkward to operate, culminating in an unattractive setup that tends to flap around somewhat when attached to the windscreens.

The X-980T has some nice features; the Bluetooth phone pairing works well and the free traffic reports and travel guides are a bonus. In terms of the menu interface and design, though, it falls down and isn't particularly user friendly.

Paul Lester

## Details

Price £60

Best price [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

Contact iHome [www.ihomeintl.com](http://www.ihomeintl.com)

Specifications 2 3W speakers •

Frequency: 150 – 20,000Hz • 4 AAA batteries • Mains adapter • 230x108x90mm (wxhxd) • 830g

## Verdict

**Pros** Offers a good degree of protection for your player; exterior audio controls

**Cons** Loses functionality without an iPod; relatively expensive for the performance

**Features**

**Performance**

**Value for money**

**Overall** A nice idea from

iHome, but we expected more in terms of performance from a rather bulky portable solution

## Details

Price £350

Best price [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

Contact Viamichelin

[www.viamichelin.co.uk](http://www.viamichelin.co.uk)

Specifications Full European maps •

4.3in touchscreen display • 3 hours battery life • Bluetooth phone support SD card expansion slot with 2GB card • 150x26x82mm (wxhxd) • 260g

## Verdict

**Pros** Travel guides built in; free traffic data and module supplied; straightforward mapping

**Cons** Poor usability and menu navigation; bulky and unattractive design; expensive

**Features**

**Performance**

**Value for money**

**Overall** Despite efficient mapping, the X-980T is an average device that is rather frustrating to use on the move

## MAINS NETWORKING

# Panasonic BL-PA100KT

Decent Ethernet-over-mains plugs, but they're not compatible with BT Homeplug



The Panasonic BL-PA100KT jumps on the Ethernet-over-mains bandwagon but goes against the grain by offering a product based on a proprietary format.

As with other Ethernet-over-mains products, you simply connect one plug into your router or modem and the other anywhere else in the house. Data is then transferred over the mains network in your house.

The BL-PA100KT kit consists of one master plug that you attach to the router and an additional plug.

The BL-PA100KT really is plug-and-play since there's no software included to change settings. 128-bit AES encryption is set up as standard and a button on top of each plug, combined with a master/terminal switch, lets you select which plug is attached to the router and which plugs will be placed around the house.

Three lights on the front of the boxes diagnose any problems and will flash red if there's no connectivity. A quick tap on the setup button provides information on the signal strength on that plug.

The plugs are rated at 190Mbps/sec but this figure is wildly misleading. In our labs, we got two bars strength and a set of inconsistent speeds ranging from 9.7Mbps/sec in close proximity to 6.7Mbps/sec over a longer distance.

However, during testing in a relatively noise-free home environment, we found speeds of 28.6Mbps/sec over a short distance and 25Mbps/sec when the plugs were split one floor apart.

If you have BT Homeplug kit on your network, you're unlikely to want to introduce this Panasonic alternative, due to its lack of Homeplug compliance. But if you're happy setting up a total Panasonic mains networking environment, the plugs are reasonably priced and perform adequately.

Emil Larsen

## Details

**Price** £119.99 (two plugs)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Panasonic  
[www.panasonic.co.uk](http://www.panasonic.co.uk)  
**Specifications** 190Mbps/sec  
maximum theoretical speed • AES  
128-bit encryption • 121x40x70mm  
(wxhxd) • 240g

## Verdict

**Pros** Reasonable performance for Ethernet over mains; attractive and versatile design

**Cons** Not Homeplug compatible; not the fastest

**Features**

**Performance**

**Value for money**

**Overall** Reasonable performance, but the lack of Homeplug compatibility is a drawback

## DIGITAL CAMERA

# Fujifilm Finepix F31fd

Prevent blurred faces easily at the touch of a button



While the Finepix F31fd isn't as compact as Canon's Ixus range (see our review at [www.pcw.co.uk/2166382](http://www.pcw.co.uk/2166382)), its slightly chunkier design makes it more comfortable to hold. At its rear is a bright 2.5in LCD screen with an anti-reflective coating, which makes viewing outdoors much easier, while a selection of small but easily accessed menu buttons sits to the right.

The main draw of the F31fd is its Face Detection feature. The camera will constantly scan for and focus on the face of anyone in shot, rather than any objects in the foreground. As soon as a face is located, a

green box is placed around it in the LCD viewfinder. This box follows the face as it moves around the scene. In tests, we found it worked extremely well and we were particularly impressed with how fast the camera picked up faces. It's an optional feature that can be activated via a dedicated button on the back of the camera.

Fujifilm also makes much of the camera's ability to shoot at ISO 3200, but high ISO settings always bring image noise and we would only recommend using anything above ISO 800 as a last resort. In Auto mode, the camera also seemed over-eager to brag about its high ISO settings, often selecting a higher ISO than necessary when shooting indoors.

Overall image quality is good, but you'll see image noise causing some quality issues, even when shooting at ISO 100. That said, if you're not planning to print out extra-large photos and won't be cropping in on detail too much, it's not really a problem. Occasional purple fringing was apparent in areas of high contrast, but colour reproduction and the camera's auto-exposure decisions were both good.

The Finepix F31fd has plenty going for it and the Face Detection technology is a bonus – especially for novice snappers sick of blurred portraits. Will Stapley

## Details

**Price** £199  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Fujifilm [www.fujifilm.co.uk](http://www.fujifilm.co.uk)  
**Specifications** 6.3 megapixels  
• 1/1.17in CCD • 3x optical zoom  
• f2.8-5 • 1/2,000-3sec shutter speed  
• 15sec long exposure mode • ISO 100-3200 • 2.5in LCD monitor • AF illuminator • 26MB internal memory  
• XD Picture Card slot • 640x480 movie mode (30fps) • Li-ion battery

## Verdict

**Pros** Face detection works well; sturdy design

**Cons** ISO sometimes too high

**Features**

**Performance**

**Value for money**

**Overall** Minor niggles aside, the Finepix F31fd performs well and the Face Detection feature will appeal to novice users

## DIGITAL CAMERA

# Nikon Coolpix S9

Stylish and compact, with easy-to-use features for snappers



In today's marketplace, a 6-megapixel digital camera such as this might give the impression of a camera desperately in need of an extra megapixel or two. But Nikon's Coolpix S9, rather than playing the numbers game, has a small but choice selection of features that help you take the best pictures effortlessly, all tucked into a delightfully crafted body.

Following the design of previous Coolpix S-series cameras, the S9 is compact, thin and has a gently sweeping front face that sits comfortably in the hand. The small, integrated flash and lens are kept out of the way up in the corner of the camera body, which helps avoid accidental finger-in-shot moments, while the build quality is exceptionally good.

The lens is recessed into the body and protected by a motorised cover to enable reasonably quick, though not lightning-fast, start-up. If you really want to draw attention to yourself, you can enhance the experience with a short animation, which is accompanied by an arpeggiated sonic flourish.

When it comes to taking photos, the Coolpix S9 has a number of tricks up its sleeve. Best of all is the one-touch portrait button. In shooting mode, this button enables automatic face detection. The camera will find your subject's face within the frame and draw a box round it before configuring the focus and exposure automatically to ensure a good portrait.

In playback mode, the same button activates the D-Lighting function – this attempts to enhance your photos by compensating for poor lighting or exposure. It's a simple 'yes or no' option, which leaves the original in place if you don't like the results.

In portrait mode, the red-eye-reducing flash is complemented by in-camera, software-based red-eye

removal. This doesn't always work properly, however, and the only way to disable it is to select a different flash mode.

When shooting close up, we found the flash was often overpowering – you need to put a good distance between the camera and the subject to avoid overexposure as there's no flash power adjustment.

In most situations the standard and portrait modes should be sufficient, but no consumer camera would be complete without a full selection of scene modes – and the S9 has plenty. In addition to a main selection of 11, many have sub-modes that help you arrange your subject in an aesthetically pleasing way.

This is achieved by drawing outlines on the LCD, which function as guides, showing you where to place people or how to position the horizon to best effect.

A standard movie mode produces video clips at up to VGA resolution. The optical zoom is disabled in this mode, leaving you with an unsatisfactory digital zoom, which we recommend you leave alone. Also in the movie menu are time-lapse and stop-motion options.

If you're more interested in fun and fashion than photography, the Coolpix S9 fits the bill admirably. It's attractive, well made and very easy to use.

Not surprisingly for a camera of this size, there's image noise even at the camera's lowest ISO setting of 64, and at ISO 400 close inspection reveals liberal application of noise reduction algorithms. It also lacks some of the features of the pricier S-series models, such as the vibration-reduction and WiFi of the S7c.

Despite these limitations, the Coolpix S9 makes the best of the available technology to create a good-looking, competent camera that will help snappers take better pictures. *Paul Monckton*

## Details

**Price** £200

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Nikon [www.nikon.co.uk](http://www.nikon.co.uk)

**Specifications** 6.1-megapixel CCD

- 3x optical zoom (38-114mm 35mm equivalent) • f3.5-5.7 • 2.5in LCD monitor • Shutter speed 2-1/2,000sec
- ISO 64-400 • 4cm macro • LED focus assist lamp • VGA movie mode
- Li-ion battery with charger • 24MB internal memory • SD card support 90.5x20.4x58mm (wxhxd) • 115g

## Verdict

**Pros** Very small; elegant design; usability; features

**Cons** Flash too powerful on close-ups; no manual controls; low-resolution LCD

**Features**

★★★★★

**Performance**

★★★★★

**Value for money**

★★★★★

**Overall** A chic little camera with features that help you to take better photos with minimal photographic skills

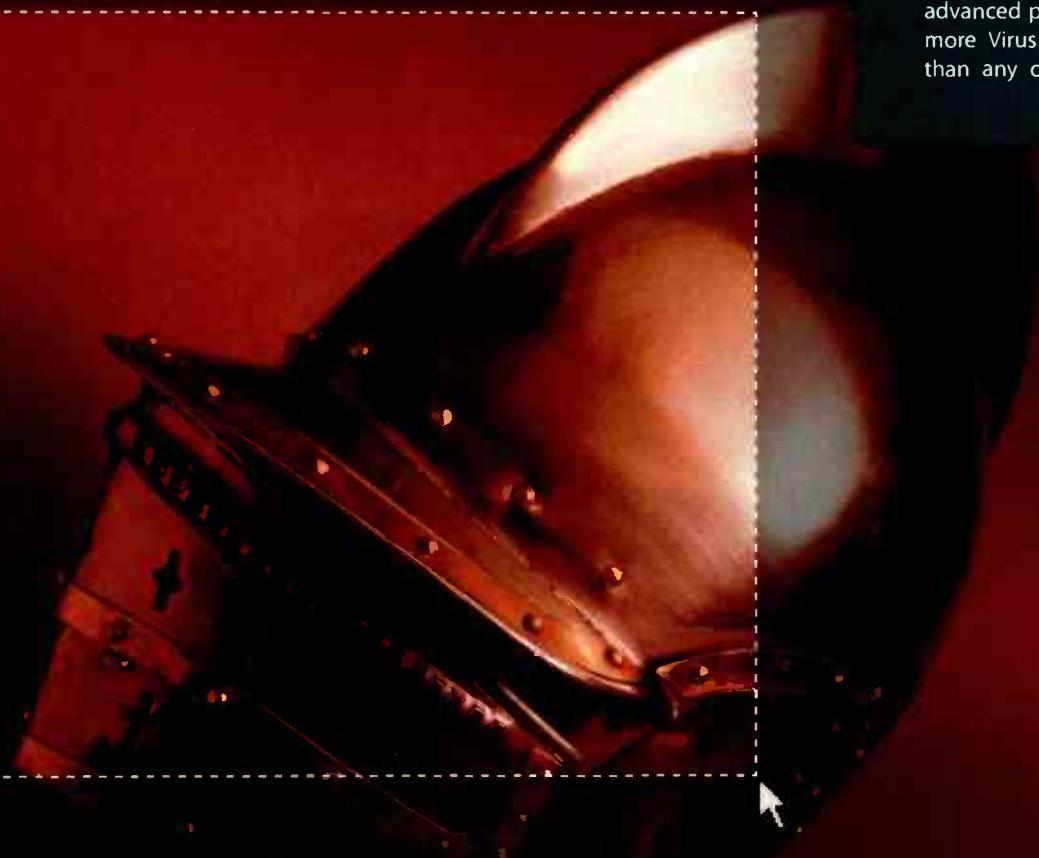
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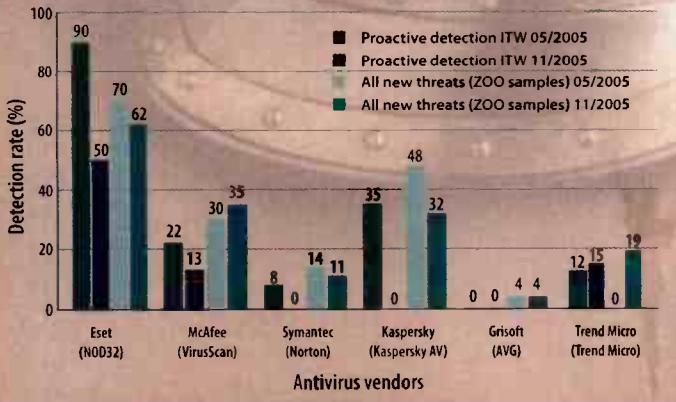
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FX-62 + CPU	£ 1309
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18x Double Layer DVD+/-RW Drive & 16X DVD-ROM  
NVIDIA® nForce® 5 7.1 3-D Surround Sound  
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Free 802.11g Wireless LAN Adapter  
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## CMS ABSplus Notebook Backup

Price £124.95 Contact [www.expansys.com](http://www.expansys.com) Overall ★★★★★

The ABSplus range of backup drives from CMS is available in a choice of sizes. The device we looked at is a 40GB USB2 model and, while labelled for notebook use, it is ideal for anyone wanting a lightweight external drive.

The one thing that stops people from backing up their systems is software that's not user friendly. But this is not the case with the bundled software that CMS includes. Bounceback is a CMS product that has a user-friendly interface and, among other functions, allows for backing up, drive formatting and, perhaps most usefully, booting from the backup drive itself, which will appeal to notebook users who want a failsafe option.

**Overall** ABSPlus is a useful, if expensive, addition to the mobile user's laptop bag.

Simon Crisp

## Antec Fusion

Price £126.07 Contact [www.occlock.co.uk](http://www.occlock.co.uk) Overall ★★★★★

With its big volume control and cold-rolled steel chassis, this new Antec case resembles large hi-fi amplifiers from the late 1970s.

The inside has been split into three chambers to separate the heat and noise of the power supply (a 430W quiet PSU is ready fitted), hard drives and the motherboard. The dividing wall between the PSU section and the motherboard has a rounded-off hole for cable runs. The motherboard section is cooled by two 120mm three-speed fans and, for extra CPU cooling, there is a convertible air guide. A nice touch is the inclusion of VFD (vacuum fluorescent display) at the front of the chassis.

**Overall** A big, attractive and well-designed desktop case, ideal for a home theatre PC.

Simon Crisp



## Asus Silent Knight

Price £44.97 Contact [www.vadim.co.uk](http://www.vadim.co.uk) Overall ★★★★★

The Silent Knight fan supports a wide range of CPUs, from Intel's sockets 478 and 775 and AMD's AM2, 939, 940 and 754 sockets, but you'll have to do some careful sizing up if you have a smaller case as it measures 115x140x110mm. Six copper heatpipes and 128 copper plates cool down the CPU. It's designed in two halves, with a quiet, slide-bearing, 92mm fan lit by a blue LED.

The design is such that should the fan fail, you can easily replace it. A plate needs to be screwed to the underside of the board to install the fan, but the clear instruction manual helps.

**Overall** Not quiet enough to put in a silent PC, but it's a stylish way to keep your dual core cool.

Simon Crisp



## Trendnet 621 PC Card

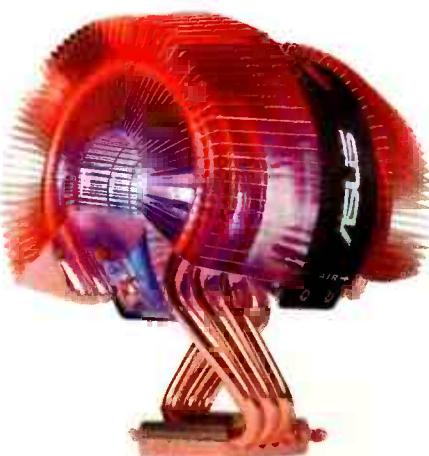
Price £89.99 Contact [www.scan.co.uk](http://www.scan.co.uk) Overall ★★★★★

This wireless PC card supports the draft-N specification. Although the final 802.11n standard won't be ratified until later this year, this should be compatible with final release kit – but there's no guarantee.

When tested in a relatively noise-free home environment, we achieved average TCP transfer speeds of 28.5Mbits/sec. With the router and card separated by two floors and some thick walls, the card maintained a reliable connection and, although speeds dropped as low as 3Mbits/sec during file transfers, it remained usable for surfing and downloading – something our old 802.11g card wasn't capable of.

**Overall** The Trendnet 621 card is expensive, but improves range even with 802.11g routers.

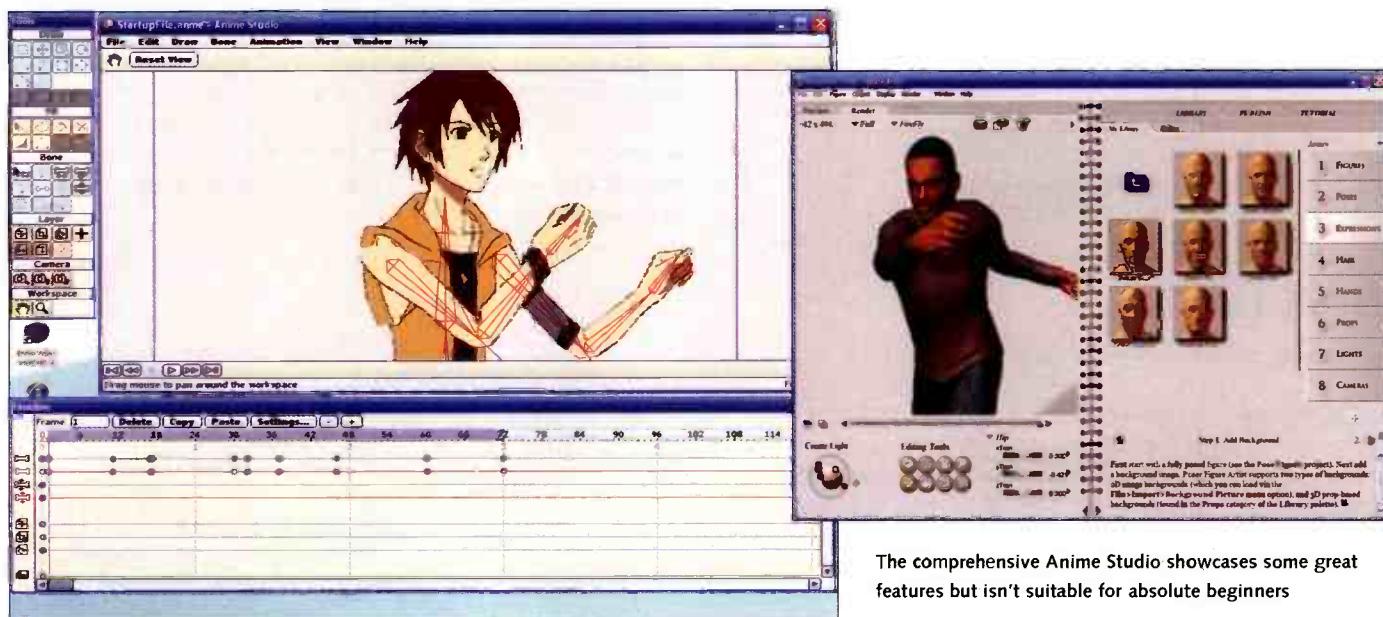
Emil Larsen



## ANIMATION SOFTWARE

## E-Frontier Anime Studio 5

Budget animation software with some powerful tools



The comprehensive Anime Studio showcases some great features but isn't suitable for absolute beginners

The trailer for the new *Simpsons* movie describes it as "the movie that dares to be ugly", emphasising the fact that it's in 2D format, compared to the 3D splendours of CGI films including *The Incredibles* and *Cars*.

Shows such as *The Simpsons* and *South Park* have demonstrated that there's life in good old-fashioned 2D animation yet, and have encouraged many young people to try creating animations. Even 2D animation software can be expensive, but E-Frontier's Anime Studio is an impressive low-cost option at £35.

Despite its low price, the software provides some sophisticated animation tools, including 'tweening' and 'bones', which speed up the animation process and make it easy to create smooth, realistic motion. However, it has limitations that can be overcome only by buying the Pro version, which costs about £120.

The program looks a bit intimidating at first as the main workspace is surrounded by a variety of floating palettes, each containing a wide array of tools. The lack of a printed manual is irritating, but the HTML manual on the CD includes tutorials that take you from basic drawing to some quite complex animation work.

You start by using the program's vector drawing tools to create artwork. The drawing tools are basic, but should be fine for the simple 2D artwork you see in *The Simpsons* and *South Park*. However, you can't import complex vector artwork into this version of the program – that option is only available in the Pro package.

Once you've created your artwork you can use the program's timeline window to create keyframe animation. Anime Studio supports tweening, which means you only need to specify some steps within an animation sequence and the program will automatically

create the 'in-between' animation frames. It's a standard technique for animation software, but Anime Studio's strongest point is its 'bones' feature, which is normally found only in far more expensive animation programs.

If you create an animated figure, such as a simple walking man, you can add bones to the figure's limbs. The bones can be linked so that moving one bone affects the bones connected to it. You could, for example, add a thigh, shin and foot bone to your walking figure. If you then move the shin bone, the thigh and foot will automatically move too, creating a smooth and realistic movement and saving you the effort of animating each part of the figure separately.

Sophisticated features such as this make Anime Studio good value for money, but we wouldn't recommend it to complete beginners. You need to be able to create decent artwork of your own, and it will help if you have some experience of animation work.

The program includes a small library of pre-drawn artwork, but the developer is obviously hoping you'll buy additional artwork from the store on its website.

The online manual is lacking. It romps quickly through keyframing techniques, and its poor editing meant we spent ages looking for a command mentioned in the tutorials that is, in fact, only available in the Pro version of the program.

Complete beginners might want to look at simpler rivals such as Toon Boom Studio, but Anime Studio's powerful controls make it a good choice for those who are happy to create their own artwork and already understand the basics of keyframe animation techniques. There's also a demo version available for download on the E-Frontier site so you can try it before deciding whether or not to buy.

Cliff Joseph

## Details

Price £35

Best price [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

Contact E-Frontier

[www.e-frontier.com](http://www.e-frontier.com)

System requirements 500MHz

processor • 256MB Ram • 500MB hard disk space • Windows 98 SE or later

## Verdict

**Pros** Very low price; powerful tweening and bones tools

**Cons** Poor documentation; can't import vector artwork from other illustration programs

**Features**

**Ease of use**

**Value for money**



**Overall** A powerful animation program at an extremely competitive price, but could be a bit complex for complete beginners



## SATELLITE NAVIGATION

## Navicore 2007 Personal

Sat nav for Symbian smartphones, but few reasons for existing Navicore owners to upgrade



**N**avicore has been producing routing software for Symbian smartphones for some time now, and the 2007 edition is evolutionary, rather than a large leap forward.

The full package comes on a 512MB memory card – over 300MB is left free for your own apps, or extra maps you may add later. The new GPS receiver is also very compact but, unfortunately, it only charges via USB, where the older one worked with a Nokia charger.

An additional new web service now allows easy map and software updates, plus extra voices and points of interest files.

The software routes quickly, with full UK postcode support. Directions are clear and work through your car's hands-free, if you have one. Additional maps available include the Middle East, South Africa and Australia. Free traffic info and safety camera updates are available via GPRS for many countries.

UK maps include plenty of points of interest; each category can be turned off and on, and have a proximity alert, but setting these options really can't be done on the move.

The basics can, however, and Speed Dial favourites mean you can navigate to your home, or other popular locations, with just one button push. You can also add location data to the phone's address book, send an MMS message showing where you are on a map, or a text with your co-ordinates.

Owners of Navicore 2006 probably won't find upgrading worthwhile; the software looks virtually identical. But if you're in the market for a sat nav and have a Symbian phone this is still a winning package, with the full European package in particular available at a very good price.

*Nigel Whitfield*

## Details

**Price** £130 (UK and Ireland), £170 (Europe) including GPS receiver, £33 (downloadable upgrade for 2006 UK and Ireland)

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Navicore

[www.navicoretech.com](http://www.navicoretech.com)

**Specifications** Symbian Series 60, 80 or UIQ mobile phone

## Verdict

**Pros** Free traffic and safety camera updates; compact GPS

**Cons** GPS charges via USB only; some interface options fiddly

## Features

★★★★★

## Ease of use

★★★★★

## Value for money

★★★★★

## Overall

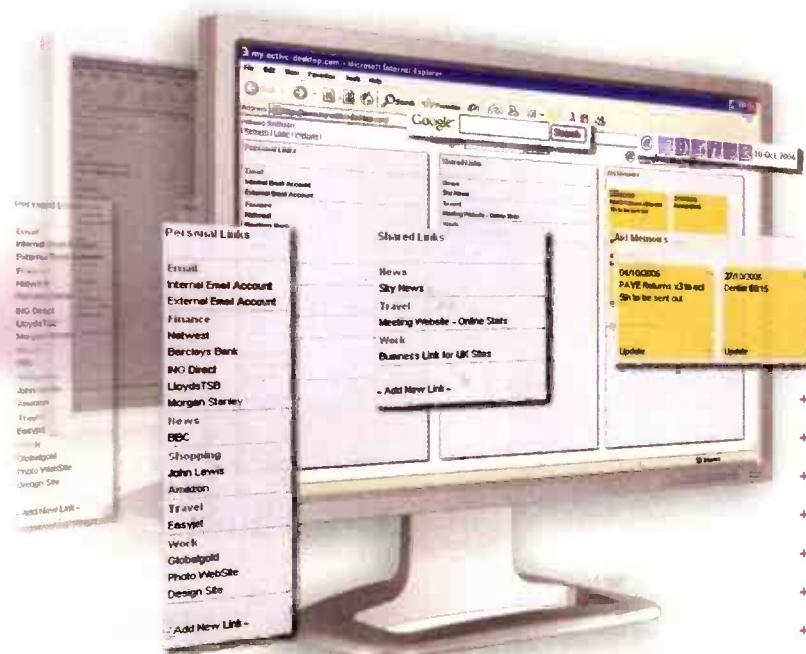
★★★★★

Good, keenly priced GPS for Symbian phone owners, but few reasons for existing users to upgrade

★★★★★

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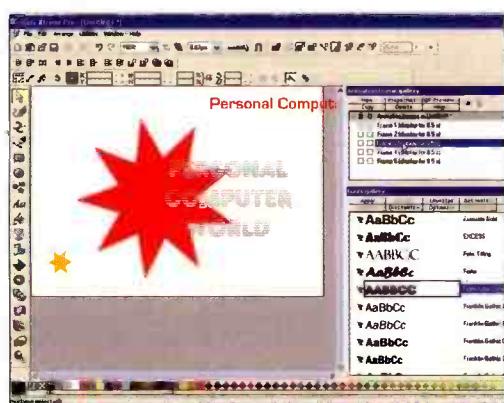
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## GRAPHICS

# Xara Xtreme Pro

Flash and Pdf creation made simple



**B**ack in 2005 we reviewed Xara Xtreme, a capable package for bitmap and vector graphics. The new Pro version includes some useful extra features, such as multi-page documents, so you can use it for DTP-type jobs, export to PDF/X, colour separation and even Flash animations.

In spite of these extra features, the Xara Xtreme interface has barely changed. This is good news for those who are used to it, but it can be confusing as many options are tucked away on buttons.

For example, to make a Flash animation you need to give a name to each object. You might hope to see a floating palette or a menu option, but in fact it's the little luggage tag button that appears on the toolbar when the object selection arrow is the chosen tool; choose the tool to create your object and the naming button goes away.

And while there's support for text columns, this too is quirky. You don't draw a text box and choose how many columns, instead you must use the same tool but draw a line from left to right. Tabs are supported but you can't turn the ruler on when in text mode because Ctrl & L performs another function at that point. On the positive side, though, text can now flow from one box to another.

Flash animations are straightforward, though a bit limited. Even so, the example one here was created by drawing just five frames, with Xtreme Pro looking after all the intermediate steps; if you want to animate a logo, it's both quick and easy.

Given the price, this is a great tool for creating graphics for the web or for print. But we do feel that in adding some of the new features, not enough thought has gone into making them as easy to use as they could be; time for an interface update. *Nigel Whitfield*

## Details

**Price** £102 approx (\$199)

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Xara [www.xara.com](http://www.xara.com)

**Specifications** 128MB Ram • 20MB hard disk • Windows 98 or higher

## Verdict

**Pros** Exports to Flash and Pdf; multi-page documents

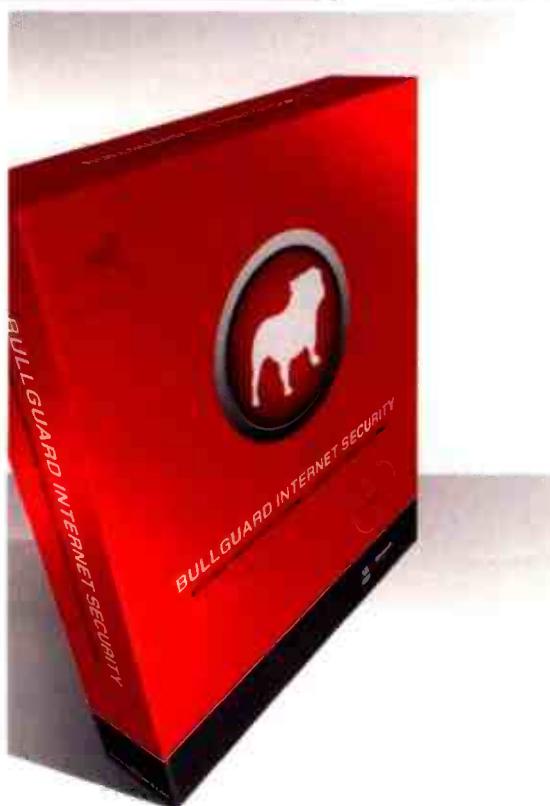
**Cons** Interface can be confusing at times

**Features**

**Ease of use**

**Value for money**

**Overall** A comprehensive graphics tool, but the interface is a bit quirky



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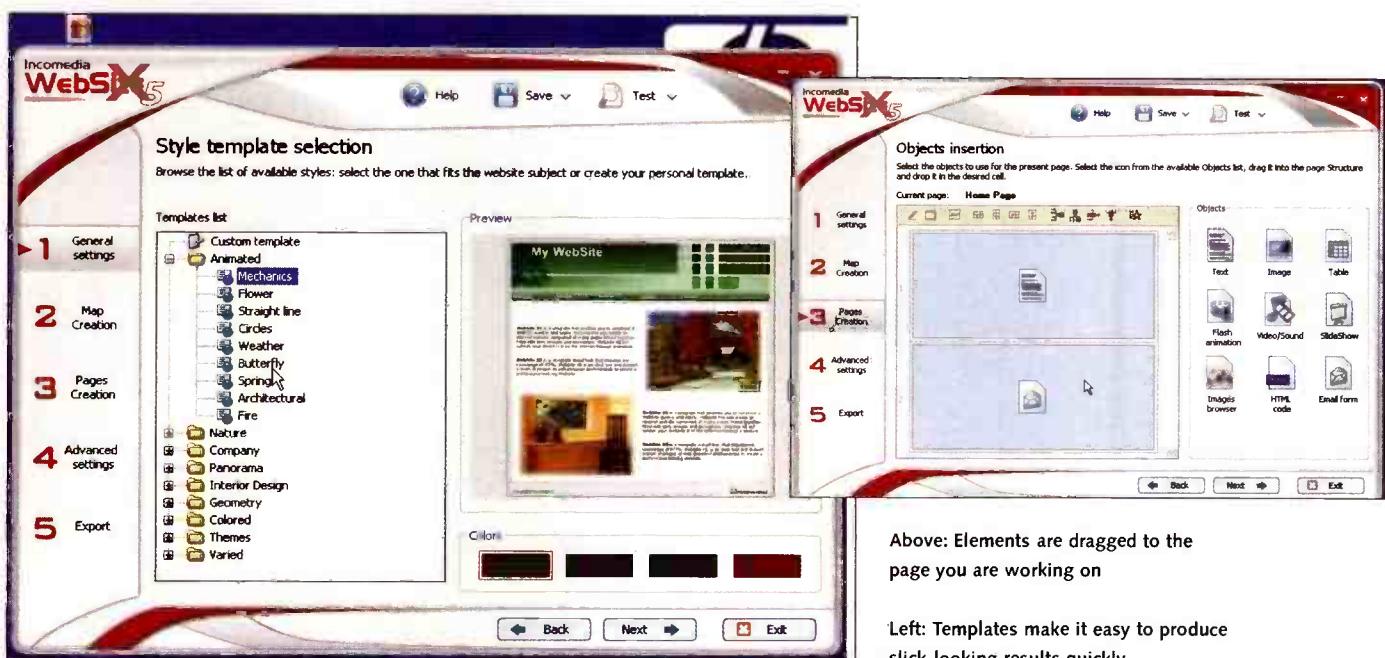
[www.bullguard.com](http://www.bullguard.com)



## WEB DESIGN

# Incomedia Website X5

Wizard-driven web page creation software that's simple to use



Above: Elements are dragged to the page you are working on

Left: Templates make it easy to produce slick-looking results quickly

**C**reating a good-looking website can take time, designing graphics, menus and so forth. Alternatively, you can use a package that helps you, with templating and automatic generation of all the navigation. Netobjects Fusion has long been a popular choice, providing an array of templates, and Website X5 from Incomedia works in a similar way.

Installation is fairly straightforward, but requires an activation key from the website that ties it to a single PC. The program works in a wizard-like fashion, with five steps to creating a website.

It starts with General settings, which asks for Title and Author details, an email address, description and keywords. It is not immediately apparent, unless you look at the help screen, that it's the title of the site you're being asked for, so don't enter 'Mr'; and if you enter an email address, it'll appear on the front page as a mailto: link, which is a recipe for being spammed.

As you work through the wizard, you can choose options for navigation menus and templates from a wide selection, with colour options for each one. You then see a map view, where you can add pages and levels – or folders – to your site. You can hide the ones you haven't finished and mark some as locked so that visitors will need a password to access them.

When creating pages, for each one you can drag elements such as Flash, video, text, slideshows, HTML code and tables onto a grid. The cells can be merged or added to, so it's fairly easy to work out the relative positions of things on the page. You can add features such as a Frontpage server web counter via the HTML code option. There are hooks for an animated front page, or an entry page that allows language selection, complete with a library of flags. You can also specify

graphics transitions between pages. Visit our image gallery to see the website creation wizard in action ([www.pcw.co.uk/2172848](http://www.pcw.co.uk/2172848)).

When you choose options such as an email form, or the password-protected pages, the code generated uses PHP, which ensures good compatibility with web servers and means you won't be tied to a particular platform for site hosting. This is good news for most, but not for those who want complicated, script-driven sites. While you can add your own code to pages, they'll still be saved with a .html extension unless they're marked as locked, when they'll be .php files.

A site can be previewed at any stage with just one button click and the results certainly look pretty impressive. If you decide you don't like the template, you can go back, change it and everything will be rebuilt – it's quite straightforward. We say 'quite' straightforward because you can't go straight back to every step. To change template, for example, you must click on Step 1, click Next twice to skip the first two screens, then choose a different template; and to edit a particular page, you need to click Step 2, Map Creation, then double-click on the page, or click Pages Creation and use the Back and Next buttons to reach the page you want.

These interface niggles aside, this is a pretty straightforward package. Even if you're not familiar with web design, you'll be able to create a site very easily, thanks to its Wysiwyg layout options and an interface that's easier to get to grips with than that of, say, Netobjects Fusion.

The price alone makes it very attractive. If you want to create a good-looking site without learning all about web design, it's well worth a look. *Nigel Whitfield*

## Details

**Price** £50

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Incomedia  
[www.websitex5.com](http://www.websitex5.com)

**System requirements** P133 or higher • 64MB Ram • 35MB free disk space • Windows 98 or higher

## Verdict

**Pros** Easy to use; fairly reliable

**Cons** Application navigation could be improved

**Features**



**Ease of use**



**Value for money**



**Overall** A quick way to create good-looking sites at a very attractive price





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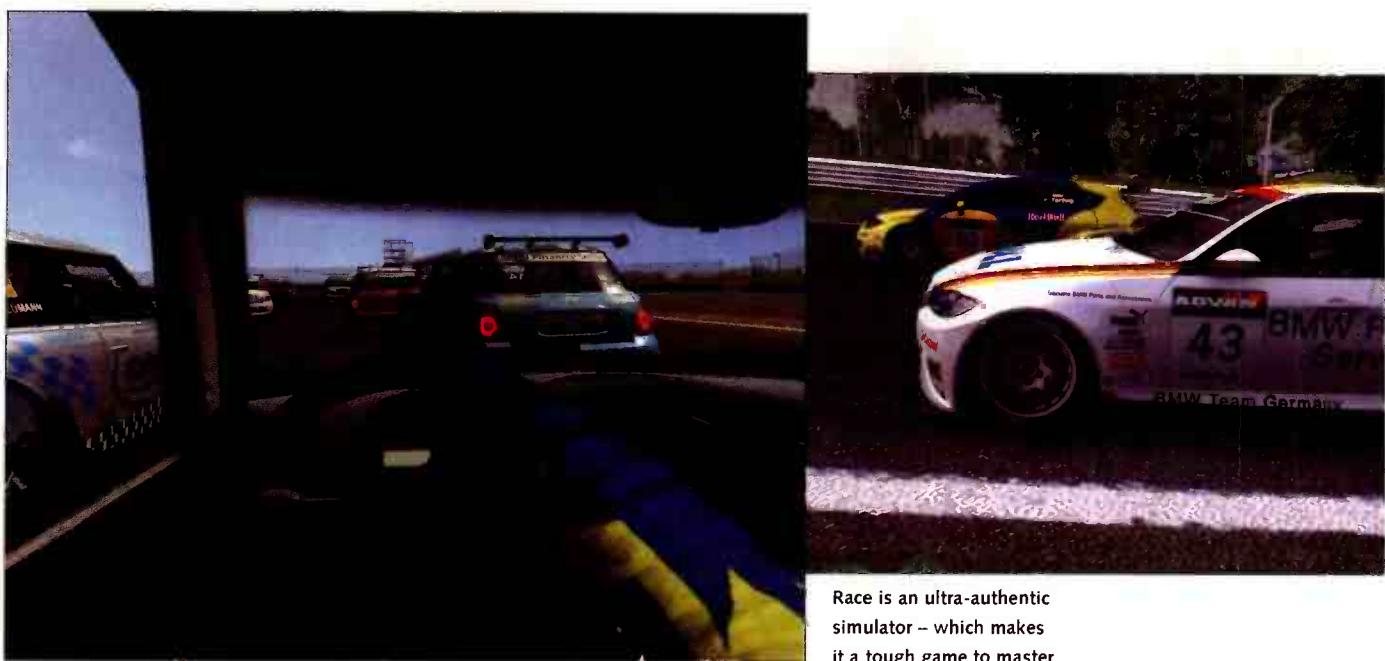
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## RACING SIMULATION

## Race: The WTCC Game



This highly detailed driving game is sure to turn some petrol heads



Race is an ultra-authentic simulator – which makes it a tough game to master

**G**ames consoles such as Playstation 2 and Xbox 360 have got top-notch racing titles coming out of their ears and, while some of these occasionally make it onto the PC format, many of the best, such as Gran Turismo and Project Gotham, don't have a desktop equivalent.

Thank heavens, then, for Simbin, which has been producing high-quality PC-exclusive racing titles for a while now. The Swedish developer was behind last year's excellent Gran Turismo 2, for instance, and has followed this up with the equally impressive Race: The WTCC Game.

For those unfamiliar with that particular sporting abbreviation, Race is the official game of the World Touring Car Championship. The main game is based on the 2006 season and features more than 30 real-world cars, along with digital representations of 10 tracks from around the world. As a bonus, the game also includes a series of historic races based on the 1987 WTCC season, including accurate cars and tracks of the time. There's also a Mini Challenge Cup mode available, which features instant action with a selection of different Mini Cooper S cars.

As well as the single-player campaigns you can take Race online or onto a Lan network and play against up to 24 other human drivers in multiplayer races.

This is a game that demonstrates a keen eye for detail, with car models not only looking extremely realistic (right down to the dashboard) but also handling very authentically. Braking, suspension, power and cornering all feel radically different from car to car and your driving experience can be massively affected by aspects such as the ambient weather conditions. The game's default cockpit view, complete with mirrors

and gloved hands on the steering wheel, helps to heighten the authenticity of the experience – as long as you can get used to it. It works best on a widescreen monitor and some players with smaller 4:3 ratio displays may find this option is too cluttered and switch to one of the game's more traditional viewpoints.

Race's level of realism is certainly absorbing, but it can work against you, too. This isn't a game where you can drive like a maniac and come away with your paintwork intact, and there are no extra points for skidding or sliding round corners. Collide with another racer or drive headlong into a barrier and your vehicle will sustain the appropriate level of damage, possibly scuppering your chances of success.

On top of this, there's a whole world of tinkering and tweaking to explore. This aspect won't appeal to everyone but it adds to the scope of the game.

We also recommend that players use some kind of game controller. Keyboard-only control is possible, but doesn't really do the game justice. An analogue joypad or, better still, a USB racing wheel will infinitely improve your enjoyment.

Race is a pretty hard nut to crack. Opponent artificial intelligence at the default settings is fairly tough and the realistic driving physics mean you'll quickly have to learn how to take a corner properly and adapt to different vehicles and driving conditions. It's possible to reduce the difficulty levels, though this lessens the challenge.

Arcade thrill-seekers will be frustrated by the way the game takes itself so seriously. But if you're willing to put in the time on and off the track, Race is a thoroughly enjoyable simulation. *Jonathan Parkyn*

## Details

**Price** £34.99

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Simbin [www.race-game.org](http://www.race-game.org)

**System requirements** 1.7GHz

processor • 512MB Ram • 2.5GB

hard disk space • DVD-Rom •

Windows XP

## Verdict

**Overall** Race is a serious racing simulation and can be quite hard, but its attention to detail and polished presentation help to make it a thoroughly engrossing experience



## STRATEGY

# UFO Afterlight

Work, rest and play with this Mars-based strategy title



Is there life on Mars? Apparently there is, if *UFO Afterlight* is anything to go by. In fact, the third title in developer Altar's strategic trilogy sees the remnants of the human race inhabiting the Red Planet after Earth has been conquered by an alien race.

The game is a mixture of squad-based tactical action and strategy on a global scale as you try to make Mars a nicer place to live. All the usual strategy game elements come into play – resource

management, technological research, diplomacy and, of course, combat.

It's quite a good setup for a strategy game, but rarely does *UFO Afterlight* live up to its promise, with a number of niggling issues seriously spoiling the fun. Graphically, for example, *Afterlight* looks dated. Sure, the game's scale is big, but the cutesy cartoon style and basic-looking environments, buildings and vehicles leave a lot to be desired. Appalling dialogue doesn't help matters much, either. Badly translated speech starts off as an amusing quirk of the game, but after several hours you'll tire of the spoonerisms and baffling turns of phrase uttered by characters during play.

Action switches between the planetary overview and close-up situations. This is fine in theory, but the developer's attempt at blending real-time strategy with turn-based gameplay and even role-playing elements (you can 'level-up' characters, for instance) makes for a pretty confusing all-round experience, particularly for those less familiar with the strategy genre.

Supreme Commander ([www.supremecommander.com](http://www.supremecommander.com)) is just around the corner and other, better space-based strategy games already on the shelves, *UFO Afterlight* is unlikely to appeal to anyone other than dedicated fans of the series.

Jonathan Parkyn

## Details

**Price** £29.99  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Altar  
[www.ufo-afterlight.com](http://www.ufo-afterlight.com)  
**System requirements** 1GHz processor • 512MB Ram • 4GB hard disk space • DVD-Rom drive • Windows XP/2000

## Verdict

**Overall** *UFO Afterlife* has an interesting premise, but there are too many annoyances to make this an enjoyable experience



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**Free Consumables Promotions:** Offers open to UK residents aged 18 or over only; free Rainbow Kit offer available to purchasers of the Samsung CLP-600N printer only; qualifying models of printer must be purchased new (not second-hand) between 1st January 2007 and 31st March 2007 from a retailer in the UK and originally sourced from Samsung Electronics (UK) Ltd (check with retailer for confirmation); offers only available to end-users; offers not available to purchasers in respect of printers they have purchased at a Samsung supported price (meaning a discounted price which Samsung has made available to the retailer for the purpose of the retailer making a discount

## REAL-TIME STRATEGY

# Europa Universalis III

Make history with this epic Euro-strategy game



In the real world, having an empire is generally something that's frowned upon these days, so it's nice that Paradox Interactive has provided an outlet for all the would-be Napoleons of this world with the third instalment of its popular strategy series.

Europa Universalis III puts all of history between 1453 and 1792 at your disposal and you can pretty much redefine the course of events the way you see fit. Instead of invading every country on the map, for example, you can play a much more subtle game,

forming alliances with other powerful nations and developing the way your own country works internally. Warfare will inevitably come into play, but you can choose to divert your focus towards a career of exploration, for example, or build up complex trade networks.

In fact, it'll probably strike you fairly early on just how vast this game actually is. As well as covering well over 300 years, it spans more than 250 countries, all with enormous populations and military resources to control. It sounds pretty daunting, and things can certainly get a little hairy at times, but, thankfully, the developers have found ways of making the game feel very manageable.

A good example is the way that the game allows you to control its pace. Europa Universalis III's gameplay works in real time, but you can slow it right down when you need to and even pause time so that you can put the kettle on and plan your next move in peace.

It's not the best-looking game by modern standards and whether you get into it or not really depends on whether historical strategy is your thing. Europa Universalis III is, however, an engrossing and addictive title. *Jonathan Parkyn*

## Details

**Price** £30

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Paradox Interactive

[www.paradoxplaza.com](http://www.paradoxplaza.com)

**System requirements** 1.9GHz

processor • 512MB Ram • 1GB hard disk space • Windows XP/2000 text

## Verdict

**Overall** A good, old-fashioned slice of historical strategy on an epic scale. Its style is unlikely to win any new fans, but it'll please existing strategists



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# 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](http://www.bapco.com)), the non-profit benchmark consortium. We are also a media member of the Futuremark Benchmark Development Program ([www.futuremark.com](http://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](http://www.reportlabs.com/testbed/bguides/benchmarks.php).

## Performance



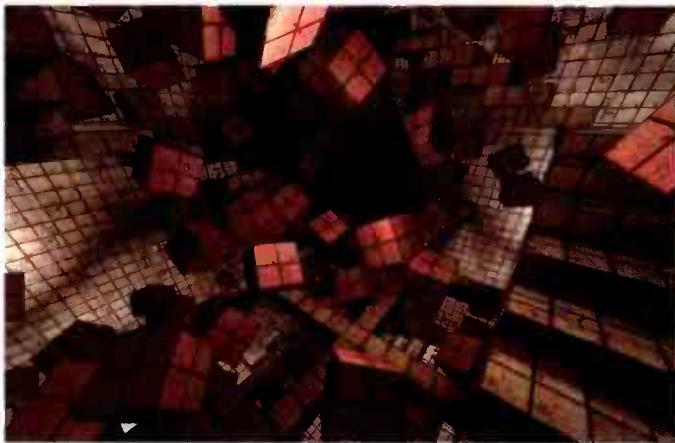
\* tested at 1,024x768 in 32-bit colour



- ❶ A score of 200 indicates that the system is twice as fast as the reference PC
- ❷ The reference PC (2GHz P4 512MB of Ram) scores 100
- ❸ A Geforce 7800 GTX would score in the region of 7,490
- ❹ A score of 60fps (frames per second) or higher is most desirable
- ❺ A result of 30fps or above means the machine can produce playable frame rates at the tested resolution



Far Cry is a real-world DirectX 9 test



PCmark05 measures memory, processor, graphics and hard drive performance



3Dmark05 pushes modern graphics cards to their limits

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# Power-packed PCs

To get the most out of the Windows Vista operating system, you may need to upgrade your PC. Cliff Joseph tests five models that are up to the task and cost under a grand

**B**uying a new PC to run the Windows Vista operating system may not be necessary for most of us – even the Home Premium version of Vista only requires, in theory, a 1GHz processor.

However, a 'minimum spec' PC isn't going to guarantee a pleasant Vista experience. After all, what's the point of using new Vista features, such as Flip 3D (the updated 3D version of the document-scrolling Alt-Tab command), if it crawls across your screen like treacle, or using the new DVD Maker feature while watching TV on Media Center if it brings your CPU to its knees?

To get the best out of any operating system, you need something with some horsepower behind it. We have rounded-up five Vista-capable machines that are kitted out with enough processor, memory and graphics power

to make Vista – and, of course, XP or Linux, for that matter – fly.

We set a price limit of £999 for these PCs and, not surprisingly, manufacturers went right up to the maximum price on every PC that was submitted.

There was a fair degree of uniformity among these systems – processors all in the 2.1 to 2.5GHz range, most with 2GB of memory and very similar graphics cards.

In fact, this was one of the most uniformly impressive groups of PCs we have seen for some time, with only minor features – such as TV tuners, wireless cards and speaker systems – to set them apart. Therefore, we have had to be ultra-pernickety in our scoring.

So if you think you're ready to get your hands on Vista, these are the sort of PCs that you should be looking at.

## ON TEST

- 108 Ambros Shuttle SD32G2 Chillblast Fusion Tundra 6300 OC
- 109 Evesham Solar Creation Mesh Elite E6600 Vista PCW
- 110 PC Nextday Zoostorm 4-6403 Advanced PC Peripheral vision
- 111 Performance results
- 112 Table of features
- 114 The many prices of Vista Editor's Choice

**'A minimum spec PC isn't necessarily going to guarantee a pleasant Vista experience'**



# Ambros Shuttle SD32G2

Price £999 Contact [www.ambros.co.uk](http://www.ambros.co.uk)



**T**he Shuttle SD32G2 is the slowest PC in this group, but it has some powerful competition. On the plus side, its compact design will appeal to many home users.

The Shuttle SD32G2 is based on a 2.13GHz Core 2 Duo processor. That can't match rivals such as the overclocked Chillblast PC, which tops the 2.5GHz mark, but it's still well above the minimum 1GHz speed recommended for a PC to run Vista properly.

Just as important, is the fact that the Shuttle is very capable of handling the graphical complexity of Vista's Aero interface. Its Nvidia Geforce 7900GS graphics card performed quite well in our 3D tests, topping 82 frames per second when running Far Cry, so it will also make a very respectable games machine.

Other features include 1GB of Ram and a healthy-sized 320GB hard disk, so there's plenty of room to store large collections of digital music, photographs or video content that you might download from the internet.

We also like the fact that the Shuttle has both six-pin and four-pin Firewire ports, since most DV camcorders use four-pin connectors, while other peripherals, such as hard disks, tend to use six-pin connectors. Having both types means you've got all the bases covered. Our only minor complaint is that the 19in TFT monitor has the traditional 4:3 aspect ratio, rather than a widescreen 16:9 display.

The Shuttle's main attraction is its neat design. Measuring 8in wide and high by about 11in deep, it's a fraction of the size of its tower-size rivals. If you're looking for a machine that won't take up too much room in your study or living room, this is the obvious choice.

## Verdict

**Pros** Compact design; good connectivity

**Cons** Slower than most of its rivals; limited room for internal upgrades

**Features**

**Performance**

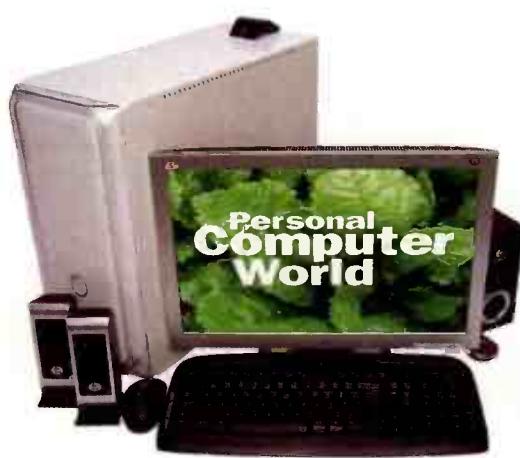
**Value for money**

**Overall** Attractive and compact design that offers reasonable features and performance



# Chillblast Fusion Tundra 6300 OC

Price £999 Contact [www.chillblast.com](http://www.chillblast.com)



**T**he Tundra's whiter-than-white chassis is certainly eye-catching, and its features and performance also stand up to closer inspection.

Chillblast manages to squeeze some extra performance out of the Tundra by substantially overclocking its relatively modest 1.83GHz Core 2 Duo processor so that it runs at a full 2.56GHz. Not surprisingly, then, the Tundra manages to outperform all its rivals in terms of raw processor power. It's also

got 2GB of Ram and a 320GB hard disk, so you've got plenty of scope for handling large multimedia files.

The overclocked processor requires two large internal fans to keep it cool, but these are fairly quiet and the Tundra doesn't make very much noise when it's running.

The only minor chink in its armour is the use of an Nvidia Geforce 7900 GS graphics card. This is a perfectly good card – certainly good enough for playing games and handling Vista graphics demands – but it doesn't match the 3D performance of the Geforce 7950GT used by the Mesh and PC Nextday systems. The Tundra's graphics card also has a very large heatsink that obstructs some of the other PCI slots inside the chassis, so the unit's expansion options are a little more limited than they seem.

However, the Tundra picks up a few extra bonus points for being the only PC in this group to include a TV tuner card, so you can benefit from the excellent new Media Center features in Vista Home Premium. It also comes with a Vista upgrade Voucher, so you're assured of a money-saving upgrade as well.

Hardcore gamers might prefer a system with the Nvidia Geforce 7950GT graphics card, but the Tundra's strong performance and versatile multimedia features make it a very attractive PC for any home user.



## Verdict

**Pros** Overclocked processor provides strong performance; TV tuner; Vista upgrade

**Cons** Oversized graphics card obstructs PCI expansion slots

**Features**

**Performance**

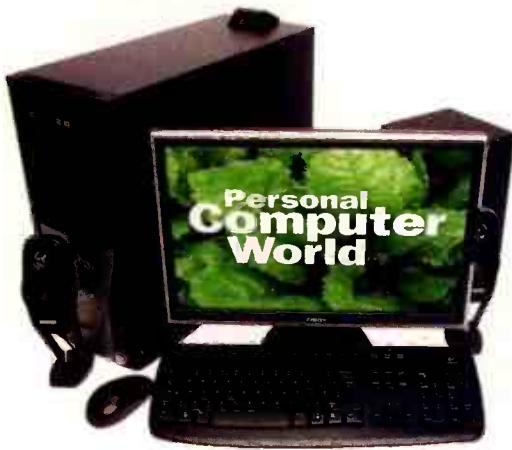
**Value for money**

**Overall** An excellent all-round combination of performance and multimedia features



# Evesham Solar Creation

Price £999 Contact [www.evesham.com](http://www.evesham.com)



**W**ith a name like Solar Creation, you might expect a machine that looks more exciting than this black-and-grey tower. But what it lacks in style, it more than makes up for in the sheer efficiency of its design.

Its 2.4GHz Core 2 Duo processor performed well in all our tests, lagging only fractionally behind the overclocked 2.56GHz processor in Chillblast's Tundra system. It has the same Geforce 7900GS graphics card

as the Tundra and, although not the fastest graphics card in this group, it's more than adequate for anyone apart from hardcore gaming enthusiasts. It should provide pretty good performance for 3D games.

The Solar Creation also has a healthy 2GB of Ram and a 320GB hard disk, so there's lots of space to store video and digital music, as well as plenty of Ram for tasks such as video editing.

There's ample room to upgrade, with several free drive bays and two PCI slots that aren't obstructed by the graphics card. However, there's no spare x16 PCI Express slot, which would enable you to upgrade to a twin graphics card, so dedicated gamers might prefer to look at the rival PCs from Mesh or PC Nextday. We were also a little disappointed to see that the 19in widescreen display only had an analogue VGA connector, rather than a digital DVI connector. This connection doesn't support the HDCP content protection scheme that's used for high-definition (HD) content, so HD video fans may want to look elsewhere or specify a better monitor.

Even so, these are minor blemishes on an otherwise well-built system. It may not have any obviously outstanding features, but the Solar Creation is a good all-round performer that will allow you to get the best out of Windows Vista.

## Verdict

**Pros** Good all-round performance; plenty of room for internal upgrades and expansion

**Cons** Display only has analogue VGA input; no option to upgrade to twin graphics cards

**Features**

★★★★★

**Performance**

★★★★★

**Value for money**

★★★★★

**Overall** A solid performer that will meet the needs of most home users

★★★★★

# Mesh Elite E6600 Vistra PCW

Price £999 Contact [www.meshcomputers.com](http://www.meshcomputers.com)



**T**he Elite E6600 is based on a Core 2 Duo processor running at 2.4GHz. In terms of raw processor power, it lags only marginally behind the overclocked Chillblast Tundra, which runs at 2.56GHz. However, it has a slightly stronger graphics card – an Nvidia Geforce 7950GT instead of the 7900GS in the Tundra – so there's very little between the two PCs in overall performance. Known graphics driver and firmware bugs meant that we couldn't run

our Far Cry benchmark, although the game itself ran fine. It also performed very well in our 3DMark05 tests, so it should be a good choice for games fans. There is a slot for a second graphics card, so gamers have the option to upgrade.

The rest of the system is pretty good, too. It has 2GB of Ram and a 320GB hard disk, so you've got all the memory and storage you need, even for demanding audio and video purposes. There's some video-editing software thrown in as well, in the form of the bundled Cyberlink editing suite, along with a copy of Microsoft Works.

Mesh has also done a good job with the Elite's peripherals. Like most of these PCs, the Elite has 7.1 sound output built in, but it's the only PC to actually include a full 7.1 speaker system, too.

We also liked the choice of monitor – an attractive 19in Sony screen with very good image quality. The only criticism here is that this is a 4:3 aspect ratio display, rather than a widescreen 16:9 model.

Some people might prefer a widescreen display for playing DVDs, in which case the Chillblast or Evesham machines would be a better choice.

The Elite E6600 gives a very good all-round combination of performance and features so you can take advantage of what Windows Vista has to offer.

Personal  
Computer  
World

**EDITOR'S CHOICE**

## Verdict

**Pros** Good performance and features; plenty of upgrade potential

**Cons** Lacks a widescreen

16:9 display

**Features**

★★★★★

**Performance**

★★★★★

**Value for money**

★★★★★

**Overall** Strong performance and well-chosen peripherals make this an unbeatable all-round system

★★★★★

# PC Nextday Zoostorm 4-6403 Advanced PC

Price £999 Contact [www.pcnextday.co.uk](http://www.pcnextday.co.uk)



The Zoostorm 4-6403 from PC Next Day stands out from its rivals in several ways. The curved, black Coolermaster chassis is one of the more interesting designs in this group. Perhaps more interesting is the choice of a 2.6GHz AMD Athlon64 X2 processor – the only AMD processor in a group otherwise dominated by Intel's Core 2 Duo chips.

This configuration produces an overall Sysmark 2004 SE performance that's noticeably below that of the 2.4GHz Core 2 Duo models from Evesham, Mesh

and the overclocked 2.5GHz Chillblast machine (although it's still nearly twice as fast as the bargain £500 PCs we tested in our February issue). But like the Mesh Elite E6600, the Zoostorm's games performance is bolstered by its Geforce 7950 GT graphics card. This produced the top scores in our Far Cry and 3DMark tests, so it's got more than enough graphics and processor power to keep games fans happy. The inclusion of a second x16 PCI Express slot gives you the option of a twin-graphics card upgrade as well.

The Zoostorm's 2GB of Ram and 320GB hard disk provide all the memory and storage space most home users are likely to need, and its 802.11b/g wireless networking, dual Gigabit Ethernet Lan adapters and memory card reader are all welcome extras.

There's a 5.1 speaker system included with the Zoostorm – better than the 2.1 speakers provided by most of its rivals, although Mesh's Elite E6600 does manage a full set of 7.1 speakers. The 19in flat-panel monitor provided good image quality, although it's a standard 4:3 aspect ratio – some people might prefer a widescreen 16:9 monitor, such as those supplied with the Chillblast and Evesham machines.

Even so, it's hard to find fault with the Zoostorm and the combination of features and performance will allow it to cope with just about any task that home users are likely to throw at it.

## Verdict

**Pros** Good 3D games performance and upgrade potential; wireless networking

**Cons** Basic bundled software; monitor isn't widescreen; overall performance below par

**Features**

**Performance**

**Value for money**

**Overall** A well thought-out configuration with all-round appeal, but not if you want a widescreen display

## Peripheral vision

If you're buying new peripherals for your PC, look out for the official Certified For Windows Vista logo, which ensures the device has been thoroughly tested with Vista and will allow users to make the most of the features on offer. There's also a second logo – Works With Windows Vista – that you'll see on quite a few products.

So what's the difference? According to Microsoft, the Works With Vista logo means a device "meets baseline standards of functionality on all PCs running Windows Vista". In practice, this means the device – whether it's a keyboard, scanner or some obscure USB widget – should still continue to work with Vista just as it works with Windows XP. However, it may not have been tested to check that it supports new features only found in Vista (most peripherals you currently use with your PC should also work with Vista on this baseline level).

Vista includes a new feature called Flip 3D, for instance, which provides a 3D view of document windows when you scroll through them using the Windows Key & Tab command. Most keyboards have got the Windows Key and Tab keys, so they will allow you to use Flip 3D (as long as your graphics card allows you to run the Aero Desktop theme). However, a keyboard with the Certified For Windows Vista logo may have additional features. Logitech's MX 3200 keyboard, for example, has a button to launch Flip 3D, rather than having to use a two-finger keyboard command. This feature, though, requires Vista drivers from Logitech that were released at the end of January, so the keyboard doesn't carry the Certified for Windows Vista logo. Logitech says it has more than 100 products that will work with



Windows Vista Upgrade Advisor can check your existing peripherals for compatibility with Vista

Vista, but only some were designed with Vista in mind and carry the Certified For Windows Vista logo.

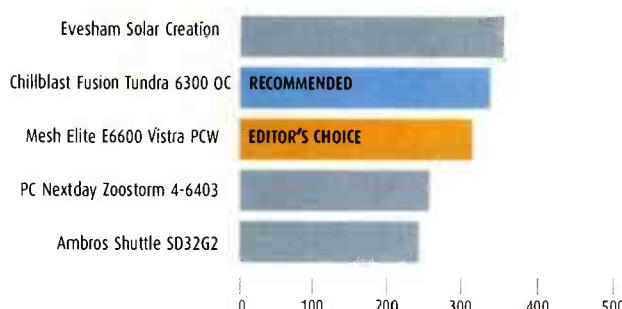
If you're about to upgrade to Vista and worried about using your existing peripherals with it, it's possible to download the Windows Vista Upgrade Advisor from Microsoft's website ([www.microsoft.com/windowsvista/getready/upgradeadvisor](http://www.microsoft.com/windowsvista/getready/upgradeadvisor)). This is a small utility that scans your PC and any connected peripherals to see whether or not they are known to work with Vista. If it detects problems with any of your current peripherals, you'll need to check with the manufacturer to see if new drivers are available for Vista.

Unfortunately, the Upgrade Advisor will only run on PCs currently running Windows XP, so if you're still running Windows ME, 2000, NT or even 98, start checking for information from the peripheral manufacturers' websites and support forums now.

# Lab results

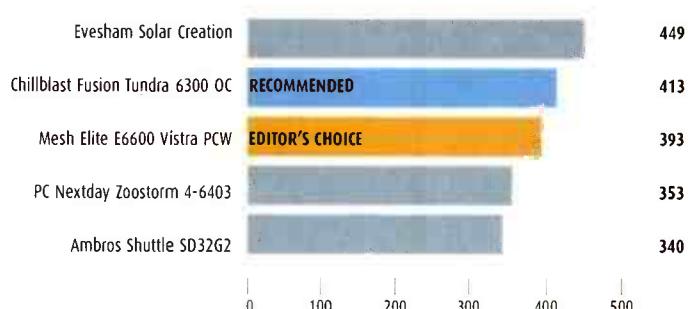
Three of the PCs wouldn't run our Far Cry benchmark due to a known bug in the firmware of the Leadtek graphics card. They ran the game fine, though

## Sysmark 2004 SE (overall)



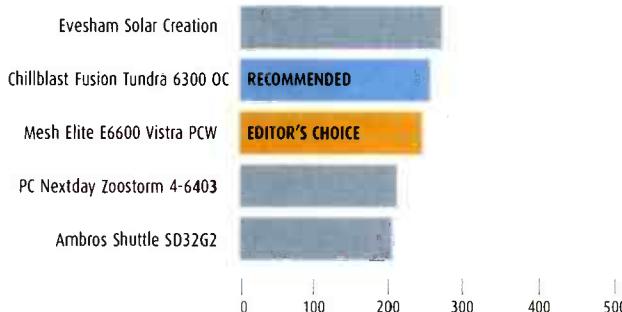
Bigger is better

## Sysmark 2004 SE (internet content creation)



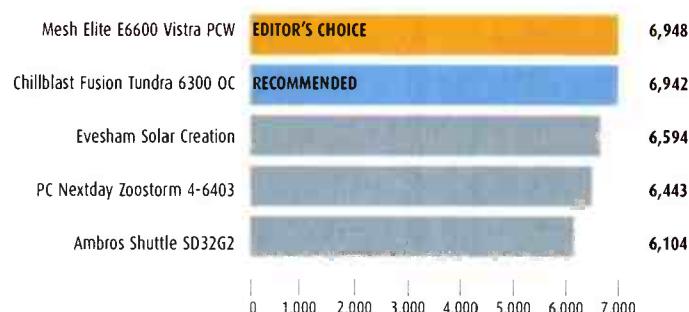
Bigger is better

## Sysmark 2004 SE (office productivity)



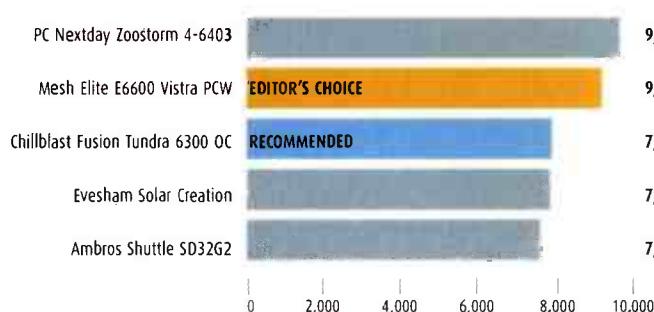
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## PCmark05 (overall)



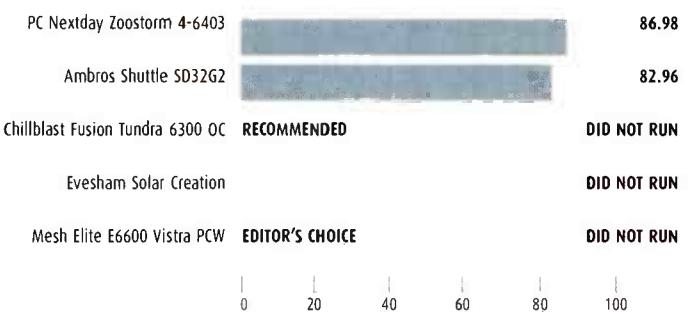
Bigger is better

## 3Dmark05 (1,024x768 in 32-bit colour)



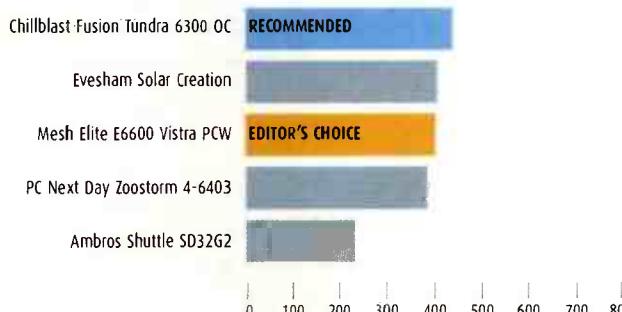
Bigger is better

## Far Cry (FPS 1,024x768 in 32-bit colour)



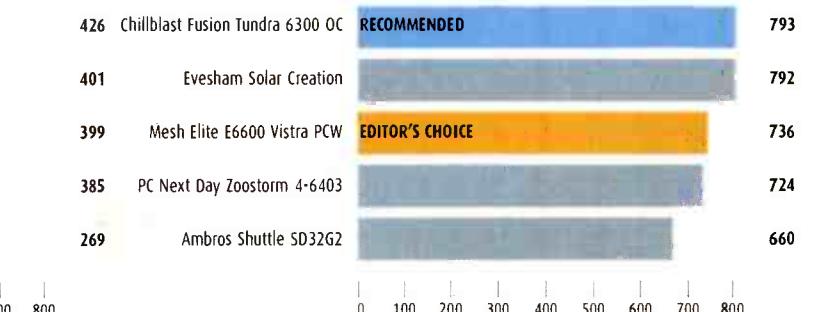
Bigger is better

## Cinebench 9.5 (single CPU)



Bigger is better

## Cinebench 9.5 (multiple CPUs)



Bigger is better

Please see page 104 for an explanation of how we tested the PCs

£999 PCs



Personal Computer World  
RECOMMENDED

MANUFACTURER	AMBROS	CHILLBLAST
Model	Shuttle SD32G2	Chillblast Fusion Tundra 6300 OC
Price inc Vat	£999	£999
Telephone	020 8998 1010	0845 456 7830
Website	<a href="http://www.ambros.co.uk">www.ambros.co.uk</a>	<a href="http://www.chillblast.com">www.chillblast.com</a>
HARDWARE		
Processor	Intel Core 2 Duo E6400 (2.13GHz)	Intel Core 2 Duo E6300 (1.86GHz OC 2.56GHz)
Motherboard	Shuttle FD32	Asus P5B-E
Chipset	Intel 945G/ICH-7	Intel 965/ICH8R
Available memory/type	1GB	2GB PC2-5400 DDR2
Occupied/spare memory slots	1/1	2/2
Max memory supported by motherboard	2GB	8GB
Hard disk manufacturer and model	Seagate ST3320620AS	Seagate ST3320620AS
Secondary hard drive	N/A	N/A
Total storage space	320GB	320GB
EXPANSION AND I/O		
No of 3.5/5.25in bays	2/1	6/5
No of free 3.5/5.25in bays	1/0	4/3
No of PCI/PCI-x16/PCI-x4/PCI-x1 ports	1/1/0	3/1/0/3
No of free PCI/PCI-x16/PCI-x4/PCI-x1 ports	1/0/0	2/0/0/3
No of USB2/Firewire ports	2/6	8/2
No of serial/parallel/PS/2 ports	1/0/2	0/1/2
MULTIMEDIA		
Primary optical drive	NEC 5170A	Samsung SH-W183
Optical drive formats and DVD write speed (max)	16x DVD, 18x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 5x DVD +/- DL	16x DVD, 18x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 5x DVD +/- DL
Secondary optical drive	N/A	N/A
Optical drive formats and DVD write speed (max)	N/A	N/A
Soundcard	Realtek ALC822/7.1	Azalia Codec/7.1
Speakers	Neutac S2114/2.1	Logitech S200/2.1
Graphics chip type/memory	Nvidia Geforce 7900GS/256MB	Nvidia Geforce 7900GS/256MB
Screen type, size and (maximum resolution)	TFT, 19in, 1,280x1,024	TFT, 19in, 1,440x900
OTHER INFORMATION		
Modem/other hardware	None	Hauppauge WinTV HVR 1100 Vista-Ready TV Card
Network	10/100/1,000	10/100/1,000
Operating system	Windows XP Home	Windows XP Home with Vista upgrade voucher
Bundled software	Nero, Power DVD, BullGuard, OpenOffice	None
Standard warranty (RTB: return to base C&R: collect and return)	One-year RTB (upgrade to two years for £69)	Two-years C&R
SCORES		
Features	★★★★★	★★★★★
Performance	★★★★★	★★★★★
Value for money	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★

Vendors of group test products are only obliged to sell them at the prices quoted here (which include delivery and credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances.



## EVESHAM

Solar Creation

£999

0870 160 9500

www.evesham.com

## MESH

Elite E6600 Vista PCW

£999

0844 736 0440

www.meshcomputers.com

## PC NEXTDAY

Zoozstorm 4-6403 Advanced PC

£999

N/A

www.pcnextday.co.uk

## Intel Core 2 Duo E6600 (2.4GHz)

Foxconn P9657AA-8EKRS2H

Intel P965/ICH8R

2GB PC2-667 DDR2

2/2

8GB

Western Digital WD3200JD

N/A

320GB

5/4

4/3

2/1/1/1

2/0/1/1

6/2

1/1/2

## Intel Core 2 Duo E6600 (2.4GHz)

Asus P5N-E SLI

Nvidia Nforce 650i SLI

2GB PC2-667 DDR2

2/2

8GB

Seagate ST320620AS

N/A

320GB

4/3

2/2

2/2/0/1

1/1/0/1

6/1

0/1/2

## AMD Athlon64 X2 5200+ (2.6GHz)

MSI K9N SLI

Nvidia Nforce 570 SLI

2GB PC2-667 DDR2

2/2

8GB

Western Digital WD3200KS

N/A

320GB

5/5

3/3

3/2/01

2/1/01

7/1

0/1/2

## Sony AW-G170A

16x DVD, 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD +/- DL, 12x DVD-RAM

N/A

N/A

Integrated Realtek ALC883/7.1

Creative Labs I-Trigue 3220/2.1

Nvidia Geforce 7900GS/256MB

TFT, 19in, 1,440x900

## Sony AW-G170A

16x DVD, 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD +/- DL, 12x DVD-RAM

N/A

N/A

Creative Labs Soundblaster X-Fi Xtreme Audio/7.1

Creative Labs Inspire T7900 7.1

Nvidia G7950GT/256MB

TFT, 19in, 1,280x1,024

## BENQ DW-1670

16x DVD, 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD +/- DL, 6x DVD -DL, 5x DVD-RAM

Lite-on SHD-16P1S

16x DVD

Integrated Realtek ALC883/7.1

Philips MMS460/5.1

Nvidia Geforce 7950GT/512MB

TFT, 19in, 1,280x1,024

## Evesham Gold Warranty two years on site, one-year RTB

E-Sata port

10/100/1000

Windows XP Media Center

None

Floppy drive, E-Sata port

10/100/1,000

Windows Vista Home Premium

Microsoft Works, Cyberlink Video editing suite

One year on site, two years RTB

54Mbit/sec wireless card, memory card reader

Dual 10/100/1,000

Windows Vista Home Premium

Nero, PowerDVD

One year on site

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

## The many prices of Vista

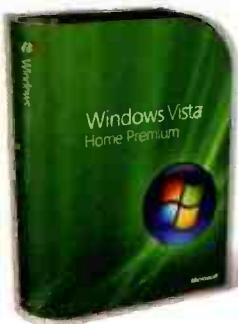
To run Windows Vista Home Premium, all you need, in theory, is a PC running at 1GHz, with 1GB of Ram and a DirectX 9 graphics card with 128MB of video memory.

Many of us will already have existing PCs that meet this specification, so you might want to buy a copy of Vista and upgrade your current PC, rather than look at a new one.

Unfortunately, working out how much that will cost is tricky – partly because there are so many versions of Vista available, but also because Microsoft was tight-lipped about UK pricing for Vista as we went to press, just a few days ahead of the official 30 January launch date.

But on launch day, all was revealed, and it pretty much confirmed the pre-order pricing we'd seen. The full version of Vista Home Basic costs £179.99 at PC World, while Vista Home Premium is priced at £219.99, and Vista Ultimate comes in at a fairly outrageous £369.99 (no wonder Microsoft was keeping quiet).

These are 'new install' versions, which allow you to install Vista from scratch onto any PC that meets the requirements. However, you can also buy upgrade versions of Vista that are designed to be installed over an existing Windows XP installation. These upgrade packs cost £99.99 for the Vista Home Basic Upgrade, £149.99 for the Vista Home Premium Upgrade and £249.99 for the Vista Ultimate Upgrade.



Vista Home Premium will cost between £79 and £211, depending on the version you buy

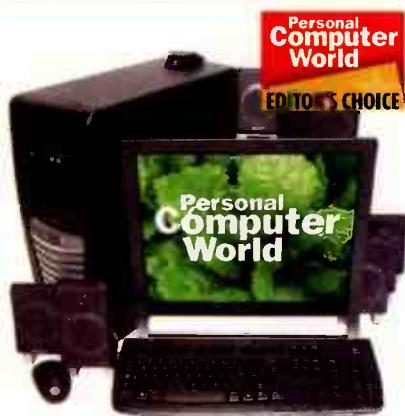
Experienced PC users can save even more money by buying an OEM version of Vista. These are copies of Vista that are designed for 'original equipment manufacturers' – in other words, proper PC manufacturers who will install Vista onto PCs that they have built and then sell them on to buying customers.

The OEM version of Vista Home Basic will set you back about £65, while OEM Vista Home Premium costs £79 and OEM Vista Ultimate costs £135, therefore you can save quite a lot of money with these packages.

The drawback with this option is that you don't get any technical support – since, as a manufacturer, you're the one who's supposed to provide technical help for your customers.

You may also be required to buy some qualifying hardware (such as a mouse or a hard drive) with the OS to comply with the terms of the OEM licence. And as far as we can tell (we have heard conflicting information), the OEM licence is similar to XP's in that it's a 'one-time-use licence' that can't be transferred to another PC. This means, in contrast to the retail versions that allow unlimited licence transfers and hardware changes, you might not be able to easily upgrade your motherboard, for example. The best option if you want to minimise outlay but retain licensing flexibility is to go for a retail upgrade version.

## Editor's Choice



Mesh Elite E6600 Vista PCW

There's no PC in this group that stands head and shoulders above its peers. All are more than capable of running Windows Vista Home Premium, tackling demanding multimedia work and running the latest 3D games.

Your choice might well rest on just one or two features. The Ambros Shuttle stands out because of its compact design. It's not the best performer, but it's no slouch and is a very good choice for use at home or in a small office.

## Editor's Choice Mesh Elite E6600 Vista PCW Recommended Chillblast Fusion Tundra 6300 OC



Chillblast Fusion Tundra 6300 OC

Chillblast's Tundra may tempt some with its overclocked processor, but the 2.56GHz clock speed doesn't give it a huge advantage over its rivals. The standout features are its TV tuner and widescreen display, which make it a good choice for multimedia work and entertainment.

Evesham's Solar Creation is a good all-round machine with strong performance, a widescreen display and a three-year warranty. It doesn't have any exceptional attributes and, as with the

Tundra, we would have liked to see a second graphics card slot for upgrades.

The Zootstorm 4-6403 from PC Nextday, on the other hand, does have a second graphics card slot and provides good all-round performance, along with a good set of 5.1 speakers. Our only complaint is that it doesn't have a widescreen display, sticking with a standard 4:3 design for its 19in flat-panel display.

The 4:3 display is also the sole weakness of Mesh's Elite E6600 Vista PCW, but its 19in Sony monitor is probably the best bundled display here in terms of design and image quality. Its 2.4GHz processor and Geforce 7950GT graphics card provide very good performance and this is backed up by high-quality peripherals, such as the Sony monitor and a full set of 7.1 speakers. We were also pleased to see that it had a second graphics card slot.

That combination of features, performance and upgrade potential make the Elite E6600 Vista PCW our Editor's Choice – although only by a very narrow margin – and Chillblast's Tundra takes a close second place as our Recommended choice, thanks to its widescreen display, strong performance and TV tuner. **PCW**



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Stock status: Brand new stock  
Warranty: 1 year "money back" warranty

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TOSHIBA

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Warranty: 1 year warranty

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emachines

### TOSHIBA SATELLITE P100-240

Intel Centrino Dual Core technology, 17" widescreen and 256MB graphics.

- Intel Centrino Core Duo T2400
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- 17" TruBrite widescreen, DVD±RW
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TOSHIBA

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FUJIFILM

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- Simple to use menu navigation
- SD card slot, USB 2.0 and AV-in/out
- Inc AV cables, charger and case

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Warranty: 1 year warranty

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YUKAI

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- P4 540 (3.2GHz), 1GB RAM
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- 11g WiFi, XP Media Center

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Warranty: 1 year HP warranty

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hp

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- Suitable for ADSL2+ (25Mbps)
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Warranty: 1 year warranty

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LINKSYS

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GR-D240 digital camcorder with a huge 22x optical zoom lens.

- Mini-DV for excellent quality
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JVC

### MSI USB DIGITAL TV TUNER

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Case style may vary

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SYSTEM

MSI

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- 16MB memory and SD card slot

Brand new stock, 1 year warranty

£129.99 ex VAT £152.74 inc VAT



Nikon

MSI

SYSTEM



## ON TEST

118 Acer PH730  
 119 Benq PE7700  
 120 InFocus IN76  
 121 Optoma HD73  
 122 Samsung SP-H710AE

123 Lab results  
 How we test  
 124 Table of features  
 127 Choosing a screen for  
 your projector  
 127 Editor's Choice

'Front projection systems are much more portable than LCD or plasma displays, can accommodate a range of screen sizes and can display much bigger pictures'

# Another flick on the wall

The latest projectors involve a wide range of technologies to deliver different features. Paul Monckton takes a look at five models that will help you make the most of your wall space

**H**igh-definition video today seems to be all about large, flat screens – usually LCD or plasma. To many people, it's all about size.

It's a reasonably safe bet that the largest, flattest thing you own is your living room wall. So, if you really want to take full advantage of that wall space, you're going to need a projector.

Front projection systems offer many advantages over conventional LCD or plasma displays. They're much more portable, they can accommodate a range of screen sizes and, best of all, they can display much bigger pictures.

The five projectors we have chosen to review here range in price from around £1,000 to more than £2,500, and while they're all single-chip DLP products, they use a variety of technologies to achieve different features and

there are marked differences in image quality. All of them support native 720p high-definition video without digital image scaling and are HD ready, so they'll support HDCP-protected output from the latest HD-DVD and Blu-ray players or from broadcast sources.

If you're intending to use a projector with your PC then it's also useful to have one that can display 1,024x768 resolutions as well as 720p. Both Acer's PH730 and Optoma's HD73 can do this. It's also important if you want to do presentations using Powerpoint in a standard 4:3 aspect ratio.

Three different DLP processors are in use here and there are wide variations in the published specifications. However, our viewing panel tests reveal that the claimed performance figures are not always an accurate guide to real-world image quality.



# Acer PH730

Price £1,149 Contact [www.acer.co.uk](http://www.acer.co.uk)



**F**inished in several shades of dull grey, the Acer PH730's only concession to domestic harmony is its shiny 'piano-black' side panels, which also house a pair of ventilation slots.

In short, it looks more like a large business projector than something that would blend in with your home decor. Indeed, out of all the projectors reviewed here, the PH730 is the most suited to business use. This is not only because of the way it looks – it also contains several business-orientated features that are unique among the models on test.

Most obvious of these is the inclusion of a pair of stereo speakers at the rear. No-one would expect a satisfying audio experience from these in a home cinema setting, but in a boardroom or classroom, where you want to show widescreen video, it's handy to be able to forget about taking additional speakers with you.

Fitted with a large selection of inputs, it also supports VGA pass-through, so you can connect a monitor at the same time as the projector, and a USB connection to allow the PC's cursor to be moved with the projector's wireless remote control.

It's much larger than most 'portable' business projectors, but at 3.5kg is easy to carry around and only Optoma's HD73 weighs less. It also comes with a carry-case which, although light, is of solid construction, and it's the only projector here to have an integrated lens cap, operated by a slider on the front of the projector.

When the Acer PH730 is in table-top use, height adjustments are made by means of quick-release feet at the front and screw adjustments at the rear. This significantly speeds up setting-up and levelling, at the

expense of some of the fine adjustment you may need when setting up a permanent installation.

All the projectors reviewed here include vertical keystone adjustment, but the Acer – together with Optoma's HD73 – can also make the adjustment horizontally, allowing you to quickly set up right-angles on your screen, even if you're forced to project from an off-centre position.

When we first switched on the projector, we were greeted with a very loud beep and a distinct lack of picture. This is exactly the kind of noise you would expect to hear when something has gone drastically wrong and we did believe at first that the projector was broken.

As it turns out, the start-up beep is part of normal operation, although it can be silenced via the on-screen menus. We're not quite sure why we saw no picture, but closing and re-opening the lens protector caused the problem to go away permanently.

The PH720 uses a 1,280x768 pixel DMD chip, rather than the native 720p resolution of 1,280x720 pixels. This is very useful if you want to run the projector mainly from a PC as it allows you to use a standard 1,024x768 4:3 resolution without the need for scaling, ensuring the best possible quality from applications and games that don't work well on widescreen displays.

It also uses a seven-segment colour wheel containing a clear segment, which is used to mix in white light with the red, green and blue. This allows you to boost raw light output at the expense of some colour saturation, making it more usable in situations such as a boardroom, where you may not want to dim the lights.

## Verdict

**Pros** Best option for business and portable use

**Cons** Business-orientated design and features lessen domestic appeal; unfriendly beeps

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** The Acer PH730 offers a combination of home-cinema and business features in a single, portable package, although we feel it's better suited to the latter use



# Benq PE7700

Price £1,126 Contact [www.benq.co.uk](http://www.benq.co.uk)



**A**lthough it features a similar physical layout to Acer's PH730, the PE7700 from Benq is most definitely a home cinema projector through and through.

The dull grey of the PH730 is replaced with a bright, shiny white casing – which is always a bonus if you're going to opt for ceiling mounting. All PC-friendly connections have been removed – neither VGA nor DVI ports are provided. Instead, you get a pair of YPbPr component video connections, one of which is fitted with BNC connectors. You can connect a PC VGA cable here by means of an adapter that's provided in the box.

To hook up a PC's DVI port, you'll need an HDMI cable and a converter, neither of which is included.

The PE7700 uses an HD2+ DLP system, fitted with a six-segment colour wheel and supporting a native 720p resolution of 1,280x720 pixels. This resolution is perfect for home theatre use, but while most PCs are capable of outputting at 720p, there's plenty of software – especially games – that does not support widescreen resolutions. Having less than 768 vertical pixels means that you won't be able to run these programs at 1,024x768, without scaling the image.

The lack of the white colour wheel segment found on the Acer PH730 also means that the Benq can't adapt to business use in brighter environments by sacrificing some colour integrity. However, even without the white segment, the PE7700 manages to put out enough light in its brightest modes to leave most of the other projectors in the shade.

The large, illuminated remote control lights up like a tray of little orange sweets. It's very easy to see in

the dark and the buttons are large and well spaced for fumble-free operation. There's direct access to all the source inputs and main adjustments without having to enter the menu system.

The on-screen menus themselves are easy to read and clearly laid out. The menu system is divided into sections, which keeps the amount of on-screen information down to a minimum while remaining quick to navigate.

However, advanced users may find the menus a little over-simplified. For example, settings such as 'normal', 'cool' and 'warm' make sense intuitively, but won't help you if you want to match a specific colour temperature, such as 6,500K.

We found 'normal' mode to be a little on the cool side, so don't be afraid to experiment with the settings to achieve the desired effect.

The PE7700 uses the same large 0.8in DMD chip found in Samsung's expensive SP-H710AE and a similar 250W lamp, yet it's rated at 1,100 lumens, compared with the Samsung's 700. Despite this, in our viewing tests, the PE7700 appeared only slightly brighter.

Benq uses its own proprietary image-processing technology, called Senseye, to improve the picture. Enhancements include brightness and black-level adjustment, colour mapping and smoothing out of jagged edges.

Despite these features, the Benq proved unable to match the sheer image quality of the SP-H710A, which is not surprising, given its significantly lower price tag. However, there's very little to find fault with in its output. It's only when placed side-by-side with the more expensive projector that the differences become really apparent.

## Verdict

**Pros** Price; image quality; three-year warranty

**Cons** No direct DVI or VGA connectors; 1,280x720 resolution

**Features**

**Performance**

**Value for money**

**Overall** An aggressively priced projector with plenty of power and good image quality.

Definitely more for home cinema use, although it will connect to PCs with the right adapters



# InFocus IN76

Price £1,499 Contact [www.infocus.com](http://www.infocus.com)



The radical design of the IN76 from InFocus is aimed squarely at home users who know that if your projector is going to be seen, it's going to have to look good – or at least interesting.

Devoid of straight edges, its polished back curves are eye-catching at first, but rather unobtrusive once you grow used to them.

The shiny black theme is continued with the remote control, which is illuminated internally with a deep blue glow. The switch to activate the light is located on the underside and easily found by your index finger in darkened rooms.

Unlike any other projector featured here, it has no supporting feet. Instead, it sits on a circular one-piece stand that tilts and swivels in much the same manner as the stands found on CRT monitors. While this lends a certain something to the product's appearance, it's not the easiest stand to adjust. To hold its position, it's necessarily quite stiff and can be tricky to set up accurately. There's also no way to correct left-to-right slants. If you're mounting the projector on your ceiling, these issues go away as the stand is removable.

Focus and zoom adjustments are made with the aid of a pair of concentric rings on the top of the projector. They provide accurate adjustment but are comparatively fiddly to use and can cause the projector to wobble on its base.

At 360x360mm, the IN76 is very deep. Only Samsung's huge SP-H710AE is deeper in this group. This means you'll have to allow for plenty of space to the rear if you're not planning on ceiling-mounting.

The IN76's on-screen menu system takes a bit of getting used to. It's very small and text-heavy – rather like the Windows Start menu – and not the easiest to

use from a distance. It's a bit of a let-down, considering how much thought has gone into the physical design of the product. However, it does simplify the remote control as no left or right cursor buttons are needed to navigate.

A great number of adjustments are available via the menus, but we found the IN76 gave just about the best picture as it was configured out of the box.

To the rear, a full selection of inputs is provided, but if you want to connect the IN76 to a PC you'll need to buy an M1-D or M1-A cable (for digital and analogue connections respectively), as the relatively uncommon M1-DA connector is used in place of the more familiar DVI and VGA ports.

The IN76 uses one of the smaller form-factor Darkchip 2 DMDs, similar to that found in Acer's PH730 except that the chip in the IN76 is a native 1,280x720 product rather than 1,280x768, which means you don't have the ability to switch to 1,024x768 without scaling the image.

It also uses a six-segment colour wheel, rather than the seven-segment version found in the Acer. Rated at only 1,000 lumens, we found it often wasn't as bright as the other projectors – even the Samsung SP-H710AE, which is rated at a lower 700 lumens.

While greyscales were very accurate and smooth and the projected image appeared without defect, the colours lacked punch and were rather under-saturated. It's still a very convincing, natural-looking image, but missing the 'wow' factor we found in some competitors.

A new model, the IN78, is now on sale, featuring a Darkchip 3 DLP system, but was not available in time for our review.

## Verdict

**Pros** Natural, accurate-looking images; design

**Cons** Swivel stand; no native 1,024x768; muted colours; noisy; expensive lamp

### Features

### Performance

### Value for money



**Overall** A stylish and competent projector, but newer DLP systems have better image quality



# Optoma HD73

Price £1,499 Contact [www.optoma.co.uk](http://www.optoma.co.uk)

Personal  
Computer  
World  
EDITOR'S CHOICE



**O**ptoma's HD73 is the newest projector in this round-up and the only one with Texas Instruments' latest DarkChip 3 processor.

Sharing the same ultra-compact case as its predecessor, the HD72 and the business-orientated EP1960, it's by far the smallest and lightest projector here but it makes no sacrifices in terms of quality. At only 347x246x95mm and weighing only 3.1kg, it's very easy to pick up and move around, making it ideal for table-top use. It's also finished in white which will help it to blend in should you opt for ceiling mounting.

Darkchip 3 provides better image contrast, brighter pictures and more detailed shadows than DarkChip 2. Because the chip has a greater fill factor, there's also less of a gap between individual pixels on screen, which makes for a smoother display.

A five-speed six-segment colour wheel helps to minimise the troublesome 'rainbow' effects that some people perceive from single-chip DLP projectors.

Like Acer's PH730, the HD73 uses a 1,280x768 pixel chip internally, so PC users and gamers can use the 1,024x768 pixel resolution without the need for the projector to scale the image to fit a 720-pixel high display. This enables you to run software that doesn't support widescreen resolutions without sacrificing any image quality.

If you run the HD73 at 1,280x720, you can shift the image up and down within the 768 lines of the chip without incurring any keystone distortion. This is equivalent to a small degree of lens shift and is helpful when it comes to lining up your screen accurately.

The on-screen menus are very clear and easy to use. Most are in plain English, though some use meaningless numerical settings, such as 0, 1 or 2 for colour

temperature. While you can see the effect of these settings, you're not told what the numbers mean.

Several image enhancement technologies are built in to boost image quality. 'ImageAI' changes the light output of the projector dynamically, depending on the brightness of projected content. Darker scenes can show deeper shadows and brighter scenes can show brighter highlights, increasing the maximum contrast ratio to a massive 6,000:1. Some viewers are able to see this process in action and are distracted by it, in which case it's easily turned off, reducing the contrast ratio to a still very impressive 4,000:1.

Thanks to TI's DDP3020 image processor, the HD73 has 'Brilliantcolor' technology, which uses enhanced colour processing to increase perceived brightness and expand the colour gamut.

Although it's rated at a higher 1,100 lumens, we found the HD73 to be significantly less bright than the Infocus IN76 when displaying a mainly white Windows desktop. When we switched to HD video content, however, there was a marked increase in image contrast, with superb colour saturation and a greater perceived brightness overall – even with the various image-enhancement options turned off.

The DDP3020 chip also provides the projects with other useful functions, such as horizontal and vertical digital keystone correction and digital zoom.

There's no VGA input, but both DVI and HDMI ports are provided, allowing two digital sources to be connected simultaneously. You can connect VGA sources to the projector using the supplied DVI-to-VGA adapter. Using this with the Scart adapter (also supplied) means you can use a standard VGA cable to connect domestic video equipment.

## Verdict

**Pros** Excellent image quality; compact size; three-year warranty

**Cons** Price; no VGA port

### Features

★★★★★

### Performance

★★★★★

### Value for money

★★★★★

**Overall** Despite being tiny, the HD73 delivers image quality that's a cut above anything else in its price range. Good for both HD video and PC applications and highly portable

★★★★★

# Samsung SP-H710AE

Price £2,700 Contact [www.samsung.co.uk](http://www.samsung.co.uk)



**D**espite specifications that might suggest otherwise, Samsung's SP-H710AE turned out to be an excellent projector that's capable of producing stunning results.

It's conservatively rated at only 700 lumens, but had no problems keeping up with the other projectors on test – often appearing brighter, due to its excellent contrast. Colours are rich, blacks are deep and whites are bright. Colour reproduction is spot-on without ever appearing over-done.

Along with Benq's PE7700, the Samsung uses the older HD2+ DLP system, which uses a physically larger DMD chip than those used by the others in this group test. By comparison, the HD2+ shows less 'screen door' effect than the smaller chips, giving you a smoother image on screen.

The SP-H710AE does indeed produce exceedingly smooth images that look as though they could have come from film. It has to be said that despite its older technology, out of the box the Samsung projector has deeper blacks and greater apparent contrast than the Optoma HD73, although the latter does have very impressive midtones.

Samsung's DNIE (Digital Natural Image Engine) claims to deliver natural hues, enhanced contrast and 'frightening sharpness'. We weren't frightened, but we can say that the other claims seem justified. The SP-H710AE easily outperforms the lower-priced projectors in terms of quality, despite using an older DLP processor.

One thing you'll notice as soon as you unpack it is the projector's bulk. It's considerably larger and heavier than any of the other projectors on test. At 9kg, it weighs over three times as much as the Optoma

HD73, so once you've set it up, you'll probably want to leave it exactly where it is.

The weight is due to its robust build quality. The design is at once modern and retro. Its dark silver body, although plastic, has a metallic look, with sweeping curves and large control buttons. Even the remote control is distinctive, with buttons that glow in soft peach and turquoise tones. With these looks, perhaps the £2,700 price tag should come as no great surprise.

Unique among the products on test is the integral lens shift function, which lets you adjust the picture up and down without causing any vertical keystone effects. If you're mounting on the ceiling, this may avoid having to lower the projector on a long hanging support. However, from a low coffee-table height, the upward shift is often less than the fixed vertical offset from most table-top projectors. This means that you can't place the Samsung in a very low position if your screen is relatively high up the wall. On the other hand, you can place it high up on a shelf and have it project the image below the horizontal, rather than mounting it permanently on the ceiling.

Because the HD2+ is a native 1,280x720 chip, you also lose out on the ability to shift the picture up and down digitally within the 768-line range of the Optoma and Acer projectors, so you're stuck with scaling the image if you want to drive the projector from a PC running at 1,024x768 pixels.

Although the rear of the projector has many connectors, notably absent is an HDMI socket. This leaves you with just a single digital connection via DVI, although VGA is provided, along with two component video inputs and the usual composite and S-video options.

## Verdict

**Pros** Superb image quality; design; lens shift

**Cons** No 1,024x768 support; price; size and weight

**Features** ★★★★★

**Performance** ★★★★★

**Value for money** ★★★★★

**Overall** None of the other projectors can touch the SP-H710AE for image quality, though the Optoma HD73 has a good try. It's big and expensive, but it's very, very good

# Lab results

Our tests showed that some projector models – particularly the Samsung SP-H710AE – appear to perform better than the official specifications suggest

## Perceived brightness



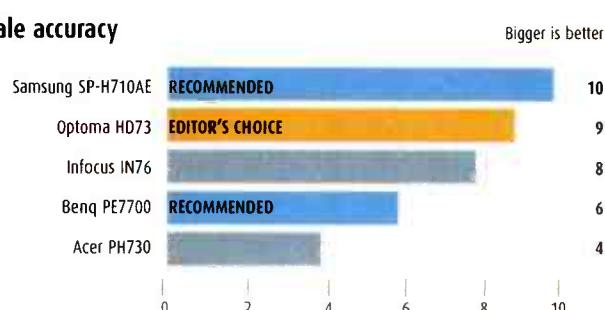
## Perceived contrast



## Colour



## Greyscale accuracy



In each test, the best result was awarded 10 points, the remaining then scored relative to this by our viewing panel

## How we tested

We evaluated the projectors by setting them up in a darkened room and using a Panoview pull-up screen from Optoma (pictured right).

We chose a PC as our video source, from which we played a variety of high-definition material. We also used Displaymate ([www.displaymate.com](http://www.displaymate.com)) to generate a selection of test patterns.

There are many measurements that can be made, such as screen brightness and contrast, but these are often of limited value because perceived brightness is due to a number of factors and often real-world images can look brighter on projectors with numerically lower brightness ratings as measured in lumens.

For example, a white screen or a Windows desktop displayed on the Infocus IN76 appears significantly brighter than the same image on the Optoma HD73. But when you play real video footage, the situation appears to be the reverse. Furthermore, image enhancing technologies such as Optoma's ImageAI can adjust the projector's parameters dynamically depending on the displayed content.

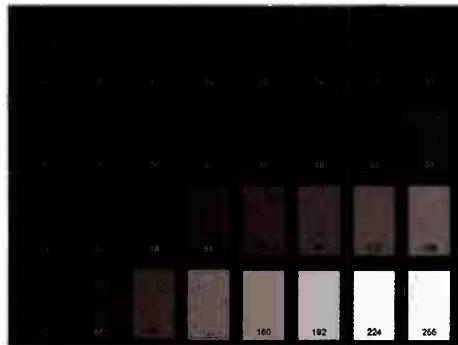
For this reason, we concentrated on a selection of high-definition scenes, chosen to reveal different strengths and weaknesses in the projectors. For each projector, our viewing panel recorded a score based on four parameters: brightness, contrast, colour reproduction and greyscale accuracy. We adjusted each projector to obtain the best picture we could in each case – often the default settings don't show off the projectors to the best of their ability.

To calculate the subjective rankings, we used a viewing panel of PCW editorial staff to judge the relative quality of the images. For each test, the best performing product was awarded a score of 10. The remaining products were then scored relative to this by our panel.



A selection of high-definition scenes was chosen to reveal different strengths and weaknesses in the projectors

Displaymate test patterns including this greyscale screen were used to test each model



HD-ready projectors					
		Personal Computer World RECOMMENDED		Personal Computer World EDITOR'S CHOICE	
MANUFACTURER	ACER	BENQ	INFOCUS	OPTOMA	SAMSUNG
Model	PH730	PE7700	IN76	HD73	SP-H710AE
Price inc Vat	£1,149	£1,126	£1,499	£1,499	£2,700
URL	www.acer.co.uk	www.benq.co.uk	www.infocus.com	www.optoma.co.uk	www.samsung.co.uk
Replacement lamp price	£279	£233.83	£349	£210	£199
Lamp life (hours)	2,000/4,000	2,000/3,000	3,000/3,000	2,000/3,000	2,000
Lamp type	230W	250W	200/160W	220 VIP	250W UHP
Power consumption (W)	285	320	300	285	350
Dimensions (wxhxd) in mm	350x282x119	380x300x115	360x360x120	347x246x95	384x425x177
Weight (kg)	3.5	5.5	4.2	3.1	9
SUPPLIED ACCESSORIES					
Printed manual	x	✓	Quick Start	✓	✓
Manual on CD	✓	x	✓	x	x
Remote control	✓ (with mouse control)	✓	✓	✓	✓
PROJECTION					
Projection technology	DLP	DLP	DLP	DLP	DLP
DLP chip type	Darkchip2	HD2+	Darkchip2	Darkchip3	HD2+
DLP chip size (in)	0.65	0.8	0.65	0.64	0.8
Colour wheel type	4x, 7 segments	5x, 6 segments	4x, 6 segments	5x, 6 segments	5x, 6 segments
Native screen resolution	1,280x768	1,280x720	1,280x720	1,280x768	1,280x720
Brightness (Ansi lumens)	1,200/900	1,100	1,000/800	1,100/800	700/500
Contrast ratio	2,500:1	2,500:1	3,000:1	6,000:1	2,500:1/2,800:1
Projection range (min/max) in m	1.2-10.38	1.08-11.91	1.5-6.1	1.5-12.2	1-3.6
Screen size (min/max) in m	0.74-7.62	0.94-7.62	0.88-4.57	0.92-7.62	0.77-7.62
Keystone adjustment (horizontal/vertical)	✓/✓	x/✓	x/✓	✓/✓	x/✓
Lens shift	x	x	x	x	✓
Audio noise standard/quiet mode (dB)	28/26	29/26	<32	29/27	28/28
Image processor	TI DDP3020	Benq Senseye	Pixelworks DNX	Faroudja DCDi/ TI DDP3020	Faroudja DCDi
Iris adjustment	x	x	x	Light intensity adjust	✓
CONNECTIVITY					
DVI	✓	x	M1-D	✓	✓
HDMI	✓	✓	✓	✓	x
VGA	✓	(Via BNC)	M1-A	x	✓
YPbPr	✓	✓	✓	✓	✓ x 2
Composite video	✓	✓	✓	✓	✓
S-video	✓	✓	✓	✓	✓
Other	VGA through, USB	BNC	USB, screen drop trigger	Screen trigger	N/A
RS-232	✓	✓	✓	✓	✓
Audio input	✓	x	x	x	x
SUPPORTED INPUT FORMATS					
480p	✓	✓	✓	✓	✓
480i	✓	✓	✓	✓	✓
576p	✓	✓	✓	✓	✓
576i	✓	✓	✓	✓	✓
720p	✓	✓	✓	✓	✓
1080i	✓	✓	✓	✓	✓
1080p	x	x	✓	✓	x
MISCELLANEOUS					
HD ready	✓	✓	✓	✓	✓
HDCP	✓	✓	✓	✓	✓
Picture-in-picture/picture-on-picture	x/x	✓/✓	x/x	x	x/x
Warranty	Two years	Three years	Two years	Three years	Two years
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

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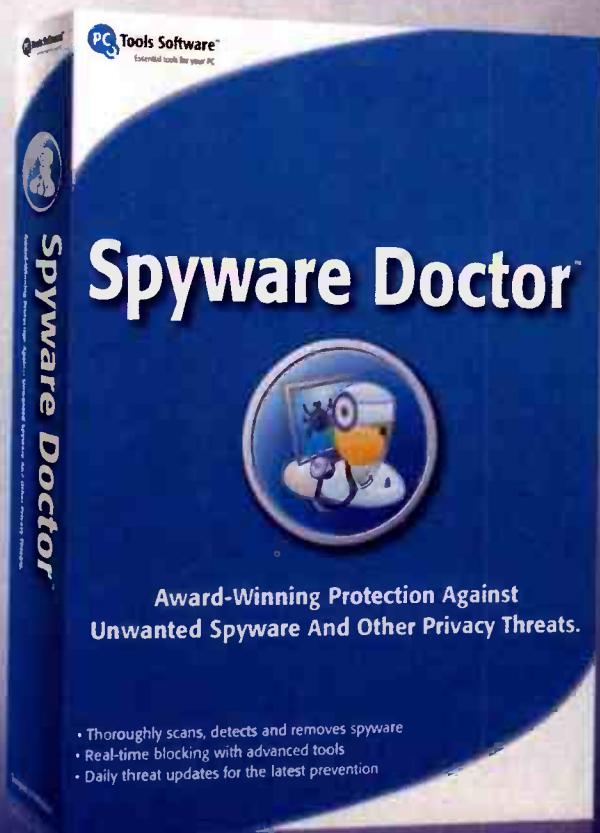
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*The Sunday Times, 3<sup>rd</sup> September 2006*

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# Choose the right screen for your projector

The cheapest and simplest form of screen is your wall. If you have a large, bare wall that's close to white and not too glossy, you'll probably find it's a more-than-adequate substitute for a screen – especially if you cover it with a coat of specially designed 'screen paint'. It'll also save you a lot of money.

Projector screens range in price from £150 to £3,000 and a huge variety of different types is available. If you plan to move your projector around, a portable screen is a good idea. Pull-up screens are very popular because they can provide large screen sizes in small boxes and are easy for one person to set up – you just place the rolled up screen on the floor, pull the material up and lock it into place. Tripod screens are similar but hang down from a tripod and pack away less neatly, while table-top screens either pull up or pull outwards horizontally to stand on a pair of feet built into the case.

If you're planning a fixed installation, roll-up screens can be fitted on the ceiling or the wall. They can also be motorised, and if your projector supports it, they can be triggered to lower automatically when the projector is turned on.

For the best quality, however, a fixed picture-frame type screen will give you the flattest surface, although it can't be easily moved, so some come with 'pictures' that roll out in front of the screen when not in use.



Hardly a typical home setup, but a good screen is worth spending money on

A large part of the cost of a fixed screen is for installation – expect to pay many times the cost of your projector for a full home setup.

The purpose of the screen is not only to provide a large, flat, unobstructed surface, but also to improve the image quality of your projector. High-tech screen materials are designed to cut out ambient light and ensure that only the light originating from the projector is reflected back from the screen. You can pay upwards of £1,000 for a small screen using technology such as this –

or you can close your curtains, turn off the lights and paint your other walls black.

## Supplier links

AVS (0870 224 2246, [www.avskltd.co.uk](http://www.avskltd.co.uk)). Fixed-frame screens from 42in (£1,006) to 100in (£3,012)

Optoma: [www.audio-t.co.uk](http://www.audio-t.co.uk) (01865 765 961)

[www.projectors.co.uk](http://www.projectors.co.uk) Tripod models from £65, portable models from £115, fixed frame from £800

Projecta screen selector wizard <http://tinyurl.com/yqvfgn>

## Editor's Choice

**Editor's Choice** Optoma HD73  
**Recommended** BenQ PE7700 • Samsung SP-H710AE



Optoma HD73



Benq PE7700



Samsung SP-H710AE

Picking our Editor's Choice from this selection of projectors is not easy. All five are single-chip DLP models with a native resolution of at least 1,280x720 pixels, but outside these constraints there are huge differences in features, performance and price. To a large extent, you get what you pay for.

Samsung's SP-H710AE is a clear winner on quality, has outstanding build quality and is unique in offering lens shift. But it has no HDMI, it's physically huge and it costs more than twice as much as the least expensive models.

Acer's PH730 is an excellent crossover product that combines business and home theatre functions. It supports native 720p and 1,024x768 resolutions and has a remote control with PC mouse functionality. It's also very

aggressively priced. On the other hand, there are projectors with much better image quality. If you do want to watch high-definition video and present Powerpoint slides to the board, then this is the projector for you.

InFocus' IN76 is an excellent projector and sits right in the middle of the price range. It also has a unique home-friendly design. But its Darkchip 2 image processor has since been ousted by the Darkchip 3 found in Optoma's H73. InFocus now has a Darkchip 3 model, the IN78, but this was unavailable for review.

Our first Recommended award goes to the BenQ PE7700. It uses older technology but produces very good image quality, has a pleasing, if conventional, design and is very easy to use. It's also the least expensive model in the

group, costing about the same as Acer's PH730 but with features more suited to home cinema.

For image quality alone, Samsung's SP-H710AE is also Recommended. It is expensive, but if you demand the best-looking home cinema and superb design and build quality, this justifies the extra cost.

For its all-round balance of performance, features and price, our Editor's Choice award goes to the Optoma HD73. Its Darkchip 3 and image processing technologies lift it above all but the Samsung SP-H710A. It too has a 1,280x768 native resolution, which allows 720p at 16:9 and 1,024x768 at 4:3 with no image scaling. Its compact size makes it the most portable choice and its relatively small price makes it excellent value for money. **PCW**

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## SMALL BUSINESS NEEDS

Want to share files or host your own web, email or database server? In this month's business section we look at the options available when it comes to small-business servers. We ask whether a server is really needed to perform such tasks, where to locate it, what kind of hardware and software to consider and how much to pay.

In the reviews section there is a small-business IP telephony solution, designed to run on an ordinary Windows PC, and a compatible Linksys IP phone. We also check out a network monitoring tool that can be used to find out just how much bandwidth applications such as VoIP (Voice over IP) really consume.

Alongside those we take an unusual property management package out for a spin, plus a scanner designed to help with those piles of business cards we all tend to collect. And if you're concerned about security, we've an affordable smartcard product that takes over where Windows' passwords leave off.

## CONTENTS

### FEATURE

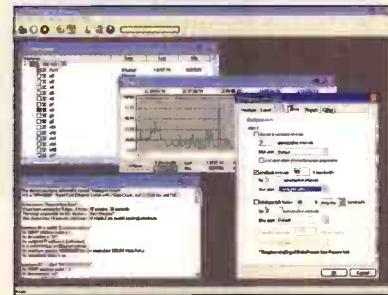
**130** When starting out in business, it is hard to know what technology you will need. Choosing a server is a good place to start

### 138 Vasco Digipass Smart Pack

**139** Harrissoft Properite  
**140** Neon Software Cybergauge  
**141** CardScan Executive

### REVIEWS

**134** Swyx Swyxware Compact  
**136** Linksys SPA942



## OUR SCORING

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

## OUR AWARDS

**Editor's Choice:** The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.

**Recommended:** A product that combines great features, usability and value for money.

**Great Value:** Not the best in class, but a product that has superior features and performance for the price.



Editor's Choice  
Business



Recommended  
Business



Great Value  
Business

The business awards are used for products that are more suited to home offices or small businesses.

'For a 20-user network, a budget of about £1,000 should get you a reasonable server from a top-name supplier'

Read the feature on page 130

# What's in a server?

*A practical guide to small-business servers. Alan Stevens guides you through the options*

**H**ere's a common scenario. You're starting out in business or looking to expand, and realise that a handful of standalone PCs and the odd notebook aren't going to get you far. You've tried networking them together, but sharing documents and other files isn't as easy as you thought. You'd also like to be able to exchange emails, contact lists, diaries and other information – and you don't know how to go about it. You think you need a server, but know little or nothing about what's involved.

So, what are the options, how much will a server cost, and how do you make sure you get value for money?

## File sharing

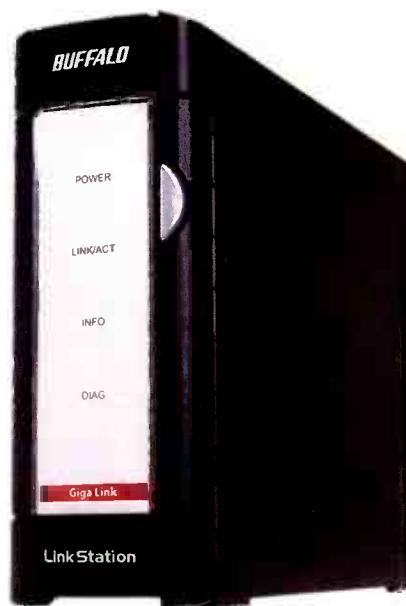
Servers come in all shapes and sizes, costing anything from about £300 up to hundreds of thousands of pounds. However, you don't have to spend a great deal. Indeed, if file sharing is your main requirement, you don't really need a full server running Windows or Linux. A Nas (network-attached storage) appliance is probably all you will need.

Nas appliances are servers dedicated to the task of network file sharing. They may be based on industry-standard server hardware but that's not always the case. They may also run Windows or a Linux OS but, again, you don't need to know that, because most are configured and managed using a browser.

In fact, the only things you really need to know are whether or not they have the capacity you require, the ability to handle the number of users you want to support, and what kind of upgrade, reliability and backup options are available.

For example, where only a handful of users are involved, something as small as the Buffalo Linkstation Pro could be all that's needed (see our review at [www.pcw.co.uk/2163167](http://www.pcw.co.uk/2163167)). Offering up to 750MB of shared disk space and starting at about £150 ex Vat, a small Nas appliance, such as the Linkstation Pro, can provide enough space for five to 10 people. Moreover, it needs hardly any management. All you have to do is plug it into the network and map some local drives to it (see box 'drive mappings' on page 132).

On the downside, entry-level Nas appliances will have only one disk and no



A cheap Nas appliance may be all that's needed to share files on a small network

additional redundancy or availability features (see box, 'Storage options' on page 132), nor can they be upgraded if you run out of space. However, there are plenty of other more capable and expandable products to choose from that do offer such features. Buffalo and other companies such as Iomega, Dell, HP, and IBM all sell Nas appliances to suit a wide range of requirements.

In terms of price, about £50 per user is a good measure. For a 20-user network, therefore, a budget of about £1,000 should get you a reasonable product with extra redundancy built in, from a top-name supplier.

## A 'proper' server

Another major drawback to a Nas appliance is that most can only be used to provide shared network storage. If you want to be able to run other applications, such as your own web, email or database server, for example, then a general-purpose server running Windows or Linux will be needed, and that can involve lots of decisions to make sure it's right for you.

The golden rule is to 'buy the best you can afford'. That means fixing a budget to include both hardware and software and choosing one of the big brand names, such as Dell, Fujitsu-Siemens, HP, IBM, or NEC. That way you make sure you have the best technology, together with good backup and support services. It also means opting for a server specification that will suit your current requirements and allow for further expansion and changes.

Unfortunately, sizing a server is something of a fine art and you may want to seek expert help before parting with any cash. However, we have listed below the key features to look for, together with a number of general recommendations that are applicable to small-business buyers.

## Processor

Dual-core processors are worth buying, even for basic file-server duties, although on a small network very little processing work is involved. If you want to run server-based email, web or database servers, look for multiprocessor servers and choose SMP for virtualisation.

## Memory

Choose Error Checking and Correction (ECC) memory for reliability. At least 1GB will be required, even for basic file and print



Buy the best server you can afford from a brand-name vendor who can provide good backup and technical support

sharing, with more needed to handle additional applications – check what the software vendors recommend and then double their suggestions.

### Storage

Size the disk storage carefully. You'll need enough space for the operating system and any applications you want to run, plus all your shared data.

If possible, go for storage that can be easily expanded should your requirements increase. Hot-swapping of disks isn't something most small businesses require.

Consider multiple disks, or mirrored and Raid-protected storage arrays for additional reliability.

### Network

Choose at least a Gigabit Ethernet interface and connect the server to a Gigabit Ethernet switch. For additional load-balancing and high availability, specify multiple network interfaces.

### Other features

Multiple power supplies and a UPS (uninterruptible power supply) are worth having. Remote management could be helpful, although on a small-business server it's not a crucial option.

Pay close attention to the software you will run on the server. Windows is a popular choice and we'll be reviewing the latest Windows Small Business Server product in next month's Business section. However, it's not the only option, and there are a number of good Linux distributions now available that are equally suited to the small-business

## 'Expect to pay more for a general-purpose server than a network appliance'

market (see screen 1).

Expect to pay a lot more for a general purpose server than a network appliance – about £75-£100 per user if you want to run Windows, as the software can be expensive, or slightly less if you opt for Linux. The same also applies when it comes to applications. Although bundled solutions – where applications are included with the operating system – often appear to offer the best value, you may not get the full package. Brand leaders usually become popular because their products are 'best of breed' and worth paying extra for.

### Virtual servers

Instead of completely separate physical servers, you might want to consider virtualisation, where several virtual servers can be hosted on the same hardware

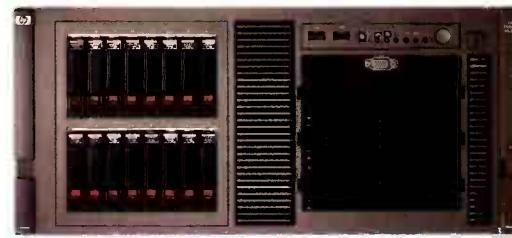
## Tower, rack or blade: which should you choose?

Servers come in three general formats – towers, rackmount servers and blades.

Tower servers are where the bulk of the electronics – the motherboard, processors, memory, hard disks and so on – are in a cabinet designed to sit on the floor alongside or underneath a desk. Designed to appeal to the small business, there's usually plenty of space to add more Ram, storage, and extras such as backup tape drives. However, towers are bulky



Servers can be configured as free-standing towers or for rack-mount deployment



so, if you have more than one, space becomes an issue, as do power and cooling requirements.

As the name implies, rackmount servers are designed to slot into industry standard 19in equipment racks. They're a good choice where space is at a premium and you have a large number of servers. However, they offer limited expansion and the extra cost of the rack can be significant if you only have one or two servers.

Blade servers are mostly bought by large companies and service providers looking for the maximum density of servers in their rack. Each server comes as a single board designed to plug into a custom rackmounted chassis. Server blades can be swapped very quickly but, like rackmount servers, expansion is limited.

platform, each with its own operating system and applications (see screen 2). No special hardware is required and the software involved is available free of charge.

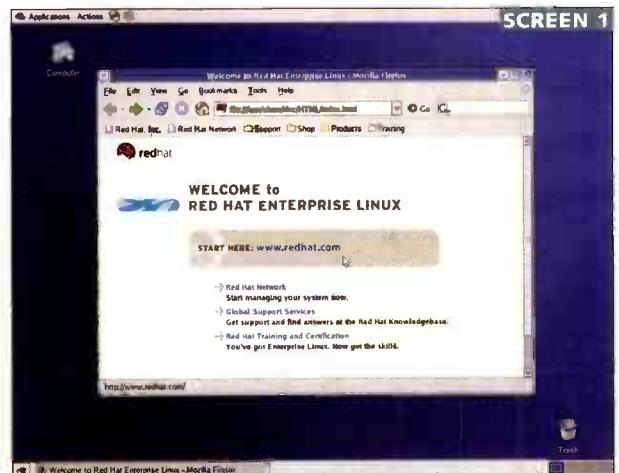
The two most popular products are VMWare Server and Microsoft's Virtual Server 2005. Both are designed for use by small to medium-sized businesses and can be run on industry-standard hardware.

You'll then need a host operating system which, in the case of VMWare Server, can be Windows or Linux, while, as you might expect, Virtual Server 2005 will only run on Windows. Either way, after the software is installed, it runs like any other application and lets you configure multiple virtual machines (VMs).

As far as the VMs are concerned, each has access to a processor (there's support for two-way SMP with VMWare Server), plus memory, disk space, network connections and everything else you would

expect to find on a 'real' system. Each VM can also run a guest operating system and applications, with both products able to run more or less any implementation of Windows (desktop or server), plus Linux and, in the case of VMWare, some versions of Unix too.

The virtualisation software shares the real physical resources between the various virtual machines, so the hardware involved needs to be well specified. However, that's not difficult and a virtual server can be copied and brought online in a matter of minutes rather than days or weeks. Making backups also becomes a lot easier with



As well as Windows, consider using Linux and open-source applications on your small-business server

# Storage options

Server buyers are faced with a bewildering range of options, especially when it comes to storage, and not just in terms of capacity and performance, but resiliency, too – an important consideration on a server where the storage will be shared by lots of people. Here's a quick beginner's guide to some of the options and jargon.

## Serial ATA (Sata)

Serial ATA is a recently developed technology for connecting hard disks to a desktop PC or server that's both fast and affordable. On most small-business servers, Sata storage is cheaper yet just as good as the more traditional SCSI alternative.

SCSI (pronounced scuzzi) is faster and more robust than the ATA storage technology traditionally used on desktops. It can be expensive and is being rapidly replaced by Sata on small-business servers. SCSI is a good choice where large amounts of storage are concerned. Look out for Serial Attached SCSI (Sas) based on Sata hardware.

## Disk mirroring

Data is stored on two disks simultaneously so that a backup copy is instantly available in the event of a failure. Disk mirroring can be achieved in software and so provides a high level of affordable data redundancy, regardless of disk technology.

## Disk array

Data is 'striped' across multiple disks in an 'array' to improve performance and redundancy, often with additional error checking and correction (ECC) information to provide on-the-fly access to lost data. It can be expensive, especially if you want to hot-swap disks, which requires a dedicated controller.

## Storage-area network (San)

An arrangement where storage is remote from the servers that use it, connected via a dedicated storage network. It's mostly used by larger companies with multiple servers. Ethernet-based iSCSI San technology is starting to be used by small businesses.



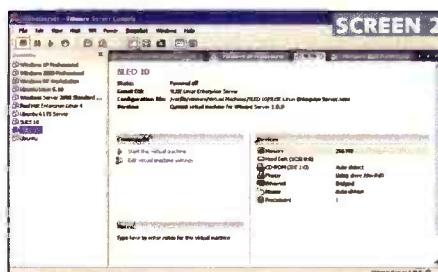
The best way to share printers is via dedicated print-server devices, either standalone or (as pictured here) fitted inside the printer

These printers don't cost much either. Most vendors have models with network interfaces built in (an 'n' in the model number is a common giveaway) adding, on average, about £30-£50 ex Vat to the price. For £50-£100 you can also buy external print-server appliances – some of which are designed to work with just one printer, others with several printers on a mix of networks.

## Don't forget backup

Lastly, don't forget to make arrangements to back up data held on your server and to ensure that you can recover the whole server should a serious fault arise.

Most server vendors will fit backup hardware and install suitable software to do this, if you order it with a new server. Otherwise it's up to you to make the arrangements, and we'll be looking more closely at such options soon, in a future business section article. **PCW**



Make the most of your hardware by using multiple virtual servers running different operating systems on the same platform

virtualisation, and several servers can be consolidated onto one, more modern hardware platform, without having to upgrade the software involved.

Note, however, that any software you run on a virtual server must still be licensed, and you should check with the vendor involved as to its terms for such uses.

## Sharing printers

Here's another networking secret – you don't need a server to share printers. Of course, you can do it that way and it does have benefits. Windows, for example, can install drivers on demand when users first access a server-shared printer. However, there are lots of good reasons you shouldn't.

To start with, sharing via a server limits where printers can be positioned (they have

to be fairly close to the server). And if the server breaks down, no-one will be able to print anything.

It's far better to buy printers with built-in network print servers or custom print-server devices. Both enable printers to be connected directly to the network almost anywhere. They also enable printers to be shared on a mix of Windows, Unix/Linux, Netware and Apple networks, with configuration and management all done from a browser.

## Drive mappings

Put a file server or network-attached storage appliance on your Lan, and Windows Explorer will enable network users to browse the shared files. However, browsing is not the most efficient way to access such data. It's far better to use mapped drives so that drive H:, for example, gives direct access to your private home folder and drive N: to a common folder that anyone can use to share information. The mappings themselves are down to you, but the procedures are the same regardless of what letters are involved.

Where only a handful of users are involved, you can either use the 'Add a network place' wizard or right-click My Computer and choose Map Network Drive from the mouse menu. Either way,



Mapped drives are easy to configure and make it easier for users to connect to shared files

you can then browse to the share, choose the drive letter to be assigned and whether or not to reconnect the share every time the user logs on, so that it's always available.

For larger numbers of users, individual setup at the desktop may not be practical. In this case, using the Windows 'net use' command at a command prompt to configure drive mappings, and login scripts can automate the process. Group policy can also be used to configure common mappings on all network PCs.

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## VOIP PBX SOFTWARE

# Swyx Swyxware Compact

Everything you need to build an IP PBX on a Windows PC



Phones aren't included in the price but you can use any Sip or H.323 product

A Microsoft management Console (MMC) plug-in is used to manage the Swyxware server



**S**wyxware is software that lets you build an IP PBX (private branch exchange) using an industry-standard PC running Microsoft Windows. A highly scalable and modular solution, we tried the new Swyxware Compact implementation – an all-in-one package, designed to give small businesses everything they need to use their own PBX.

As it's limited to 10 users, you don't need a server operating system for Swyxware Compact. Windows XP Professional is fine, although you can use the Windows 2000 and 2003 server editions if preferred. You may also want to install one or more ISDN cards (BRI or PRI) to make and receive calls over the public switched telephone network (PSTN). However, they're not absolutely necessary as the software supports the use of Sip-based (Session Initiation Protocol) services to connect to the outside world.

Installation was straightforward. The Microsoft .Net Framework 2.0 needs to be in place as does an SQL Server database, but both are included with a unified setup program to get everything loaded.

Administration is achieved using a local or remote plug-in for the Microsoft Management Console (MMC), which has lots of wizards to help with the configuration of users, line setup, calling restrictions, phone preferences and so on. However, there's quite a lot that needs to be done and a fair amount of telecoms knowledge is assumed – something not usually found in most small businesses. We would strongly recommend specialist installation via a Swyx partner, who could also advise on client handsets.

Phones aren't included but you can buy a range of Swyx-branded IP handsets, USB phones, headsets and Dect phones for use with the package. Alternatively,

it's possible to use Swyxware with any Sip-compatible or H.323 device, including softphones running on PCs. Two external lines are supported out of the box with up to 10 possible through a licence upgrade. There's shared fax support too and basic conferencing for up to six participants per conference. Although limited to 10 extensions, Swyxware Compact offers most of the major call-handling features of the full package.

Users can put calls on hold, play hold music, transfer calls to other numbers, forward calls automatically and so on. Global and personal phone books can be configured, hunt groups set up, plus you get extensive call-logging features.

Voicemail is another standard option. An SMTP mail server is required for this to work, but it doesn't have to be Exchange or a highly specified system. Users can record their own outgoing messages with voicemails either sent as email attachments or accessed via a handset. Those using the SwyxSoft Softphone can also record conversations – useful for training and to help resolve disputes.

A CTI (computer telephony integration) module provides software integration with, for example, facilities to dial numbers directly from an Outlook contacts folder. Finally, through the use of a graphical extended call-routing tool, it's possible to implement automated call-handling routines – "Press one for sales" and so on.

We found it to be a comprehensive and flexible solution which, unlike a lot of alternatives, doesn't require dedicated hardware. It works well and is easy to manage once everything is configured.

On the downside it's expensive, particularly compared with open-source alternatives, and where you have fewer than 10 users.

Alan Stevens

## Details

**Price** £1,521.63 (£1,295 ex Vat)  
**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Swyx 0118 945 0418  
[www.swyx.com](http://www.swyx.com)

## System requirements

Pentium III PC or faster running Windows XP Professional (Windows 2000/2003 Server editions can also be used) • 512MB Ram, 65MB disk space • SQL Server for user data • SMTP mail server for voicemail features • Supported ISDN BRI/PRI adapters for direct PSTN gateway (analogue and Sip trunks supported)

## Verdict

**Pros** Runs on Windows XP; can be used with SIP or H.323 handsets and softphones; voicemail and call recording; support for analogue, ISDN and Sip trunks

**Cons** Good amount of telecoms expertise required to configure; handsets extra; high buy-in price if less than 10 users

**Features** ★★★★★

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** A comprehensive software-based PBX solution, but the small-business marketplace is crowded with open-source and custom hardware alternatives

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## VOIP TELEPHONE

# Linksys SPA942

Business-quality handset for Sip-based IP telephony



The Linksys SPA942 isn't difficult to configure but the complex web interface makes it look harder than it is

**O**riginally from Sipura – the VoIP specialist acquired by Linksys' parent Cisco in 2005 – the SPA942 is a Sip-based (Session Initiation Protocol) IP phone that can be used with an in-house exchange and/or public Sip services. Aimed at the business user, it can support up to four lines and features an extensive list of call-handling options.

Unlike cheaper IP handsets we've seen, the SPA942 is a solid and professional-looking piece of kit with a positive key action and built-in speakerphone. It can be used flat on a desk, propped upright using the stand provided, or wall-mounted. A user-programmable backlit display is also built in with four associated softkeys and directional menu button. Plus there's a headphone socket, voicemail indicator and dedicated message retrieval and call-hold buttons.

A two-port Ethernet switch is built into the hardware. One is marked Wan and is used to attach the phone to the network. The other enables a desktop PC to share the same connection, helping to reduce the amount of cabling required. Support for 802.3af Power over Ethernet (PoE) comes as standard, with a separate AC adapter as an option where PoE isn't available.

Installation was straightforward, although somewhat complicated by the number of programming options available. Unless otherwise configured, the phone gets its IP address using DHCP, after which you enter the required Sip line connection settings via a remote web browser. Up to two independent Sip connections can be programmed with support for two more via a licence upgrade.

Users can then set up their own personal directory (up to 100 entries) and speed dials. They

can also choose customised ringtones, with distinctive ringing based on calls made and received as a standard feature.

Other options are dependent on the PBX or gateway service involved, but the firmware supports an impressive range of business telephony features. Everything from putting calls on hold with selective or automatic forwarding, through to call pickup, music on hold and intercom facilities. A call-timer is built in, along with basic call-logging features.

We tested the phone using first a Windows-based PBX (Swyx – see review on page 134) then a couple of public Sip services (Free World Dialup and Sipgate). All were very simple to configure, requiring just a username, password and the URL of the Sip gateway.

We did, however, experience a few problems with a Nat-protected internet connection and dynamic addressing. However, these are common to all Sip-based services and we discovered plenty of online help, much of it specific to the Linksys hardware. The only real issue was the initially baffling array of options, few of which need any form of tweaking to get the phone to work.

Call quality will, of course vary depending on the service and network infrastructure. However, with a good choice of codecs available (the firmware that does the digital voice encoding/decoding), we achieved results on a par with a conventional business phone, and overall we were very impressed with the Linksys package.

Another plus is the ability to securely configure the phone remotely, enabling service providers and resellers to set up and upgrade the phone to work with their services in advance.

Alan Stevens

## Details

**Price** £109.28 (£93 ex Vat)

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Linksys 0800 068 0327 [www.linksys.com](http://www.linksys.com)

**Specifications** Sip-compatible IP phone • Integrated 2-port Ethernet switch • 802.3af PoE support • 12-button dialling pad • 128x64 monochrome LCD display • Four softkeys and menu navigation button • Up to four call appearances (lines 3 and 4 require licence upgrade) • Speakerphone • Headset jack • Encrypted remote setup and firmware upgrades

## Verdict

**Pros** Multi-line; dual Ethernet ports; PoE; Sip compatibility; extensive range of call-handling features; secure remote setup

**Cons** Complex web-based configuration interface

**Features**



**Performance**



**Value for money**



**Overall** An affordable yet top-quality business IP phone that can be used with a variety of in-house or hosted Sip services





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## PASSWORD SECURITY

# Vasco Digipass Smart Pack

Get smart with your passwords



Top: A USB attached reader is used to access the Windows logon and other credentials held on a smartcard

Left: A Windows console is used to manage the information held on the smartcards, with optional remote management if required

**P**asswords can be a real pain to manage. If short, they're easy to remember but, similarly, easy to crack. Too long or complicated and they're promptly forgotten, and support staff can end up spending valuable time resetting them. Another problem can be the number of passwords you have to remember – one to log on to your PC, another to get onto the intranet, another for email access and so on.

Digipass Smart Pack neatly resolves this dilemma. All your passwords are stored in one place – on a secure smartcard – which, together with a Pin, can be used to gain access to everything – your desktop, the Lan, applications, websites – the works.

There are three parts to the Smart Pack: a smartcard reader, the smartcards designed to go with it and client software, which can be installed on any PC running Windows 2000 or XP Professional.

The card reader gets installed first, by plugging into a free USB port. If the PC is running XP then suitable drivers will be loaded automatically, otherwise it's just a matter of directing the new hardware wizard to search for them. The next step is to install the client software by running the setup program provided, and then rebooting.

At this point you can still log on to the PC in the usual way, although you'll notice that the logon screen has been replaced with one from Vasco. Log on normally, and it's possible to start using the smartcard, simply by placing it into the reader and specifying the Pin you want to use – the Pin plus the card provides secure, two-factor authentication of your identity.

However, Windows knows nothing about Pin codes and smartcards. It still wants you to log on using a

username and password, so the next step is to store those credentials in the smartcard chip using the management console provided. It's also possible to force Windows to log on only with a smartcard if you want and lock the PC or log off whenever the card is removed from the reader.

Next time you log on, all you need to do is insert the card and type your Pin – the Vasco software does the rest. A couple of applets running in the taskbar will also learn how you log on to other applications and websites and store that information on the card. So, as long as your card is in the reader, you won't have to remember any passwords and each one can be as long or as complicated as you like.

Terminal server logons can also be stored on the card and the reader used with thin-client terminals running XP Embedded. Digital certificates can be stored and used too, either to authenticate yourself or encrypt and digitally sign emails and other documents. Note, however, that you can't use stored certificates for both purposes and the setup and management required is a lot more involved if you want to take advantage of these options.

Ordinary password management, by contrast, is remarkably straightforward, even resetting PIN codes when users forget them. Remote management of the smartcards is yet another option on larger networks, and if you're at all concerned about security or just want to reduce the time spent resetting user passwords, the Digipass Smart Pack is a tidy and relatively painless way to solve the problem.

Alan Stevens

## Details

**Price** From £117.50 (£100 ex Vat) for an evaluation kit (software plus two smartcards and card readers)

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Vasco 01296 482 661  
[www.vasco.com](http://www.vasco.com)

**Specifications** PC with free USB port • 128MB Ram • 40MB disk space • 300MHz processor or greater • Windows 2000 (SP4 required), Windows XP Professional SP2, Windows Server 2003 or thin client running Windows XP Embedded

## Verdict

**Pros** Secure two-factor authentication; automatic learning of application and web logons; thin-client support; option to lock PC when card is removed; optional remote management of smartcard data

**Cons** Windows only; web logon only works with Internet Explorer

**Features** ★★★★★  
**Performance** ★★★★★  
**Value for money** ★★★★★

**Overall** A relatively easy way to replace worn out Windows and web passwords with secure two-factor sign-on

★★★★★

## PROPERTY MANAGEMENT SOFTWARE

# Harrissoft Properite

A place for buy-to-let landlords to manage their property



Properite provides specialised tools to manage rental properties, tenants and rental income

**A**imed at the burgeoning buy-to-let housing market, Properite is a specialised application designed to equip landlords with all the tools they might need to manage their properties, tenants and rental income.

The software is a standalone Windows application, written for Windows XP (Home or Pro), with Microsoft Word required to create, edit and print things such as tenancy agreements, welcome packs and other documents included in the package. You'll also need the Microsoft .Net Framework V1.0, a copy of which comes with the program and can be either downloaded or supplied on CD-Rom.

Installation takes just a couple of minutes, after which a wizard guides you through the setup of your first property. Basic information is asked for at this point, such as the address, purchase date and price of the property, plus the number of rooms and the landlord's name and phone number. There are no limits on the number of properties that can be configured, and each is stored in a separate folder, along with any other documents associated with it.

Other details can then be added. For example, you can record gas and electricity meter readings, dates when smoke detectors have been tested or are due for testing, and key-holder lists for burglar alarm systems. You can also compile inventories – especially useful with furnished property – log valuations and create rental adverts with photographs.

Another wizard helps you to capture information relating to tenants, such as referee and guarantor details, previous addresses, deposits taken and so on. A separate tool is used to manage tenants' details, from which you can create and print screening

checklists, tenancy agreements, receipts and other documents. However, the templates are quite general and include spelling and other errors. It's also worth getting any legal agreements checked out by a solicitor before they're used for real.

In the Premium Edition, you get a cashbook to record both rental income and outgoings, with facilities to calculate income and capital gains tax liabilities. There are no direct links to popular accounting packages but information can be exported in .csv format.

The ability to keep a detailed history of events relating to each property is another option, along with a graphing tool that can be used to see how each property is performing and to investigate what might happen if rents or interest rates were to change. For some reason, however, the developers have opted for fancy 3D graphs that, while showcasing their programming skills, do little to make the information easy to understand.

There's also a memo pad and an Outlook-style diary, which works well. However, we didn't find the interface that intuitive. A workspace metaphor is used to start with, but this does little more than act as a portal for the other tools and seemed a little redundant. We also found the way the windows resized and moved about a little quirky at times and would have liked more integration with other applications.

If you're a landlord or a property agent, you may find Properite useful because it organises all your property information. However, that apart, we found it far from a complete solution, with a lot lacking on the financial and legal side. It was also a little rough around the edges and didn't provide much more than standard office productivity tools.

Alan Stevens

## Details

**Price** £99 (£84.25 ex Vat)

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** Harrissoft 07712 589 794  
[www.properite.co.uk](http://www.properite.co.uk)

**System requirements** 1.7GHz processor or above • 128MB Ram • 25MB free disk space • Windows XP (Home or Pro edition) with Service Pack 2 • Microsoft .Net Framework V1.0 (included with application) • Microsoft Word required to generate and view documents

## Verdict

**Pros** Written specifically for the UK buy-to-let market; can calculate tax and capital gains liabilities; graphing of property performance

**Cons** Lack of integration with accounting and other applications; user interface may not be to everyone's taste

### Features



### Ease of use



### Value for money



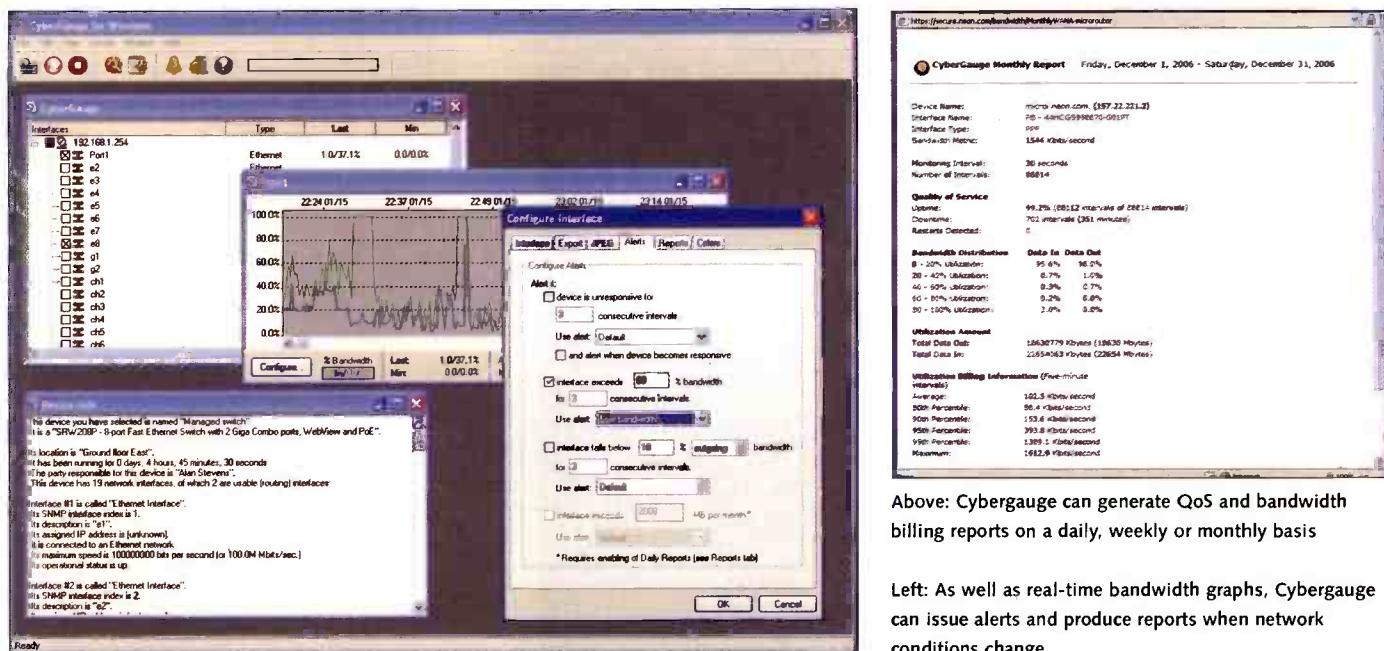
**Overall** Helps to consolidate property information in one place, but could do with additional development and functionality



## BANDWIDTH MONITORING

# Neon Software Cybergauge 7.0

Find out how much bandwidth you're using – the easy way



Above: Cybergauge can generate QoS and bandwidth billing reports on a daily, weekly or monthly basis

Left: As well as real-time bandwidth graphs, Cybergauge can issue alerts and produce reports when network conditions change

**C**ybergauge is a deceptively simple, but nonetheless powerful bandwidth monitoring utility. Point it at a switch, router or other network device and it can tell you how much bandwidth is being used on each of the available network ports. It can plot usage, create daily, weekly or monthly reports, and even send you an email or other alerts when bandwidth levels are getting low.

All you need to run Cybergauge is a network-attached PC running Windows 2000 or XP. Trial software can be downloaded from the Cybergauge site for free and it installs in seconds. The only real limitation is that it will only monitor devices that can understand the simple network management protocol (SNMP), which rules out a lot of low-end products.

However, most business-class devices do support SNMP, and the latest version Cybergauge 7.0 understands all implementations up to SNMPv3. This means it can monitor a wide range of hardware; and not just switches and routers, but internet gateways, network-attached storage (Nas) appliances, file and application servers, and even network printers.

For our tests, we started with an internet router to see how much of the broadband link was being used – surprisingly little, as it turned out. We then moved on to investigate a managed switch, the software-enabling device that measures the impact VoIP has on the bandwidth available to data users on our network. Lastly we used Cybergauge to monitor our network printers to see if they affected performance – they didn't.

In each case all we had to do was type in the IP address of the device and its associated SNMP community name. Details of the device and its

interfaces were automatically retrieved and we could choose which of the ports we wanted to look at. That done, it was simply a matter of clicking the Start button to begin monitoring.

The base licence enables you to monitor up to five devices with no limit on the number of interfaces involved. There's very little to go wrong. In fact, the only issues we had were in deciding which of the ports to monitor – this wasn't helped by the rather arcane names used by the vendors – and getting the settings right when using SNMPv3 because of additional security features.

Cybergauge can also be configured as a Windows service so monitoring can continue around the clock, regardless of who's logged on. It's also possible to customise the built-in alerting system to configure alerts and issue reports for specific time-frames, for example to send out alerts only on weekdays.

Utilisation graphs can be viewed, printed and exported from the management console provided, and there's the option to copy chart images in Jpeg format to a remote FTP server for display on websites. Reports can be generated on an ad-hoc basis or according to a pre-set schedule. These can include uptime, total utilisation, traffic distribution, and percentage billing information, as well as comprehensive usage data to help with capacity planning.

On the downside, there's no automatic discovery of devices as exists in more general SNMP management consoles, and the interface can get a bit cluttered at times. These are minor irritations in an otherwise excellent bandwidth monitoring utility that will find a place in any small-business management toolkit.

Alan Stevens

## Details

**Price** From £304.33 (£259 ex Vat) to monitor up to five devices

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)

**Contact** Networks Unlimited

01798 873 001 [www.neon.com](http://www.neon.com)

**System requirements** Network-attached PC running Windows 2000 (Professional, Server or Advanced Server), Windows XP or Windows Server 2003 • Monitored targets need to support SNMPv1, SNMPv2 or SNMPv3 text

## Verdict

**Pros** Makes it easy to monitor bandwidth use; no special hardware required; comprehensive QoS and billing report options; customisable alerting

**Cons** No automatic discovery; SNMPv3 options can be complex to configure

## Features

**Ease of use** ★★★★★

**Value for money** ★★★★★

**Overall** Makes light work of monitoring bandwidth use. Has lots of potential uses

★★★★★

## BUSINESS CARD SCANNER

# CardScan Executive

Turn business cards into valuable business data in seconds



The CardScan Executive scanner draws its power via USB and can handle a wide range of card sizes and formats

Like me you've probably got an extensive collection of business cards tucked away in an old box or drawer, just waiting to be put into some kind of order – should you ever find the time. Alternatively, you may be one of those people who files cards away carefully in a folder but, even then, baulk at having to go through them all to find a single contact.

CardScan addresses this problem, courtesy of a tiny USB scanner and intelligent recognition software that, in seconds, can turn a piece of card into valuable business data.

The scanner is simplicity itself, with no controls to speak of, just an illuminated arrow showing where to insert the cards to be scanned. It doesn't even have a power supply, drawing all the power it needs from the PC via its USB connection.

As with most USB devices the CardScan software needs to be installed first, after which the scanner is configured like any other using the wizard provided by Microsoft in Windows. You can then start scanning. And it is really quick – about two to three seconds for the average-sized card. Also, it doesn't matter whether the cards are black and white or colour, or what they're printed on. In our tests we tried all sorts, even oddly shaped and thick plastic cards. It coped with most examples, only complaining when we tried some mini CD-Rom cards, although we even had some success with those.

It also doesn't matter much how the information is arranged. The software is able to work it all out, identifying names, addresses and telephone numbers with startling accuracy. Of course, you can also edit the data manually, plus you get to keep

the scanned image, along with any notes you may have scribbled on the card.

The CardScan software will open as soon as you start to scan a card. You can also scan and process batches of cards in up to five different languages and automatically categorise the results. The latest CardScan 8 program is a self-contained contact management application that can be used to organise all sorts of data beyond what's scanned in from business cards. For example, we were able to drag and drop information from other applications and websites into CardScan, then use that information to address emails, make phone calls and print labels. It is also possible to export data to an Outlook contacts folder and an ACT database and use a business card to sign an outgoing message. Support for Lotus Notes and Goldmine is also available in the CardScan Executive implementation we tried.

Synchronisation of contact information with Windows and Palm-based handhelds and smart phones is another useful option. Plus there's an even smaller monochrome scanner available CardScan Personal (£118 ex Vat) designed with mobile users in mind, and a CardScan Team (£288 ex Vat) implementation, which adds extra workgroup sharing, export, and management tools.

Lastly, all versions come with a free subscription to 'CardScan at your service', an online storage facility that can be used to back up contact data files and access contact information online, via a browser.

We found it all incredibly useful. Small it may be, but it works well and can unlock all the business information held on those cards currently lurking at the back of your drawer.

Alan Stevens

## Details

**Price** £199 (£169.36 ex Vat)

**Best price** [www.pcw.co.uk/bestprices](http://www.pcw.co.uk/bestprices)  
**Contact** CardScan 0118 983 1562  
[www.cardscan.com](http://www.cardscan.com)

**System requirements** PC with free USB port for scanner connection; Windows 98/ME, 2000 or XP; Pentium processor or later • 64MB Ram • 90-120MB free disk space

## Verdict

**Pros** Fast scan times; intelligent recognition of important data; synchronisation with other contact management applications and handheld PCs

**Cons** Outlook integration could be improved

### Features



### Performance



### Value for money



**Overall** A great tool for unlocking valuable marketing and contact information



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Source Code: V253



## SOMETHING FOR EVERYONE

As ever, there's a wealth of information in *Hands on*, whatever you use your computer for. Linux users will find useful tips on disaster recovery, while in Windows, Tim Nott looks at encrypted filesystems and how to keep them secure. In Word processing, he gives an insight into Smart Tags, while spreadsheet users can find out how to add custom functions.

Tim Anderson gives visual programmers an overview of XNA, a new technology for creating games, while in Web development, you can read the second part of my Perl tutorial. Gordon Laing takes a look at Nas systems in the Hardware and Performance columns, while in Networks, Alan Stevens explains what you need to know about Power over Ethernet.

Mark Whitehorn goes back to basics in his Database column and Ken McMahon looks at how to remove noise in Digital imaging. And, of course, we have answers to your questions. You'll find the address for each contributor at the top of their column, so please let us know if there are topics you would like to see covered.

## CONTENTS

### 144 QUESTION TIME

Our experts answer your questions

### 148 HARDWARE

If you want extra capacity or to share your data, learn how to build your own network-attached storage (Nas) device

### 150 PERFORMANCE

DIY projects rarely run smoothly, but with perseverance, the results of hardware tweaking will pay off in the end

### 154 WINDOWS

Encryption is an effective way to guard your confidential data, but using it correctly is a serious matter

### 156 LINUX/UNIX

Valuable data can be lost if you have not made regular back ups. Learn some tips for disaster recovery

### 158 DIGITAL IMAGING

If you take photographs in low light conditions without using a flash, noise will be a problem. Find out how to lower the signal-to-noise ratio and improved images

### 160 WORD PROCESSING

How to get Smart Tags to work for you in Word

### 162 SPREADSHEETS

Set up your own functions and store them as Excel add-ins

### 164 WEB DEVELOPMENT

Use Perl to make a professional-looking web search function

### 166 NETWORKS

Find out how and when to use Power over Ethernet to support your peripherals

### 168 DATABASES

How relational databases work, plus a look at Psion tools and further handy uses of '&'

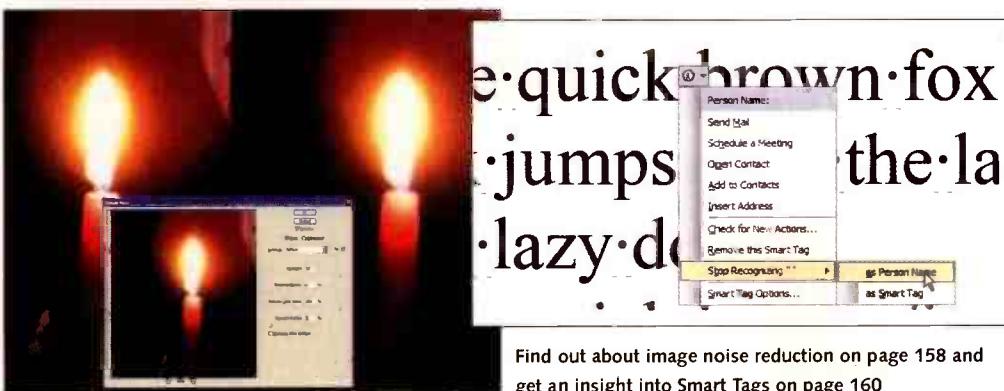
### 170 VISUAL PROGRAMMING

XNA has the potential to make powerful games programming even easier than before

# HANDS ON

### 26 PAGES OF...

- ADVICE
- TOP TIPS
- TECHNIQUES
- WORKSHOPS
- HARDWARE SOLUTIONS
- SOFTWARE SOLUTIONS
- Q&A



Find out about image noise reduction on page 158 and get an insight into Smart Tags on page 160

# Advice from our experts

Take care of your computer problems and discover new ways to use your PC

## DATABASES

### Put a spell on you

**Q** How do I stop Access trying to correct my spelling when I type words into text and memo boxes on my forms? It drives me nuts. It's almost as bad as that paperclip (which I've got rid of). Is it something in the Windows control panel that I am missing?

*Frustrated*

**A** One person's help is the bane of another person's life!

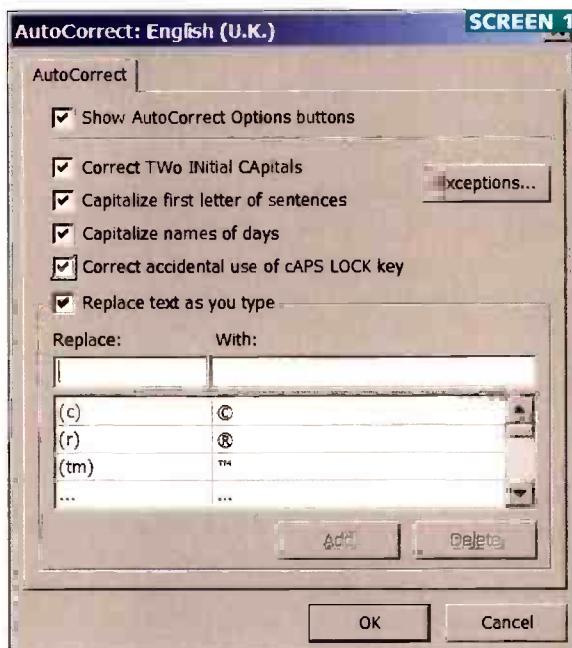
Happily a cure for your frustration is easy to prescribe. Look at the properties sheet for each text box control on the form (a memo field placed on a form is also a text box control). About half-way down the Other tab is the Allow Autocorrect property. By default it is set to Yes so your spelling is corrected. You've guessed: set it to No (see screen 1).

Some of the autocorrection behaviour is under your control, so you might find that with a bit of tweaking, Autocorrect helps rather than hinders. Drop down the Tools menu and select Autocorrect Options... You can choose whether to capitalise the first character of a sentence and/or correct two initial capitals, for example. A long list of replacements is shown and you can add your own if you habitually type 'fiends' instead of 'friends'.

## DIGITAL IMAGING

### Bring them back

**Q** After making some changes to 3,000 Jpeg files and renaming them, I find that the original file dates (camera dates) have been lost. I would like to restore them. I can find utilities for resetting the dates manually, but this will take hours. Is there a macro or program that will do this, preferably using Visual Basic for Applications (VBA)? I can identify the original dates from copies of the original photo files, because the



new names include the original serial numbers. I have also matched these up with the changed ones in an Excel spreadsheet using the VBA Datecreated property, but it is read only.

I am using Windows XP Pro SP2 and Microsoft Office 2000 Pro. I also have access to Photoshop 8.

*Anthony Birtles*

**A** You did the right thing in making backups first. The simplest option might be to go back to the originals and remake the simple changes using a program that doesn't mangle the Exif data. If that's not possible, try Exiftool by Phil Harvey (see screen 2)

### 'Exiftool is a module which can read and write metadata to image files'

(<http://owl.phy.queensu.ca/~phil/exiftool/>). Exiftool is a Perl module with a command-line application for reading and writing metadata to image files. There's also a standalone Windows executable that doesn't require Perl; you can download Perl for Windows from [www.activestate.com](http://www.activestate.com).

## Get the message

**Q** I have Sony Handycam DCR-HC35 and a Acer laptop with Windows XP. When I try to burn the digital tape contents onto a CD using the software 'Picture Package VCD' (supplied with the Handycam), I get the error message 'Insert a new blank CD-R in the CD drive'. This is despite the fact that a blank recordable CD-R is placed in the CD drive. I am able to burn regular CDs/DVDs using the DVD writer. It is only when I try to copy the Handycam tapes to a CD, I get this error message.

*Sivasailam VS*

**A** You're not alone; other people have had problems with earlier versions of Picture Package not recognising their CD and DVD writers. In most cases this problem can be solved by going to the Picture Package website ([www.ppackage.com/e](http://www.ppackage.com/e)) and installing the appropriate update. You'll also find a list of supported DVD writers.

## HARDWARE

### Vista options

**Q** I'm thinking of upgrading from Windows XP to Vista and wondered if I'd get any benefit going for the 64-bit version. I've got an Athlon 64, so it should support a 64-bit operating system.

*Bernard Anderson*

**A** This is a question understandably being asked by many people with PCs equipped with 64-bit processors. Most 32-bit applications should run fine, but until 64-bit versions of your favourite programs arrive, one of the few benefits you'll enjoy with a 64-bit OS is support for more than 4GB of Ram – but then not many motherboards will support more than 4GB, and even if they could it would be a costly system.

Probably the bigger issue though concerns drivers. 64-bit Vista requires 64-bit drivers for your hardware – and

signed ones at that. Signed 64-bit drivers for major graphics, disk controller and networking chipsets may be available today, but many of your other cards and devices may not be supported yet, or even ever supported. It's fair to say if you're running a media PC with a TV tuner, you're unlikely to get everything working under 64-bit. And if you're currently running a 32-bit version of Windows XP, you may need to perform a fresh install from scratch for 64-bit Vista.

So while the broad availability of 64-bit Vista may sound tempting for those with 64-bit processors, we'd advise most people to stick with the 32-bit versions for compatibility and ease of upgrading. The exceptions are those using workstations or servers with motherboards which can accommodate more than 4GB of Ram and which have devices with full driver support.

## Taking over

**Q** I recently ditched my old Windows 95 computer in favour of a Compaq Presario V5000 laptop running XP Home Edition. I now want to extract some valuable info and photos that I had stored on some Zip disks. Is it possible to externally connect my Zip drive 250MB to Expansion Port 2 on my new laptop and if so who could supply the connectors? I would also like to use my HP 1120C A3 printer, which connected to a parallel port on my old computer, but no such port exists on my new laptop.

RS Boughton

**A** We're assuming you have an external Zip 250 drive, which Iomega produced in SCSI, USB, Firewire and parallel port versions. We're not sure which particular model you've got, although we guess it's not the USB version, as that would plug right into your new laptop.

If you have one of the other versions, there are several options open to you. You can equip your laptop with a SCSI or Firewire port with a suitable PC Card adapter, although it could be pricey. If you have the parallel port model, you may be able to use a USB-to-parallel port converter which costs around £20. These are widely available from companies like Belkin, Keyspan and Maplin – but do check they will work

SCREEN 2	
255	
Camera Profile	: ACR 2.4
Has Settings	: True
Crop Top	: 0.002222
Crop Left	: 0.142222
Crop Bottom	: 1
Crop Right	: 0.842963
Crop Angle	: 0
Has Crop	: True
Exposure Time	: 1/2500
Shutter Speed Value	: 1/2500
F Number	: 6.3
Aperture Value	: 6.3
Exposure Program	: Aperture-priority AE
Date/Time Original	: 2006:06:08 17:33:54+01:00
Exposure Compensation	: 0.33
Metering Mode	: Partial
Total Length	: 113.0mm
Exif Version	: 0221
Max Aperture Value	: 4.0
ISO	: 400
Flash Fired	: False
Flash Return	: No return detection
Flash Mode	: Off
Flash Function	: False
Flash Red Eye Mode	: False
Exif Image Width	: 1026
Exif Image Length	: 1022
Color Space	: Unknown <-1>
Serial Number	: 1731010354
Model	: 70.0-200.0 mm
Lens Info	: 70.0/1 200/1 0.0 0.0/0
Image Number	: 137
Flash Compensation	: 0
Owner Name	: unknown
Firmware	: 2.0.3
ICC Profile	: Adobe RGB <1998>
Color Mode	: 3
Caption Writer	: Ken McMahon
History	: Canon
Make	: Canon
Camera Model Name	: Canon EOS 20D
Orientation	: Horizontal (normal)

with your drive first though, as some are designed for printers only. One of these USB-to-parallel converters is the solution for connecting up your older printer though.

Another option is to simply buy (or borrow) a USB Zip 250 drive, which will connect straight to your new laptop and read your old disks. Alternatively you could visit a camera store with a printing kiosk which supports Zip 250 media, as they may be able to burn you a CD of its contents; some PC stores may also let you do this if they have a Zip 250 drive on display.

Finally, if your old Windows 95 system is still around, you could access it and the Zip drive using your laptop and a product like Laplink, or again burn a CD using the old system, or even remove the old hard disk and connect it to your new system. So as you can see, there are plenty of options open to you.

As for the Expansion Port 2 on your laptop, that's a proprietary connector designed to be used with the supplied expansion base adapter, which in turn can be connected to an HP XB3000 docking station. These normally equip laptops with a wealth

Exiftool can be used to update the metadata in your image files

of ports, but according to HP's specs, the XB3000 only offers USB, Ethernet and AV connectivity – so one of our earlier suggestions would be your best bet.

## LINUX

### Double drive

**Q** I have installed Ubuntu Linux (Edgy). In the file manager my floppy drive shows up twice, and seems to give an error if I use it. I have installed the updates but it hasn't fixed the problem. How can I get rid of it?

David Bullon

**A** The Edgy installer has a minor bug where it can write incorrect information about the floppy drive to the system. The information is stored in the /etc/fstab file and can be easily fixed by hand. Open up a terminal and run **sudo gedit /etc/fstab** and find the line which begins '/dev/media/floppy0' and change the beginning of the line to read '/dev/fd0' (with a zero, not an 'O'). Do not change anything else, and save and exit. This will fix the problem immediately.

## Media missed

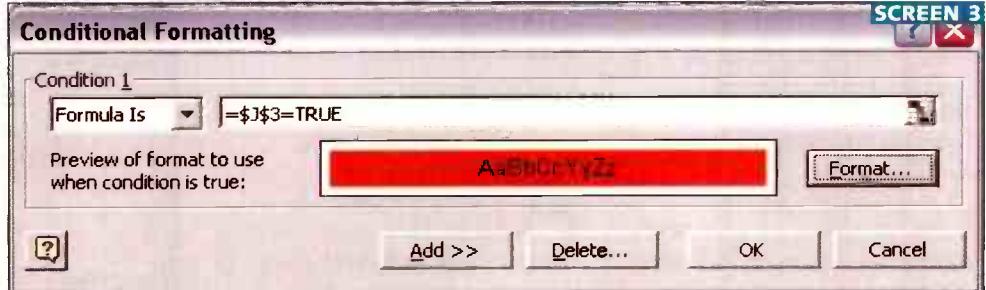
**Q** I have set up Fedora Core 6, but I cannot get access to any of my music or video files. I have seen how to fix this in Ubuntu, but what can I do in Fedora?

Robin Taylor

**A** There is no 'multiverse' repository for Fedora Core as there is for Ubuntu. However, a third-party repository has been set up to provide the same sort of applications – those restricted by patents mainly.

Log on to the website <http://rpm.livna.org> and follow the instructions for Fedora Core, and you should be able to install any of the extras you need.

Conditional  
Formatting can  
refer to other cells



### SPREADSHEETS

#### Colour condition

**Q** I am using 10 columns of an Excel spreadsheet with various text in cells A3 across to I3. I want to know if there is a conditional format whereby if I enter text, say YES, into cell J3, then all of the text in cells A3 across to I3 will change to another colour, say red, but if other text is entered into J3 then all the text in these other cells remains as is?

*Dave May*

**A** Yes, Conditional Formatting can apply to any data on the worksheet. But the entries are fussy. Enter, TRUE instead of YES in cell J3. In A3 choose Conditional Formatting on the Format menu and then Formula Is in the Condition 1 box of the Conditional Formatting dialogue box. To the right of that enter, `=J$3=TRUE` (see screen 3 on previous page). You do not need an IF function or quote marks. Choose the format to use when the condition is met. Either use a red colour font or have a red background to the cell. Use the Format Painter tool to copy this format across the range B3:I3.

#### What's owed

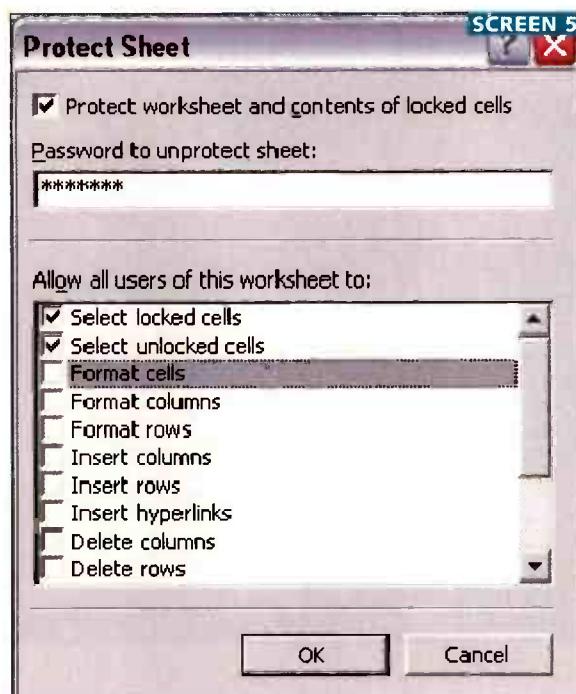
**Q** I produce a workbook for each meeting of a forum, with columns for the names of people who have booked to attend, an invoice number, amount due, amount paid and amount owing. How can I get Excel 2000 to automatically place in another workbook (which has the names and columns in the same layout) the amounts owed?

*Chris Pearson*

**A** Just have IF function formulas in the second workbook referring to cells in the first workbook. For example if you want an amount displayed in a cell in Book2 when the contents of cell C2 on Sheet1 of Book1 is more than zero (and to be blank when it isn't) you would enter in the cell in Book2: `=IF([Book1]Sheet1!$C2>0, [Book1]Sheet1!$C2,"")`

(Key:  $\vee$  code string continues)

You can drag this formula down the column. Enter the workbook name in brackets and follow the worksheet name with an exclamation point.



#### Sorting it out

**Q** I know you can sort a table vertically in Excel, that is by row labels, but can you sort horizontally, putting the column headings in alphabetical order?

*Nora Beck*

**A** In recent versions of Excel the sort dialogue box has been expanded to allow this. Highlight the full table, including the column headings. Choose Sort on the Data menu. Click the Options button. In the Sort Options dialogue box accept the default first key sort order of Normal. For orientation choose, Sort left to right. OK out (see screen 4). The columns will be sorted with the headings in alphabetical order.

#### No superscript

**Q** I can't seem to be able to show a superscript in Excel. If I enter 432 in a cell and then highlight just the 2 in the Formula Bar and format it as a superscript it initially displays 43<sup>2</sup> but then when I press Enter it reverts to 432. How do you enter a superscript?

*Peter Wild*

**A** You are on the right track but Excel requires you to leave a space between the number and the superscript. So enter 43 2 and then format the 2 as a superscript.

#### Password point

**Q** I wish to create a password screen on a spreadsheet. The staff can enter their name and password and it will verify this and allow them in. When the user enters the password in a cell, instead of displaying the characters, I would like it to display asterisks. Is this easy?

*Luke Swift*

**A** In the Help files, review the section, 'Password protect a worksheet' (see screen 5). When anyone tries to open the worksheet by entering a password, only asterisks will be displayed. When you say, "allow them in" I assume you're trying to duplicate the effect of a website page which, after entry of a password, allows the users to open another website page. With Excel you need to put a link in a cell which leads the user to a password-protected worksheet. Instead of asking for a password you ask them to click the link. The second sheet will then ask for a password and display the asterisks.

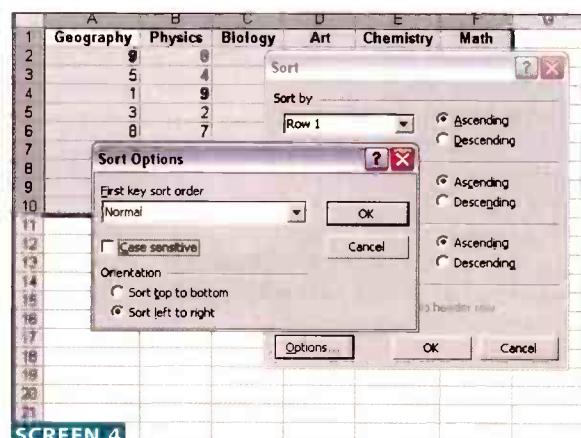
#### WINDOWS

#### Grey matter

**Q** When I search the XP help file for a word or phrase and click on one of the results, the help text in the right pane shows the search terms highlighted in grey. This is rather distracting and makes the text hard to read – is there a way of turning this feature off?

*Malcolm Byrne*

**A** You can prevent this by going to the Help and Support options, then Search Options, then clearing the 'Turn on search highlight' option. However, if you find



the highlight option useful but would like to turn it off on a per-page basis, then right-click anywhere in the text and choose Refresh from the context menu – the highlighting will be cleared (see screen 6).

## Space discovery

**Q** I have lots of Windows updates in my Windows folder. An example is: \$NtUninstallQ329834\$. Together they appear to use 600MB of disk space. Short of reinstalling Windows XP, how can I reclaim this space?

David Shaw

**A** These are not the updates themselves, but contain the files needed to uninstall the updates, and they are coloured blue as they are compressed. You can delete them to reclaim the space, but in the unlikely event that you want to remove a particular update from Control Panel, Add/Remove, you won't be able to do this. A sensible strategy would be to delete those older than a few months.

## WORD PROCESSING

### Show the path

**Q** Is there a way I can get the filename and path to appear at the bottom of each page of a document? I'm using Word 2003, and I presume this can be done with footers, but I can't see how.

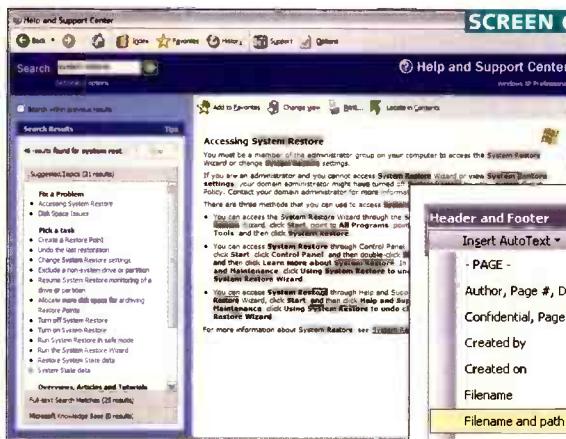
Jennifer Stacey

**A** Yes, this can be done and you are on the right track with footers. The easy way is to go to View, Headers and Footers and click in the footer area. From the Header and Footer Toolbar, click the 'Insert Autotext' button, and you'll see what you want – 'Filename and path'. Should you want to insert this somewhere other than a footer or header, then insert, Field, FileName. You can choose to either tick the box to add the path, or add the `\p` switch manually to the field code (see screens 6).

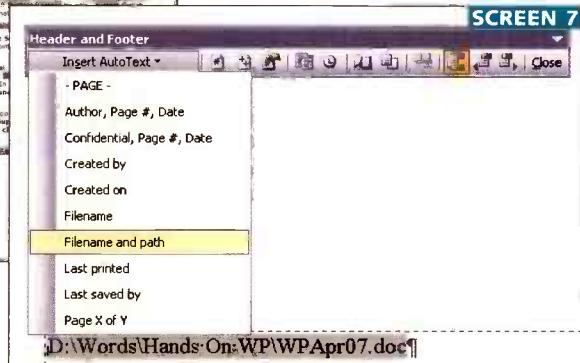
### Stuck with labels

**Q** I frequently print pages of labels and until recently each label had a non-printing border that was helpful in formatting the page. This has now disappeared. Can you help me get it back?

Max Hawkins



Left: Right-click, Refresh to lose the highlights in help



Getting the filename and path into a Word footer

unlike Notepad which needs a separate copy of the program running for each file. Many users felt that the single document interface is wasteful of screen space as each document has its own set of menus and toolbars.

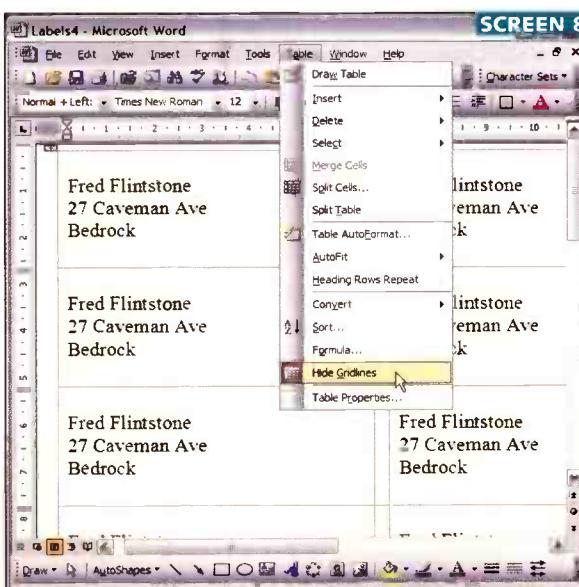
In Word XP and 2003, Microsoft relented somewhat, and you can return to the MDI, though the option is cunningly disguised.

If you go to Tools, Options, View and clear the checkbox titled 'Windows in Taskbar' then you'll get just one Word window and you can 'Arrange all' or 'Compare side by side' from the Window menu. The latter produces a small toolbar that lets you tile the documents side by side instead of on top of each other, and lets you synchronise scrolling between documents if you find that useful.

The downside is that you no longer get a separate button (or a grouped button) for each document. Curiously, Excel does let you have MDI and separate Taskbar buttons. PCW

**A** Microsoft abandoned the multiple document interface (MDI) with Word 2000, and instead each document opens in a separate Word window, although only one instance of Word is running,

Showing non-printing label borders



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**Gordon Laing** has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

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# Building your own Nas

If you fancy doing a bit of DIY, here's how to build a network-attached storage device

**M**any people are realising the benefits of accessing their data over a network. Storing data on networkable devices gives extra capacity without messing around with disk upgrades. It offers easy, centralised backup facilities, shared access to data that could support multiple platforms, such as PCs and Macs, and means that even if you buy a new PC or extra systems, your data is ready to be accessed from them.

The market for network attached storage (Nas) devices has exploded over the past year. At its simplest, a Nas is a box containing one or more hard disks, which connects to your network and presents the storage as a sharable volume. More sophisticated models support Raid, P2P or torrent downloads, or act as iTunes servers.

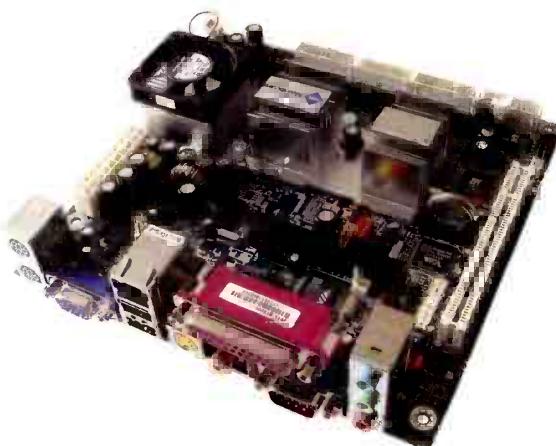
A Nas is normally sold either with hard disks already fitted, or as a basic unit ready to be fitted with your disks, but you can also build your own.

Nas processor and memory requirements are very modest. You could build one with an old PC, equipping it with a big hard disk and a Gigabit Ethernet card for better network performance if desired.

There are several Nas software packages. FreeNAS is a popular, especially as there's no charge, but at the time of writing it was still in beta and you may not want to trust your data to something that isn't 100 per cent complete; see [www.freenas.org](http://www.freenas.org).

One of the best options is Naslite 2 from Server Elements. This is available as a downloadable CD image from [www.serverelements.com](http://www.serverelements.com) for about £18. If you have existing hardware, you could build a very affordable Nas, that could potentially outperform a commercial model. Here's how.

Naslite 2 is available in two main versions, both with the same



functionality once running, but one boots from a CD and the other from a USB device, such as a flash memory key. If your motherboard supports bootable USB drives, the latter is preferable because the USB device can store any configuration changes that otherwise require a floppy disk drive on the CD version.

The downloadable ISO images for Naslite 2 are just 5.02MB and 6.63MB for the CD and USB versions respectively, and any CD writing program should be able to burn a disc from them. The compact OS is based on Linux and, once booted, runs in an 8MB Ram disk.

Naslite 2 requires a Pentium or better (500MHz would be fine), at least 64MB of Ram, a PCI network adapter (this could be onboard), a bootable CD (and bootable USB media of at least 16MB for the USB option), and of course a hard disk for the storage. It supports IDE, SATA, SCSI, USB and Firewire interfaces, along with hardware Raid cards or chipsets.

There's a full list of compatible storage and network controllers at the Server Elements website, but since Naslite 2 is based on the Linux 2.4.x kernel, a wide range of chipsets is supported. Naslite 3 is due for early 2007 and will be based on the 2.6 kernel with support for newer

Via's Epia range of Mini-ITX boards with integrated processors are an ideal platform for a DIY Nas project

hardware, which should include the Promise Supertrak EX8350 hardware Raid card tested in March's Performance column ([www.pcw.co.uk/2173912](http://www.pcw.co.uk/2173912)).

### Test configuration

To test Naslite, I used an old Via Epia M10000 motherboard bought from the Mini-ITX store at [www.mini-itx.com](http://www.mini-itx.com). Epia boards are ideal for Nas projects because they're small, consume little power and have integrated processors with plenty of muscle.

Naslite 2 will happily operate with 64MB of Ram but will perform better with 256MB, so I fitted a 256MB Crucial Dimm. For storage, I used an ageing 80GB Seagate IDE hard disk, and I would boot from an old 32MB memory key. These were components from previous Hands on projects.

The USB version of Naslite 2 is initially configured by a small bootable CD image downloaded from the Server Elements website, so you'll need an optical drive, but this can be removed once the system's operational.

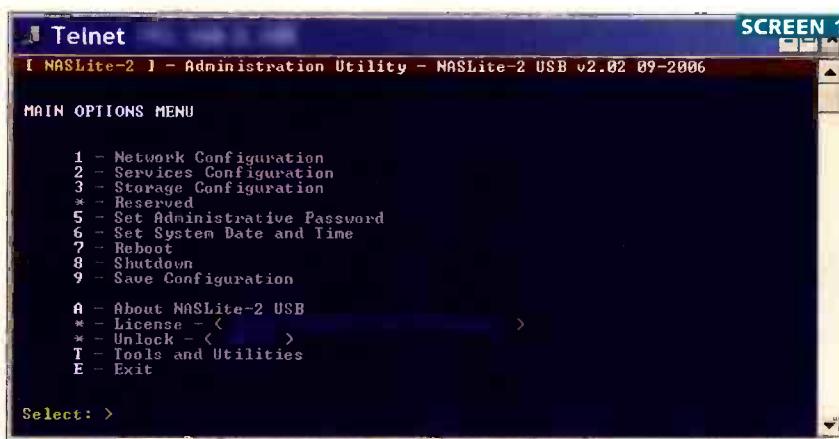
### Installation

Installing Naslite 2 is straightforward and is fully documented in a PDF manual from the Server Elements website, but here are the basics.

Once you've bought a licence, downloaded the ISO image and burnt a CD, you should set your motherboard to boot from it.

With the USB version of Naslite 2, the bootable CD will launch a utility to prepare your USB storage device. Not all USB storage devices are bootable and some motherboards are fussy about what they can boot from.

I tried and failed with various memory keys, along with a USB card reader, but found an old 32MB key that worked fine. Naslite 2 USB also offers the option to configure the USB device as either a bootable super



The main admin menu of Naslite 2, accessed using Telnet from a PC

floppy or a fixed disk with a bootable partition; if one doesn't work with your motherboard, try the other.

The first bootable super floppy option worked fine with my Epia board, although I had to set the Bios boot options to include USB-HDD and USB-Zip along with USB floppy, and disconnect the DVD drive after the key had been configured. Naslite also lets you create a kicker floppy disk to boot from, which then fires up the USB device – handy for motherboards without a USB-boot option.

Once your system is booting from the USB device or the CD, Naslite presents a list of diagnostics, some of which will fail at this point. You should then log in using the default 'admin' and 'nas' for the username and password respectively.

From the Naslite admin menu, you should change the Network Configuration so the IP address is on the same subnet as the PCs that will access it – so if your PC is on, say, 192.168.0.x, set the Nas to the same first three numbers and choose a number at the end that's unused on your network. Change the workgroup name to match whatever you're using on any Windows machines, then enter the licence code, save the configuration and reboot.

Viewing the Nas contents from a Windows XP system

Upon rebooting, the Nas will still fail some diagnostics but you should now be able to Telnet into the admin menu using a PC and the IP address you gave it. You can use this to remotely configure the Nas, eliminating the need for a monitor or keyboard on the unit.

To fully unlock the Nas, you need to retrieve a code from a webpage, so open a browser and enter <http://192.168.0.200>Status/htm/unlock.htm>, swapping the IP address to the one you've given the Nas. You can then enter this code using the admin menu to unlock all the features before saving and rebooting again.

When Naslite boots up again, you'll need to configure the hard disk(s) using the admin menu; full instructions are in the downloadable Pdf. When you're done, save the

configuration and reboot again. Your Nas should then be fully accessible, although Mac owners may need to tweak their systems – see box, below.

If you use Naslite USB, you can now dispense with the optical drive. If your Nas then comprises just a low-power processor, one hard disk and a USB key, you could swap the PSU for a tiny model such as the PicoPSU, reviewed in previous Hands on columns.

### Verdict

After my first attempts – see this month's Performance column – I was impressed at how quickly you could have your own Nas up and running. With co-operative hardware, mine was ready for action just half an hour after digging around for old components. The compact unit is now happily sharing files with my PCs and Mac, while consuming just 45W.

Since I don't need 24-7 access to the data stored on it, I'll look at implementing power saving and some kind of suspend or disk spin-down in a future edition; and since the single disk is vulnerable to failure, I'll also look at a Raid solution.

Pre-assembled Nas boxes are priced competitively but if you have an old PC or components to recycle, you could save money – and a DIY Nas system running Naslite 2 has the potential to outperform a commercial Nas. If you're using a Nas or have built your own, we'd love to hear from you. **PCW**

## Macintosh support

If you run both PCs and Macs, one of the nicest things about a Nas is having a single storage area that is accessible from both. As a dual-platform kind of guy, this was one of my goals for my DIY Nas, although I was dismayed to find my Mac reporting an 'Error -36' when trying to gain access.

This is a known issue with Mac OS X 10.4 when attempting to connect to Windows or Samba servers (Naslite uses Samba). Unlike OS X 10.3, version 10.4 only supports encrypted passwords when accessing Windows or Samba servers, while Naslite employs plain text. Fortunately, the solution is well documented on the Apple website and involves a small edit to a file using the Terminal, the Mac's



One benefit of having a Nas is being able to access files with both PCs and Macs

equivalent of a command prompt. Once the modification was made, my Mac happily accessed the Nas share. For more information, visit <http://docs.info.apple.com/article.html?artnum=301580>.



SCREEN 2



**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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# Troubleshooting motherboards

Our eventual DIY Nas success shows you shouldn't lose heart when projects go awry

In the Hardware and Performance columns, we enjoy tweaking existing PCs and finding the best components to build the ultimate systems. Of course, it doesn't always run smoothly.

The nature of PC hardware and the tweaking process often means long hours with no guarantee of success. If you've ever tweaked PC hardware or built your own system, you'll probably have come across problems that seem insurmountable. Some can be resolved instantly, thanks to an overlooked setting, but others just won't budge. You know it should all work fine, but it won't play ball.

## Nas nightmare

A prime example came when preparing a DIY network-attached storage (Nas) project for this month's Hardware column. While the Nas installation was assembled and running within half an hour, it followed a day of utter frustration with a previous configuration. My first attempt used components virtually identical to the successful configuration but yielded no success.

I had originally started with an old Via Epia M9000 board which, coupled with a spare 80GB IDE disk and 256MB Crucial Dimm, seemed an ideal platform. Drawn by the convenience of booting from a USB key, I opted for that first, but while Naslite 2 USB happily booted from a CD, found the key and wrote the required files to it, I couldn't persuade the Epia board to boot from it. There were several USB options in the boot menu in the Bios, but none made any difference. Maybe it was my Bios version or the USB key in question, but either way, it was a no-go.

My second attempt involved the CD version of Naslite 2, which boots each time from a CD and applies any



configuration changes with a floppy disk. The installation went smoothly up to the point where you need to connect to the Nas using a web browser from another system to retrieve the unlock code.

While the Nas accepted external Telnet requests for configuration, it wasn't providing HTTP services, in spite of them appearing to be operational from the point of view of the Nas, so we got no web access or unlock code.

I contacted Naslite's developers via the live chat facility on the Server Elements site and they patiently trouble-shot the system, eliminating all variables until, after about four hours, we were all stumped. It was particularly odd since Via Epia are a popular choice for running Naslite and Server Elements even had its own M9000 installation running fine.

## Call it a day

I'd like to say we eventually found the problem, or spotted the dumb mistake that prevented it from working, but it

just wasn't happening. At times like these, you can either keep plugging away, often fruitlessly, or cut your losses. With deadlines to meet, I had no option but the latter.

I was still keen to build a Nas for the Hardware column, though, so I turned to alternative components. I first dug out an ancient dual-Celeron system that I'd earmarked for a future server project. Once connected, there was a distinct lack of action, followed by a small puff of smoke from beneath the board and a worrying smell.

My third attempt was with another Via Epia board, this time an M10000 model. Having previously prepared a 32MB USB key with the Naslite software for the original M9000 system, I thought I'd have nothing to lose by connecting it and seeing what happened. To my amazement and joy, it booted Naslite 2 first time and about half an hour later, my first Nas was fully operational and talking to both my PCs and Mac – as described in this month's Hardware column.

## The moral?

If there's a lesson to be learnt here, it's realising that sometimes whatever you're trying to do just won't work. Everyone is willing to plug away for different periods, but whether its minutes, hours, days or even weeks, there should be a point when you call it a day. Annoyingly, some PC configurations just won't ever work the way you want them to and – even more annoyingly – you may never find out why.

While there's little or no comeback with existing components, it's always worth checking if you can return new parts should they not work as required. I was fortunate in that I had a number of old motherboards to try, and wouldn't you know, it really was a case of third time lucky. **PCW**



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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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# Tales from the crypt

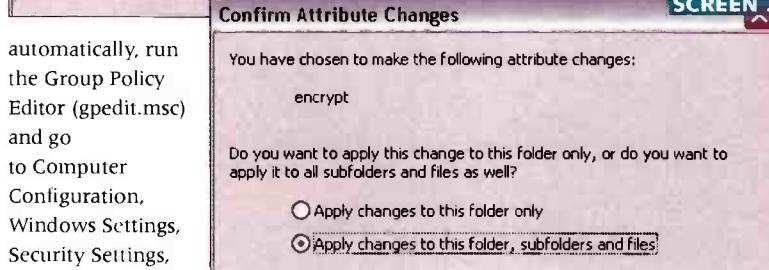
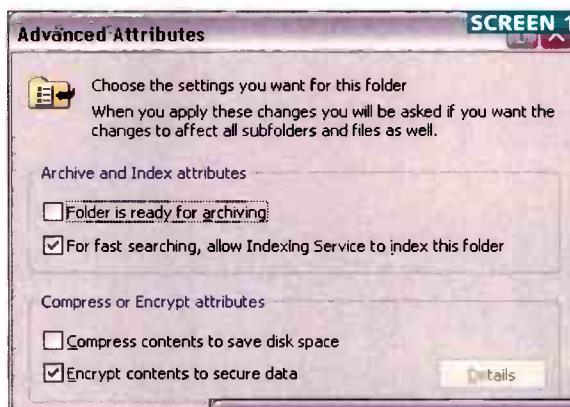
Encryption is an effective way to protect confidential data – but handle with care

Last month we looked at some of the advanced features of NTFS ([www.pcw.co.uk](http://www.pcw.co.uk)) and here, as promised, is a guide to encryption.

First of all, it's only for XP Pro (or Windows 2000) users. Encryption is a serious business. If you don't take the right steps you could end up with unrecoverable files. Don't use it unless you really need it – for example, if you have sensitive data on a PC that can't be physically secured. Before you encrypt your working data, read through this column and do a practice run with some copied files.

As with compression, encryption is completely transparent. Though you can encrypt on a per-file basis, it makes more sense to encrypt a folder (for instance My Documents) and all its contents. To do this, right-click on the folder, select Properties, and on the General tab click the Advanced button, then tick the 'Encrypt contents' box, then OK (see screen 1).

OK out of the main dialogue and you'll be asked if you want the subfolders and files encrypted (see screen 2). Windows will spend a little while encrypting the current contents and all new additions to the folder will be automatically encrypted. If you have the option enabled in Folder Options, the encrypted files and folders will have green names. Note, however, that encryption and compression are mutually exclusive. Files marked with the system attribute and those in the Windows folder cannot be encrypted. It's good practice to encrypt the Temp folder in case this contains temporary document files that weren't cleared at shutdown, but this may interfere with some software installation, so you may have to decrypt the folder before installing new software and re-encrypt it afterwards. For tight security, clear the swap file at shutdown. To do this



automatically, run the Group Policy Editor (gpedit.msc) and go to Computer Configuration, Windows Settings, Security Settings, Local Policies.

Security Options. 'Shutdown: Clear virtual memory pagefile' is in the list on the right (see screen 3).

No one can decrypt the files unless they log on as you. If they examine the disk under a different operating system, all they will see is scrambled files. So it's vital to have a strong password (see box on the next page).

## Encryption keys

Encryption is done using a public and private key pair. The public key is used to encrypt the data. Decryption requires a private key, generated automatically when you first encrypt a file or folder. If the key isn't backed up and gets damaged or deleted, it won't be possible to decrypt the files on any partition. Changing your password will also stop you decrypting files unless you have a back up.

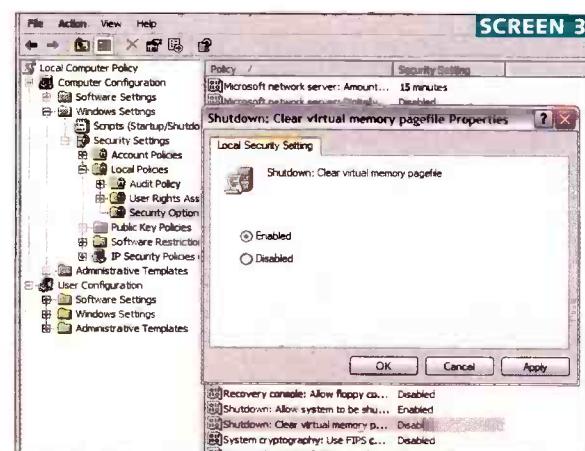
Clearing the page file on shutdown

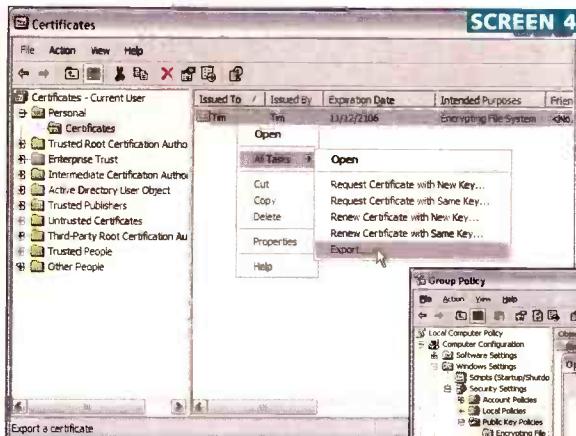
You should back up your private key and certificate (the code that binds your private key to your user identity) to a floppy or other removable media – Start, Run, certmgr.msc. If this doesn't work, Start, Run, MMC will give you an empty console. From the File menu, Add/Remove snap-in then click the Add button and select Certificates from the list of standalone snap-ins, then choose 'My user account'. You should be able to click through the console tree to see your certificate

under Certificates, Personal, username. It will be issued to your user name by your user name and have 'Encrypting File System' as its Intended Purpose. Right-click on it, and choose All

Tasks, Export (see screen 4). This will start the Export Wizard. Select the option to Export the Private Key with the certificate.

At the next screen choose Personal Information Exchange and tick 'Enable strong protection'. The next screen will prompt you to create and confirm a password.





Left: Backing up your private key and certificate

Below: Adding the Recovery Agent



The following screen will prompt you for a filename. With a floppy in the drive, browse to that drive and give a name for the file. This will produce a Personal Information Exchange (Pfx) file on the floppy. Remove the floppy, store it in a safe place and commit the password to memory. Should your private key be damaged or deleted and you are unable to open your encrypted files, retrieve the floppy, double-click on the Pfx file and follow the import wizard, supplying the password when asked.

### Secret agents

There's a flaw to this strategy. If the user account is damaged or deleted, the certificate will be of no use. Any file encrypted by that user on any NTFS partition will be forever encrypted. The secret is to appoint a trusted third party who holds a certificate confirming them as a Recovery Agent. It's like giving a trusted neighbour your house keys. On a standalone or workgrouped PC, this should normally be the hidden administrator account, to which you log in (if you use the Welcome Screen press Control & Alt & Del twice) with the username Administrator and the case-sensitive password that was created when you installed Windows. This account has the same privileges as any other account with administrator status but it is kept out of sight and used solely for administration.

If the administrator password is not known then another user with

administrator status can reset it. In the Start, Run box, type control userpasswords2 to change any account password by selecting the account and pressing the Reset Password button. All user accounts with administrator status need protecting with a strong password.

Having logged in to the (rather than an) Administrator account, you need to create a data recovery certificate for the Administrator. Open a command window and type cipher /r:filename – replacing filename with your own choice of name. You'll be prompted to specify and confirm a password. This will create in the current directory (by default the top level of the Administrator profile) two files, filename.cer and filename.pfx (see screen 5).

Open the Group Policy Editor (Start, Run gedit.msc). Navigate down through Computer Configuration, Windows Settings, Security Settings, Public Key Policies. You should see Encrypting File System

in the right-hand pane. Right-click this and 'Add data recovery agent...' This launches a wizard, which will prompt you to browse folders for a certificate – again this should open by default in your profile, where you can select the .cer file (see screen 6). Your certificate will be added with 'USER\_UNKNOWN' as the user (which is normal), and you can finish the wizard.

Backing up the Recovery Agent's private key is very similar to backing up a user's. While still logged in as Administrator, run certmgr.msc (or add the Certificates snap-in as before) and look under Personal, Certificates for the certificate whose Intended Purpose is File Recovery – right-click, All tasks, Export and follow the wizard. Again, enable strong protection and export to a floppy or other removable storage that can be securely stored. 'Delete on successful export' gives further security but you'll have to reimport the key from the floppy to recover data. Before you log off, delete the .cer and .pfx files you created with the cipher command.

Once a Recovery Agent has been created for a standalone or workgrouped computer, it has transparent access to all files and folders subsequently encrypted on that PC by any other user. Users can also share encrypted files, but note this is independent of the 'Shared Documents' folder – subfolders and files in here can be encrypted by any user. Once a file has been encrypted, if you go to that file's property sheet and click the Advanced button, you'll see a Details button next to the Encrypt contents checkbox. Clicking this will show you who encrypted the file and who the Recovery Agent is. If you encrypted the file, you can share it with another certificated user by clicking the Add button and selecting their name. **PCW**



Creating a recovery certificate

## Strong passwords are the key

Your security is only as good as your password, so make sure it's a good one. In general, passwords that are easy to remember are easy to crack. Follow these points for a good one:

- Use at least seven characters.
- Use a mixture of upper and lower case, numbers and symbols, such as sD7{y9B.
- Don't include your name, or that of loved ones or pets.
- Don't include recognisable words.
- Don't use your logon password for anything else.
- Make sure the Administrator account has a different strong password.

If you must write it down, do so somewhere hidden and unguessable.



**Barry Shilliday** has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time he prefers to travel the world – and snap it with his camera.

→ **Comments welcome on the Linux/Unix column.**  
Email [linux@pcw.co.uk](mailto:linux@pcw.co.uk)  
*Please do not send unsolicited file attachments.*

# Linux disaster recovery

## Quick and efficient backup methods – and what to do when it all goes wrong

**T**he time you come to realise just how dependent you have become on your computer is when things go terribly wrong. Your partitions won't mount, your files seem corrupt or, worst of all, your entire hard drive seems to have become unreadable.

The first and most obvious piece of advice, as anyone would tell you, is to make regular backups. It is surprising how many people who have years worth of valuable files have few or none of them backed up.

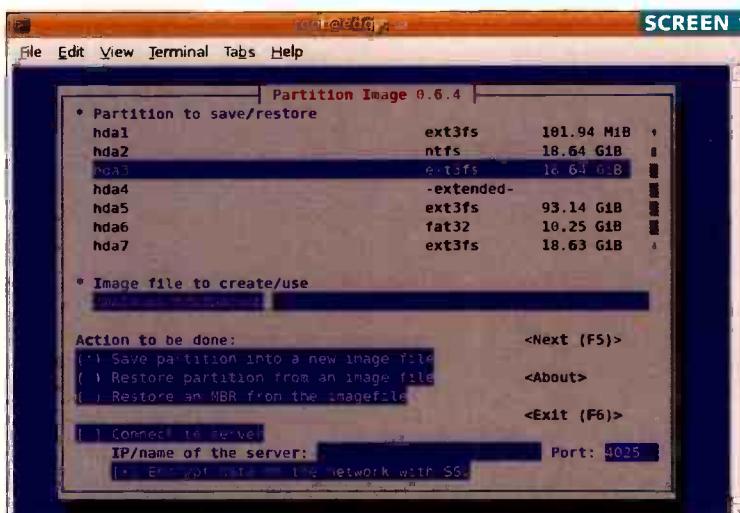
This month, we will look at some preventative measures and – in case bad things do happen – some tips for disaster recovery.

## Simple backups

If you are a regular reader of Hands on, you may remember that we looked at rsync last year. This is a really useful tool for duplicating files quickly and with minimal fuss. The duplicate files it creates can be 'synced' at any time, so only changed files will be copied over. This method is good for regular backups, where you are protecting yourself more from accidentally deleting files or finding an older version of a file. To copy the directory 'documents' to /backups you could run:

With this command `rsync` will use the archive method (`-a`), which preserves all of the files' original attributes (including permissions, date modifications and so on), and will recursively copy the directory (including the documents directory itself) to `/backups`. You could run this command weekly to maintain a regular copy of your files.

Rsync was designed to work well over a network. If you have OpenSSH set up on both machines, just include the machine's name before the directory, for example:



```
$ rsync -av documents myserver:/backups  
(Key: ↵ code string continues)
```

## Partition backups

An alternative to copying individual files and directories is to make a raw copy of an entire hard drive or partition. This is easily performed in all forms of Unix (and OSX) using the standard 'dd' command. What this does is to read raw bytes from any file (including devices) and to copy them back to any other file or device. Since only raw bytes are being read, the dd command doesn't need to understand the layout of the data at all, so this method works with any kind of filesystem. For example, /dev/hda1 is a 5GB partition and contains a Linux ext3 filesystem:

The dd command now reads every byte from the partition and copies it to a file called image.ext3 in the current directory. This is an exact clone, so copying back the file to the partition would return the data to the precise state it was in when the backup was made:

Make an efficient backup of only the used parts of a partition with **partimage**

Copy raw contents  
from a partition  
using 'dd' and  
'ddrescue'

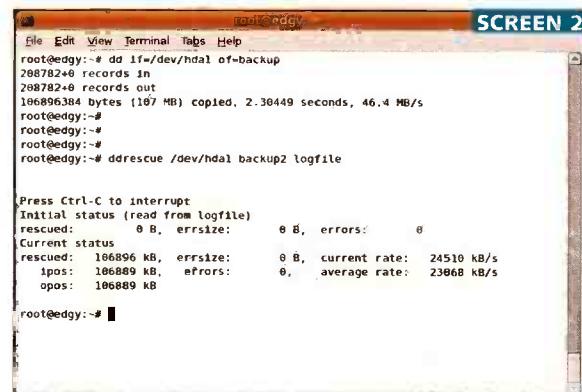
```
# dd if=/dev/hda of=/dev/hdb
1000+0 records in
```

A severe word of warning: be very careful when using the dd command. A

mistyped command can result in a complete loss of data. If you accidentally entered `/dev/hda2` on the second command, your backup would be restored to the second partition instead, completely overwriting whatever was there previously, and without any warnings.

## More efficient cloning

While dd is found on every Unix and Linux system and is a reliable way to back up your data, it has a major disadvantage for general use: every byte must be duplicated, whether it contains any valid data or not. If you



want to back up a 100GB partition where only 20GB of the space is in use, you will still need 100GB of additional space to clone the data.

Partimage ([www.partimage.org](http://www.partimage.org)) is a useful open-source application that helps to solve this problem. Unlike dd, partimage copies only used parts of the filesystem. To do this, it must obviously understand the filesystem it is copying, so it isn't a simple raw copy like the one dd provides.

Partimage supports all popular Linux filesystems (ext2, ext3, reiserfs and so on) as well as Fat-formatted filesystems. It has limited support for NTFS. Partimage can also compress the data it backs up, which may help to reduce the size of the backup considerably, and on fast modern machines it makes little difference to the backup time. Recent versions allow backing up over a network.

Although it is a terminal text-based application, it is really no more difficult to use than a typical GUI program (see screen 1). If you're

## If you lose your MBR and don't have a copy to restore, the computer can't find any partitions

using Ubuntu Dapper or Edgy, partimage can be installed from the Universe repository with **sudo apt-get install partimage**.

### Data corruption

Partimage and dd are incredibly useful tools for making backups of your partitions, but what happens if there is a problem with the hard drive itself? If the drive has developed bad sectors, or is for some reason giving input/output errors, you may not be able to access the data properly, and you should certainly not try to continue to use the partition. Recovering some or possibly all of the data from the partition is possible, using the GNU ddrescue tool.

This command behaves like a beefed-up version of dd. Just like its sibling it will copy raw data to and from a file or device, but it has much better resilience over errors and gives considerably better feedback on its progress. If it detects an error reading from the hard drive it will leave a gap and continue, rescuing as much of the data as it can; dd on the other hand would fail at the point of error.

Additionally it has the advantage that

Testdisk may help to restore your partitions if you lose your master boot record



it can copy only the necessary data; if you repeat a copy it will try to read only the missing parts. This means that if you have two damaged versions of a single file you recover the file completely, providing the damaged parts don't overlap.

Ddrescue's similarity to dd also means it can act as a direct replacement. The syntax differs from dd, however: provide the file or device to copy from first followed by the destination. Append the logfile option to keep track of what has been copied:

```
# dd if=/dev/hda3 <
  backup.img logfile
```

Once the restored image is created you can run a filesystem check on it to access the data and salvage as much as possible. See screen 2 for an example of the output of ddrescue compared with dd. As with partimage, you can install ddrescue in Ubuntu Linux with the apt-get command.

### Partition tables

In last month's Hands on (see [www.pcw.co.uk](http://www.pcw.co.uk)), we looked at how partitions are set up on PCs and saw that they are stored on the master boot record (MBR). A good preventative step to avoid difficulties later is to

make a back up of your MBR. This is stored in the first sector (512bytes) of the hard drive, so you can do this easily with dd:

```
# dd if=/dev/hda of=mbr bs=512 <
  count=1
```

The bs option sets the block size (the number of bytes to read in one chunk) and the count option sets the number of blocks to copy. This command therefore makes a raw copy of the first sector of the 'hda' hard drive and puts it in the file 'mbr'. Make a copy of this file on a different computer or a separate storage device, such as a USB pen drive.

If you lose your MBR and don't have a copy to restore, you will find that the computer cannot find any partitions, thus any data, on your drive at all. In this instance a useful application is Testdisk ([www.cgsecurity.org/wiki/TestDisk](http://www.cgsecurity.org/wiki/TestDisk)).

This is an open-source tool that will scan your drives for partitions and try to recover the details of the partitions (see screen 3).

So long as only your MBR is damaged and you are using regular filesystems, this tool should reliably recover the partition table and can write it back to the drive for you. **PCW**

## Recovery CDs to help retrieve data

Performing system and data recovery is sometimes a critical task, so there are a few dedicated Linux distributions created for that purpose. These will boot from CD, or possibly from a USB pen drive, and usually give network access as well as access to all your drives. Most will enable you to recover data from all kinds of operating systems, not just Linux. One such example is SystemrescueCD ([www.sysresccd.org](http://www.sysresccd.org)).

This is based on the Gentoo Linux distribution and includes partitioning utilities such as gparted, and recovery utilities including dd, ddrescue, partimage and Testdisk. It also includes full read and write support for NTFS partitions. An alternative is to boot into a regular Linux distribution from CD, such as the Ubuntu desktop CD, and install the necessary utilities into the live system.



**Ken McMahon** is a freelance journalist and graphic designer. His involvement with digital cameras began with a Commodore 64. He graduated to Macs and now works mostly with PCs.

→ Comments welcome on the Digital imaging & video column. Email [digitalimaging@pcw.co.uk](mailto:digitalimaging@pcw.co.uk). Please do not send unsolicited file attachments.

# Noise pollution

Effective image noise reduction programs and plug-ins can be found for little outlay

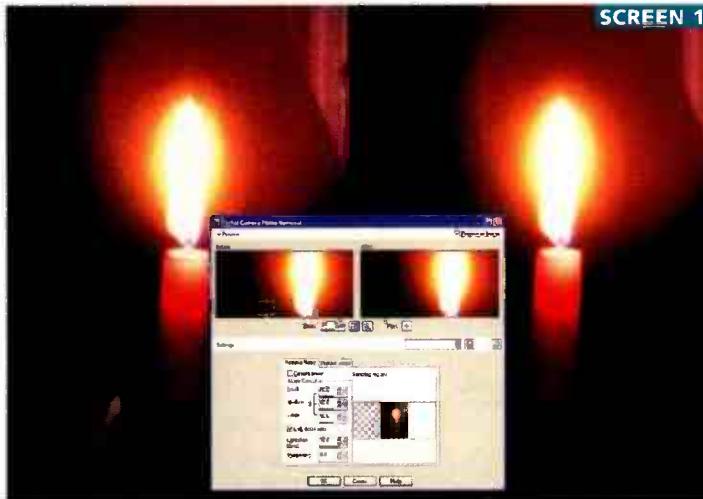
**T**his is not the first time I've covered dealing with digital noise, but it is the kind of problem that's going to be around for a while, despite advances in sensor technology.

As Gordon Laing pointed out in the Winter 2006/7 issue of *PCW*, camera manufacturers seem intent on packing more and more sensor sites on to smaller and smaller chips, resulting in higher resolution images but at the cost of increased signal-to-noise ratios.

In most circumstances, noise isn't something to worry about. At low ISO settings, you'd have to look carefully to spot it using anything but a camera phone. But if, like me, you do a lot of shooting in low light and don't like using flash, noise is something you have to learn to deal with.

The first step is to ensure you get the exposure right. In low light, you're often shooting using the camera's maximum aperture and trying to minimise subject or camera movement by selecting a shutter speed above 1/30th of a second. You'll have set the camera ISO to its maximum sensitivity – 800 or even 1,600 ISO.

In these circumstances, it's tempting to try to steal a stop of exposure by, say, shooting at 1/30th instead of the indicated exposure of 1/15th to avoid the possibility of camera shake. The problem arises when you come to adjust the image. 'Stretching' the histogram using a levels adjustment to redistribute all the pixels bunched on the left of the chart across the full tonal range, thereby lightening the image, solves one problem but causes another. Because relatively few bits are used to record shadow detail, stretching the histogram in this way brings out a lot of noise along with any shadow detail there might be. Of course, there are situations when a photo with a lot of



There are three sampling regions set by default. To set your own, drag in the left-hand thumbnail. Obviously, you need to define image areas where the noise is worst, but you also need to steer clear of areas with lots of image detail.

Selecting regions of flat colour (where noise is usually most evident in any case) produces the best results.

The Remove Noise tab has three Noise Correction sliders – small,

noise is better than no photo at all, or one with camera shake, which is a lot more difficult to deal with than noise. So given that noisy pictures are sometimes the only ones you can get, what can you do to improve them?

## Noise abatement

As little as two or three years ago, if you wanted to get rid of – or, more realistically – reduce noise in your images, the only option was a plug-in or a utility specifically designed for the job. These days, most photo editors include noise reduction filters, though they don't all work the same way and some are better than others.

Corel Paint Shop Pro 9 was one of the first applications to incorporate a noise filter and, though in the current version – Paint Shop Pro Photo XI – it is little changed, the Digital Camera Noise Removal filter is still a sophisticated and effective tool. Like most of Paint Shop Pro's filter dialogue boxes, it contains before and after preview thumbnails, in this case with the added functionality of setting and displaying sampling regions used to differentiate noisy pixels from genuine image data (see screen 1).

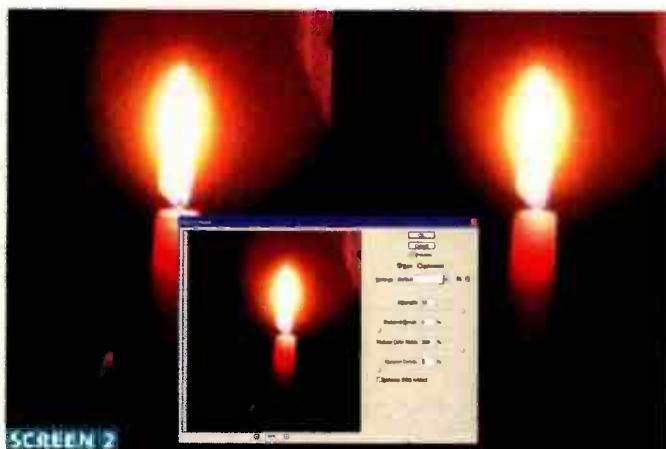
Paint Shop Pro's filter on the default settings. On an image like this, the detail loss is less obvious. Ordinarily you'd be more conservative

medium and large – which work on pixel clusters of different sizes. The small and (to a lesser extent) medium sliders do a good job of reducing noise while maintaining image detail. The large one does a lot of collateral damage and so I tend to leave it alone. For all but the worst cases, you won't need to set any sliders beyond 50.

Below the noise correction sliders are two further controls labelled Correction Blend and Sharpening. The first of these blends the noise-corrected image that you see in the preview thumbnail with the original, reintroducing some of the image detail that may have been lost in the process. The second, as far as I can see, applies the unsharp mask filter.

These tools provide a quick fix and you might want to use them if you're defining a filter preset, particularly for use in a batch process. But for individual images, I prefer to leave these set to zero. If you duplicate the background layer before applying the filter, you can use the layer opacity and blend controls to better effect.

You can also use mask layers to restrict the filter to only those parts of the image that require it.



SCREEN 2

Alternatively, if you're looking for a quicker, more automatic way to restrict the filter, try the Protect Image tab. This uses a hue map to define a range of hues that you can protect from the actions of the filter. As noise is mostly confined to shadow regions, if you confine it to the lighter-toned hues it can be quite effective.

### Photoshopping noise

Photoshop's Reduce Noise filter is a more straightforward tool than Paint Shop Pro's, at least in basic mode. There are four sliders controlling Strength, Preserve Details, Reduce Color Noise and Sharpen Details. While it's not impossible to go over the top with Photoshop's Reduce Noise filter, it's a more subtle tool than Paint Shop Pro's. Even if you max out all the sliders, you'll get an improved, though slightly soft image (see screen 2).

In advanced mode, you can apply the filter to individual colour channels. Noise is usually more pronounced in one channel – usually, but not always, blue (see screen 3) – so by restricting the filter to that channel, or at least applying more noise reduction to that channel than the others, you can achieve better results with less overall image softening. If you intend to use this feature, first (in Photoshop) press Ctrl & 1, Ctrl & 2 and Ctrl & 3 to view the red, green and blue channels respectively and identify the channel with the worst noise problem.

Applying noise reduction to individual channels is an effective way to reduce noise while retaining image detail. If your image editor or noise plug-in doesn't provide individual channel adjustment, apply it separately to the channels that require it. This may involve splitting the image into its constituent red, green and blue channels, then recombining them after applying the filter.

**Left: Photoshop's Noise Reduction filter on maximum. It's hard to go over the top with this one**

**Right: The blue channel (right) usually has the worst noise problems**

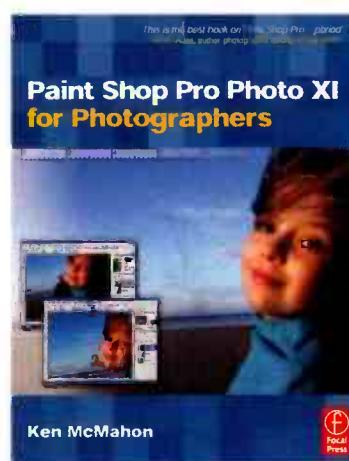
### Other tools

Other editing applications provide noise reduction but few, if any, provide the level of control available in Photoshop and Paint Shop Pro. Ulead Photo Impact's Reduce Noise filter has separate sliders for luminance and colour noise and a third for something called Impulse Noise, which I assume you either ignore or set to some arbitrary amount depending on how the mood takes you. Flippantly aside, it actually does a cracking job of removing noise and retaining detail on the default settings.

Photoshop Elements' Reduce Noise filter works, as you'd expect, in much the same way as Photoshop's, but lacks the sharpen option (no loss) and Advanced mode with individual channel control. Users of the open-source Gimp application can download Martin Egger's noise reduction script from <http://registry.gimp.org/plugin?id=6719>.

If your image editor doesn't provide noise reduction tools, or you're not satisfied with the results they produce, there are plenty of plug-in and standalone utilities to try. Some are freeware or shareware, and at under £50, even the professional-quality tools are affordable.

Neat Image, one of the best-known and more sophisticated plug-ins, is available in Mac OS and Windows versions as both a standalone application and a Photoshop plug-in. There are five



Paint Shop Pro Photo XI for Photographers

versions, ranging from a freeware edition with limited functionality to the Pro+ edition, which costs \$74.90 (about £38).

Neat Image relies on profiles to determine which image pixels are noise and which are image detail. You can generate these profiles yourself using images shot with your camera at specific ISO settings, or you can download them from the Neat Image website, where there's a large library of profiles from users. The use of profiles makes Neat Image useful if you've got lots of images taken with the same camera using the same settings. More expensive versions of the standalone application can batch process images and the Photoshop plug-in can be used in Actions.

Noise Ninja ([www.picturecode.com](http://www.picturecode.com)) is also available for Mac and PC platforms in standalone and plug-in formats. There are two versions of the standalone application. Home costs \$34.95 (£17.80) and Pro is \$69.95 (£35.60). For an extra \$10, you also get the Photoshop plug-in version.

Like Neat Image, Noise Ninja is also profile-based. Profiles are easy to produce using the supplied calibration chart and there's a long and growing list of user-generated profiles on the Picturecode website.

Other plug-ins that have a reputation for producing good-quality results include Visual Infinity Grain Surgery ([www.visinf.com](http://www.visinf.com)), Alien Skin Image Doctor ([www.alienskin.com/idoc/](http://www.alienskin.com/idoc/)) and Power Retouche Noise filter ([www.powerretouche.com/Noise-filter\\_plugin\\_introduction.htm](http://www.powerretouche.com/Noise-filter_plugin_introduction.htm)).

### Blatant book plug

The latest edition of my book, *Paint Shop Pro Photo XI for Photographers*, published by Focal Press, ISBN-13: 978-0-240-52066-7, is now on the shelves. PCW





**Tim Nott** is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

→ Comments welcome on the Word processing column.  
Email [wp@pcw.co.uk](mailto:wp@pcw.co.uk)  
Please do not send unsolicited file attachments.

# A game of tag

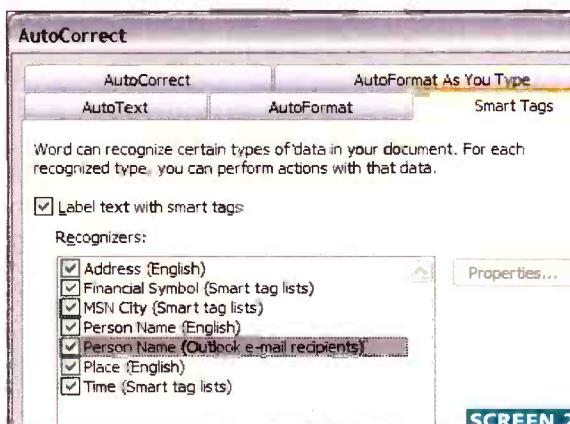
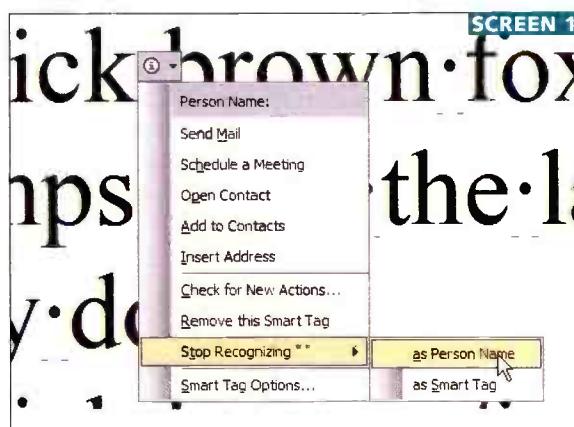
Rein in Smart Tags' random behaviour in Word and make them work for you

**R**eader Ted Ashleigh has brought us an excellent example of Word weirdness. A document on a colleague's machine appeared with two dots between each word. This wasn't caused by double spaces, as two spaces produced four dots, and in any case these weren't the normal space dots that you see with formatting marks made visible – instead of being centred in the line, these were slightly below it.

Fiddling with Word options made no difference, but a chance hovering of the mouse over a space revealed a Smart Tag Actions button, a small pop-up containing the letter 'i'. Clicking on this revealed that Word was under the impression that a space was somebody's name, and offered a number of options including sending mail. How this had come to pass was a mystery, but suspicion falls on an Outlook or Outlook Express Address book. The solution lay in the Actions Button menu: 'Stop Recognizing " " as Person Name' (see screen 1) sent all the mystery dots – which are in fact dashed underlines – away.

So, what are these Smart Tags and how can you use them? First, you need to be running Word 2002 (aka XP) or later, and have Smart Tags visible (Tools, Options, View). This will show tagged items with purple dashed underlines. You also need to have the tags recognised and the Action Buttons appearing – you'll find these options under Tools, Autocorrect Options, Smart Tags (see screen 2). We have seen that Word attaches Smart Tags to names. If you've got Outlook (rather than Outlook Express) installed, then you get a few more options such as adding a name to your contacts.

The names don't have to be in your Outlook or Outlook Express. Anything Word thinks might be a person's name is tagged. How it decides this is a



mystery. Out of a list including Jarvis Cocker, Bill Gates, Howard Hughes, Robinson Crusoe, Moby Dick, Rip Van Winkle and Tim Nott, only the Great White Whale and yours truly were honoured with Smart Tags. PCW also gets tagged, with options that include getting a stock quote, company report or recent news. Sadly, this turns out not to refer to us but to Asian Telco PCCW. The 'tickers' or stock market mnemonics for companies are stored in a data file (Program Files\Common Files\Microsoft Shared\Smart Tags), but again the selection seems random. MSFT and AAPL (Microsoft and Apple) get tagged, as do some British firms, such as BAESY (BAE Systems

PLC, formerly British Aerospace). British Airways merits a tag but only by its New York Stock Exchange name.

Word will also have a stab at tagging things it thinks might be places. PCW's home, Broadwick Street, gets a tag to summon driving instructions or a map. Unfortunately, MSN Maps goes looking for this in New York. Some items that should bear a Smart Tag don't, and some items may stop displaying their tags.

In this case, try going back to the Autocorrect Options, Smart Tags dialogue, and click the 'Recheck Document' button. This brings up a confirmation message involving the Grammar checker, but click the Yes button and you may or may not find that missing tags are restored.

You may think Smart Tags, while theoretically a smart idea, are not one of Microsoft's success stories in terms of implementation, especially for those of us who don't live in the US. In fact, Microsoft was going to implement Smart Tags in Internet Explorer under Windows XP so that any word on any web page could be turned into a link to wherever Microsoft chose.

Fortunately, this piece of blatant hijacking never made it to release.

Although there are third-party Smart Tag Recognisers available, these are usually aimed at large organisations. It is, however, possible to create your own. Although you can show off your intellectual muscle by doing this in Visual Basic, it's also possible to do something with an XML file created in Notepad. We adapted the code in the box 'Wiki travel code' (see Fig 1) from some sample code on the Microsoft website. The original looked up North American cities on MSN, so we've Europeanised this and have made Wiki Travel the search site. The important lines are those starting <FL:termList>..., which lists the cities

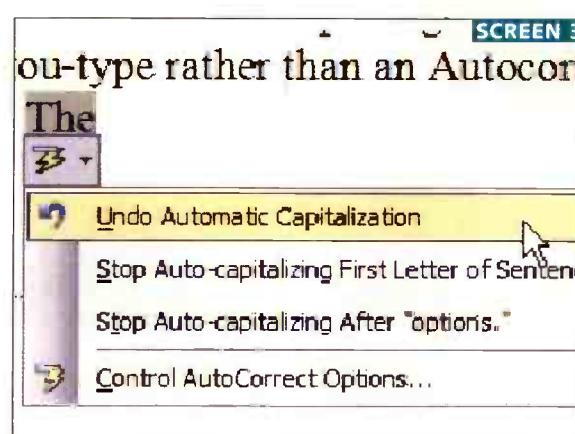
recognised and the <FL:url>, which defines the URL used for the look-up, with {TEXT} serving as a placeholder for the chosen city. Obviously you can add further cities, each separated by a comma and a space, and you could specify a different search URL – we chose Wiki Travel as the URL syntax is consistent and doesn't use countries or continents. You can download the Microsoft Smart Tag Software Developer's Kit from <http://tinyurl.com/yyf8yq>.

Two other things Microsoft (sometimes) treats as Smart Tags are the pop-ups that appear when you paste or when Word makes an Autocorrection. We covered the Paste Options button in January's column ([www.pcw.co.uk/2169117](http://www.pcw.co.uk/2169117)), but here's a reminder that should you find it distracting, you can turn it off from Tools, Options, Edit. When Word carries out an Autocorrect or Autoformat-as-you-type action, you may see a small blue box underlining the start of the corrected Word. I say 'may' as you have to backtrack to the word either using the mouse or arrow keys. When you mouse over this, the word is selected and the blue box expands to an Autocorrect options button (see screen 3).

This offers the choice of undoing the correction (which you can also do from the Undo button on the main toolbar, Alt & Backspace or Control & Z), stopping all corrections of the word, or opening the Autocorrect Options dialogue. If it's an Autoformat-as-you-type rather than an Autocorrect action, you'll see a slightly different menu (see screen 4). The Autocorrect Options dialogue also lets you stop the buttons appearing.

#### Zooming and thesaurus

Further to February's piece on looking good on screen ([www.pcw.co.uk/2171087](http://www.pcw.co.uk/2171087)), Roger Castle-Smith points out an easier way to zoom in Word if you have a wheel mouse. Hold down the Control key and rotate the wheel – this will increase or decrease the zoom



Autoformat options allow you to undo corrections

level in 10 per cent steps. And further to our suggestions for replacing Word's lamentable thesaurus, David Edwards recommends the free version of Wordweb, which is at <http://wordweb.info/>. As with Ideamagic, it sits in the System Tray and you can summon it by highlighting a word and pressing Ctrl & Alt & W. Subjecting it to the 'ass' test elicited over 50 synonyms across four senses.

#### Yet more Word weirdness

Reader Eric Meads reported that when he started up Word 2003 or a new document, it appeared in print layout view with the cursor in the Header area. He had to switch to Header and

Footer view to get out of this and wondered how he could start with the cursor in the body of the document.

Despite a lot of playing around with Normal.dot, we couldn't reproduce this, apart from getting new documents to start in print layout view. After a few fruitless suggestions, such as checking for auto macros or add-ins, the penny dropped. This is another Microsoft Word 2003 innovation, and one which has caught a lot of people out in various ways.

It goes by the name of Hide White Space. With this enabled, the area between the top and bottom margins and the top and bottom of the page are collapsed. The idea, we suppose, is to get more words on the screen, (so what's wrong with Normal View?) but as the text – or, in a new document, the insertion point – is crammed right up against the top edge of the screen page, it looks as if you are about to type in the header. Switching to View, Headers and Footers restores this area, but you then have to click out of the header to get back into the main page area. You can also turn this off from Tools Options, View or by hovering the mouse over a page division and clicking the Show White Space pop-up. PCW

FIG 1

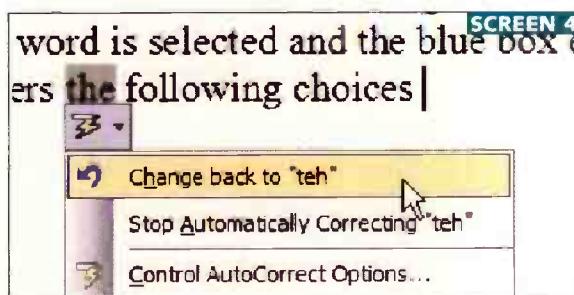
## Wiki travel code

```

<FL:smarttaglist xmlns:FL="urn:schemas-microsoft-com:smarttags:list">
  <FL:name>Wiki Travel City Lookup</FL:name>
  <FL:lcid>1033,0</FL:lcid>
  <FL:description>Looks up City Guides on Wiki Travel</FL:description>
  <FL:updateable>false</FL:updateable>
  <FL:updatefrequency>10080</FL:updatefrequency>
  <FL:autoupdate>true</FL:autoupdate>
  <FL:smarttag type="urn:schemas-microsoft-com:office:smarttags#CityGuide">
    <FL:caption>Wiki City</FL:caption>
    <FL:terms>
      <FL:termlist>London, Edinburgh, Paris, Barcelona, Manchester, Rome, Riga, York, Madrid, Dublin, Helsinki, Stockholm</FL:termlist>
    </FL:terms>
    <FL:actions>
      <FL:action id="CityGuideLookup">
        <FL:caption>Lookup Wiki Travel Guide</FL:caption>
        <FL:url>http://wikitravel.org/en/{TEXT}</FL:url>
      </FL:action>
    </FL:actions>
  </FL:smarttag>
</FL:smarttaglist>

```

(Key: ↵ code string continues)



Autocorrect options help as you type



**Stephen Wells** is a freelance journalist and a regular contributor to computer magazines. He's been writing PCW's Spreadsheets column for over 10 years.

→ Comments welcome on the Spreadsheets column.  
Email [spreadsheets@pcw.co.uk](mailto:spreadsheets@pcw.co.uk)  
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# Create your own add-in

How to set up custom functions and store them in an add-in for easy access

**D**o you have a formula you need every now and then, but can never remember where the reference is? It's a good idea to save it in a custom function, or User Defined Function (UDF) as it's called in Excel.

If you have a number of such functions, they will always be to hand if you put them in an add-in. It's easy to create custom functions and your own add-in.

Let's start by making a UDF that calculates your body mass index (BMI) when you enter your height in feet and inches and your weight in stones. Open a new workbook. Press Alt & F11 to open the VBA for Excel editor. On the Insert menu, choose Module. In the Code window that opens, type Function BMI and press Enter. The following appears:

```
Function BMI()
End Function
```

Point the cursor between the parentheses and enter:

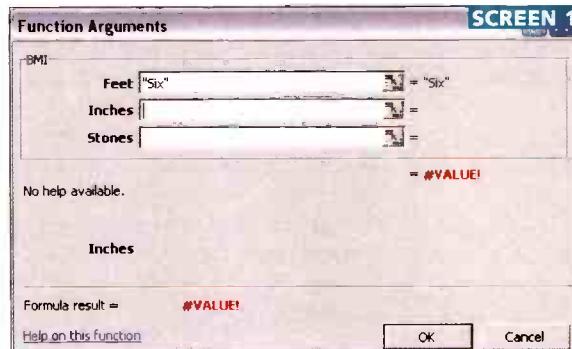
```
Feet As Double, Inches As Double, Stones As Double
```

(Key:  $\vee$  code string continues)

Ignore any pop-ups that may appear. The VBA editor is only trying to be helpful. Feet, inches and stones are the bits of information the new function is going to ask the user for. 'As Double' is the data type and tells Excel that the user will be entering numbers. In fact, if you try to enter text instead of a number for feet, inches or stones, Excel will object and shout #VALUE! in bold red type in this function's dialogue box (see screen 1).

BMI is calculated as weight in kilograms divided by height in metres squared. All the following code does is convert the user's entries to metric and calculate the BMI. Enter this between the existing two brief lines of code:

```
BMI = Round((0.454 * (14 *  $\vee$ 
Stones) / ((0.0254 * ((Feet *  $\vee$ 
```



**(12) + Inches)) ^ 2)), 1)**  
You'll find the caret mark  $\vee$  above the 6 on the top row of a regular keyboard. The ROUND function here cuts the answer down to one decimal.

It's hardly necessary in a macro this short but you should know that you can add comments in your macro by preceding them with a single apostrophe. In this function's code, you might like to include:

**' Calculates Body Mass Index**

In the listing on screen, any comments will appear in green. Now the code for your new function should look like this:

```
Function BMI(Feet As Double,  $\vee$ 
Inches As Double, Stones As Double)
    ' Calculates Body Mass Index
    BMI = Round((0.454 * (14 *  $\vee$ 
    Stones) / ((0.0254 * ((Feet *  $\vee$ 
    12) + Inches)) ^ 2)), 1)
End Function
```

Press Alt & F6 to return to your worksheet to test that it works. Click on a cell. On the Insert menu, choose Function and then under Category choose User Defined. Select BMI and click OK.

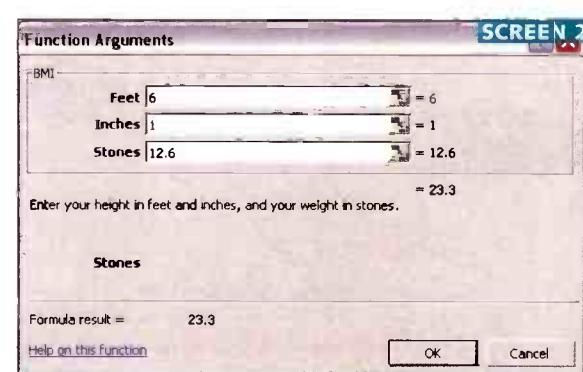
A Function Arguments dialogue box will open. If you enter my details, 6 for feet, 1 for inches and 12.6 for stones and click OK, you should see the answer 23.3 in the cell. If a lady enters 5 for feet, 6 for inches and 10

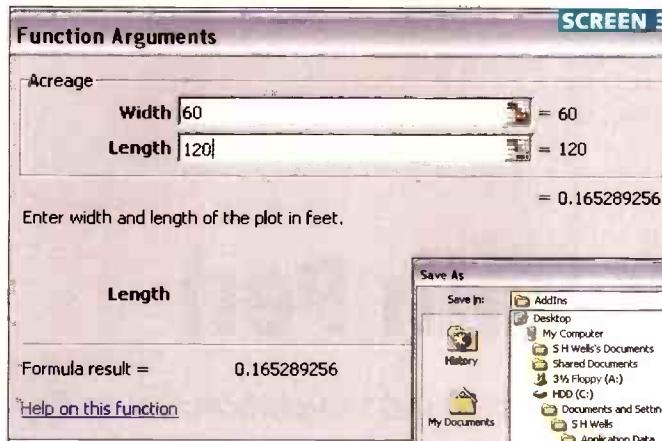
for stones, the answer should be a BMI of 22.6. Now you know the function works, you can enter your own details, which will be of much more interest. Unless you're a muscular athlete or some other exceptional case, the guideline for a normal BMI is between 18.5 and 24.9.

In the Function Arguments box, you'll have noticed it says 'No help available'. But we can fix that. Press Alt & F8 for the dialogue box that lists the macros in the workbook. Don't be discouraged that your function isn't listed. In the Macro name: box at the top enter BMI and click the Options button. Ignore the Shortcut key option. In the bottom box labelled, Description: type **Enter your height in feet and inches, and your weight in stones.**

Click OK to close this box. Back in the Macro dialogue box, click Cancel. Click the fx button at the left of the Formula Bar. Choose the User Defined category and then BMI. You'll find this helpful description both in the Insert Function dialogue box and the Function Arguments box (see screen 2). Very professional.

I should mention that you could enter the required values for your function in cells of the worksheet and then enter the cell addresses in the function. If the feet were in A1, the





inches in A2 and the stones in cell A3 you could enter A1, A2 and A3 as the function arguments.

### Create another function

Press Alt & F11 again to open the VBA for Excel editor. Under the code for your BMI function, enter the code for another UDF. Here is a function to calculate the volume of a cylinder:

```
Function Cylinder(Height As Double, Radius As Double)
    ' Calculates volume of a cylinder
    Cylinder = Height * Radius ^ 2 * 3.14159
End Function
```

Close the VBA editor. Press Alt & F8 for the dialogue box that lists the macros in the workbook. In the Macro name: box at the top, enter Cylinder and click the Options button. In the bottom box labelled Description: type Enter height and radius.

Here's a third custom function. It calculates the acres, or more likely fraction of an acre, of a building plot when you enter the width and length in feet:

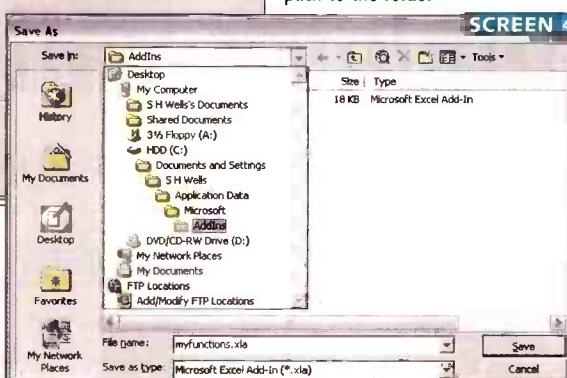
```
Function Acreage(Width As Double, Length As Double)
    ' Calculates acreage of a plot
    Acreage = (Width * Length) / 43560
End Function
```

If the answer is less than an acre, this function provides the answer as a decimal. But you can format a cell as a fraction before or after entering this UDF. Choose Cells on the Format menu, then Fraction in the Number category and Up to two digits under Type. Now .25 of an acre will be shown as 1/4.

Close the VBA editor and press Alt & F8 to show the macros dialogue box. In the Macro name box at the top, enter Acreage and click the Options button. In the bottom box labelled

Left: This function calculates the acreage of a building plot

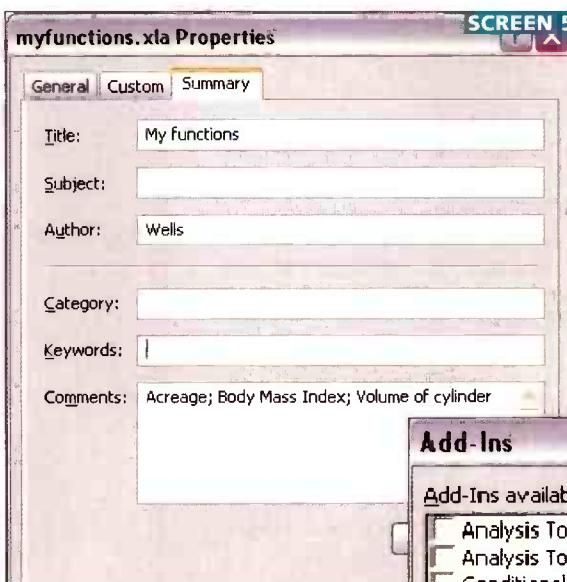
Below: When you save an add-in file, Excel will show the path to the folder



Description, type Enter width and length of the plot in feet (see screen 3). Save the workbook with a name like myfunctions.xls. This creates a workbook with the new functions in it.

### Create an add-in

At the moment, these three functions are only available in the new workbook you have just saved, or in other workbooks if your new workbook is open at the same time. But you can always have them available if you store them in an add-in. If your new workbook has



Above: Give your new add-in its own contents list

Right: Your add-in's name and a description are displayed

the default three worksheets, delete two of them to save memory.

Choose Save as on the File menu. In the Save as dialogue box type your chosen name, like myfunctions.xls in the File name: box. The .xla extension signifies an add-in. Where it says Save as type, click the down arrow and choose Microsoft Excel add-in. In Excel 2000, XP and 2003 the Save in box at the top will now say add-ins by default. (In earlier versions you have to find the add-ins folder yourself.) If you click the down arrow by the Save in box it will show you the path to the folder (see screen 4). Save the file there. Close Excel.

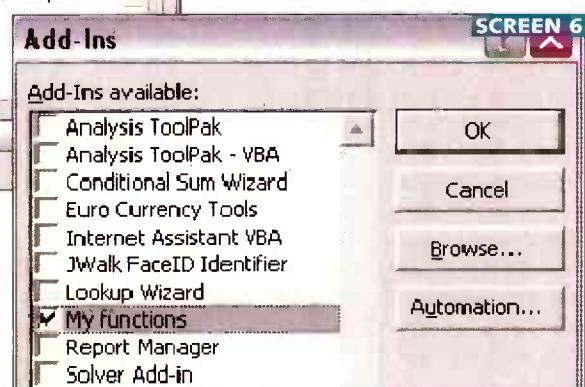
To give a title to your add-in and have a description appear in the add-ins dialogue box use Windows Explorer to go to this folder. The path is probably C:\Documents and settings\Your name\Application Data\Microsoft\AddIns.

Right-click on the icon of your add-in file and choose Properties. Three tabs will be displayed. Click the Summary tab. In the Title box, type a name for your add-in. This can be useful if the file name of the add-in is not self-explanatory. In the list of add-ins in Excel later you will see this name instead of the name of the actual add-in file (see screen 5).

In the Comments box, you can give a description that will also be displayed in the add-ins dialogue box. In this case it might be Acreage; Body Mass Index; Volume of cylinder. Click Apply and then OK.

Open Excel and choose add-ins on the Tools menu. Click on the box next to your add-in to put a check mark in it. This makes the add-in available (see screen 6).

When sharing workbooks and wishing to have the functions available, you can either include your functions in the workbook or send on your add-in when you send on your workbook. PCW





**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. It returns in the June issue. Email [webdev@pcw.co.uk](mailto:webdev@pcw.co.uk) Please do not send unsolicited file attachments.

# Simple templates with Perl

How to create a professional-looking, user-friendly web-based search function in Perl

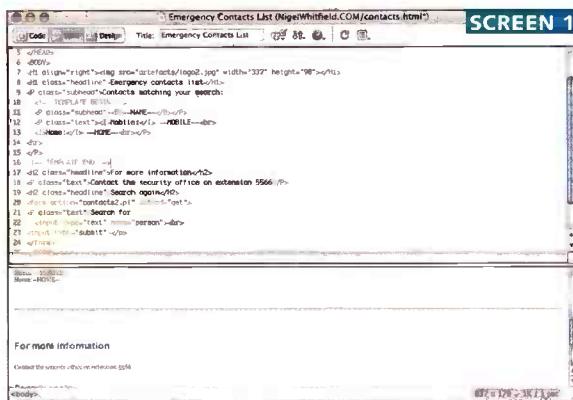
Last month, we looked at the basics of Perl and saw how a very simple script could be used to extract information from a file on a web server URL. We showed how saving a file in Csv format from Excel and writing a few lines of script would make it accessible from any web browser and support basic queries.

The results were displayed as text, which may not be enough if you want to create a good-looking site. This month, we'll look at some more functions in Perl and show you how to use pattern matching and substitution to create a script that does much the same job, but uses an HTML file as a template to create attractive results.

## Making a template

The first step is to design the page for your results. Some web design tools, such as Dreamweaver, have methods of creating templates for database-driven websites, but here we just want something simple. Using whatever method you fancy, mock up a page designed to show someone's name, mobile and home phone numbers as in my test script (see Fig 1). You can add extra information if you wish.

We'll use pattern matching to replace information in the template with data from our Excel Csv file. Start by picking as examples some data that should fit – for example, the longest name in the database – and create a page that looks good. Try to ensure there's a clearly defined area of the page where the information will appear and that your design would look good if the contact details were copied and repeated immediately below where they appear. This is so that things still look good when you have more than one result. Ideally, you want a page that has information above and



below the results, such as the company logo, links to other parts of the site and so on.

Next, you need to turn the page into a template that our Perl script can work with. Replace the dummy data with something that doesn't appear anywhere else in the page. For example, the sequence --NAME-- probably won't be found elsewhere, and similarly --HOME-- and --MOBILE-- can be used for the home and mobile phone numbers. We'll put code in the script to replace these tokens with the genuine data.

How does the script know which is the part of the page it can repeat if there are multiple entries that match our search term? We'll add a bit of code that marks the start and end of the area where the contact details for each person appear. Do this using HTML comments, so there's nothing visible on the page. If the editor you use doesn't have an option to insert comments, switch to viewing the source and enter a line that says <!-- TEMPLATE BEGIN -->

above the start of the contact area, and below it, add one that says <!-- TEMPLATE END -->

Take care to avoid breaking any tags, or causing problems with nested tags, if the area is repeated.

**Simple HTML comments are used to mark the repeating areas of our template code**

## The logic

We saw last month how you can read through a file in a script and look for lines that match. We used that to select information from the Csv file. This month, I'll use the same technique to create a page using the template.

The script will start reading the HTML file and send each line to the web browser until it spots the TEMPLATE BEGIN comment. Then it will make a copy of everything between there and the TEMPLATE END. When that section has been read, the database will be searched and for each item that matches, the data grabbed from between the TEMPLATE comments will be used to create HTML code with the information. Finally, the rest of the file will be sent to the browser, completing the page.

To prevent the code from becoming an unsightly mess, I'll split it up into various sections, using subroutines. These are just sections of the Perl code that are more or less self-contained and can be called from elsewhere. You can pass parameters to them, just as with Perl's own functions.

The main part of the code will read through the HTML file. When it's got all the template info, it will call a subroutine that does the search, and that will itself call another one to format and output each result.

## The code

Our subroutines begin with the word sub, followed by a curly bracket; another one closes them. You can put them before or after the main section of code. We also then have a line like **local (\$n, \$h, \$m) = @\_**;

This tells Perl that these are variables that can't be accessed from outside the subroutine; @\_ is a special array, which contains all the parameters passed to the routine. Since it's an array, you need the brackets round the list of

variables. You'll also notice two ways of calling the subroutine; you can use either the name prefixed with & or the word do followed by the name. Use the former if you want to use the return to pass a value back from a subroutine, for example

```
$noFound = <
&query_contacts($find) ;
(Key: < code string continues)
```

The next thing to look at is the main code. You can see we've used a similar loop to last month's code to read through the template file, and the same sort of pattern matching function to look for the start and end of the template section. Obviously, since we're creating a proper web page, we use the content type of text/html this time. When the start of the template section is found, we use .= to append the next line of HTML to the existing contents of our template string.

Going back to the subroutines, performing a substitution is simple; it looks like the pattern matching we've done but this time there are two parts, preceded by the letter `s` for substitution; the first part shows what we're looking for, and the second is the substitution. The trailing letter `g` means 'global', without which Perl would replace the first occurrence of the pattern in the template string.

Finally, we've used this pattern matching and substitution again, in processing the Query String from the environment; we look for any text that matches 'person=' and replace it with nothing. Why? So we can add a nice touch at the bottom of our web page with a little snippet like this

```
<FORM METHOD="GET" ACTION=<br>
"contacts2.pl">  
<P>Search again: <INPUT TYPE="text" NAME="person"><BR>
<INPUT TYPE="submit"></P>  
</FORM>
```

With a search box added, we have a page that fits the design of our website and works in a way most users will understand.



## SCREEN 2

## Code for contact details template page

```

#!/usr/bin/perl
#
# Emergency contacts script for PCW

sub query_contacts {
# routine to find the required name from the database
local ($query) = @_ ;

    open( CONTACT, 'EmergencyContacts.csv' ) ;

    while(<CONTACT>) {

        ( $name, $home, $mobile) = split(',') ;
        next if $name eq 'Name' ;
        next if (( $name !~ /$query/i ) && \
        ( $query ne '' )) ;
        do display_contact($name, $home, $mobile) ;

    }
}

sub display_contact {
# output a contact record, using the template
local ($n, $h, $m ) = @_ ;

    $output = $template ;
    $output =~ s/--NAME--/$n/g ;
    $output =~ s/--HOME--/$h/g ;
    $output =~ s/--MOBILE--/$m/g ;

    print $output ;

}

print "Content-type: text/html\n\n" ;
open(TEMPLATE,'contacts.html') || die("Can't find template
file\n") ;

$templateFound = 0 ;

# strip out the field name if we have a query
$find = $ENV{'QUERY_STRING'} ;
$find =~ s/person// ;

while(<TEMPLATE>) {

    if ( $templateFound ) {
        if ( $_ =~ /-- TEMPLATE END --/ ) {
            $templateFound = 0 ;
            # query the database
            &query_contacts($find) ;
        } else {
            $template .= $_ ;
        }
    } else {
        if ( $_ =~ /-- TEMPLATE BEGIN --/ ) {
            $templateFound = 1 ;
        } else {
            print $_ ;
        }
    }
}

```

(Key: < code string continues)



**Alan Stevens** has implemented and supported networks for over 25 years, working for IT vendors, system integrators and customers. He now mostly researches and writes about networking matters.

→ Comments welcome on the Networks column.  
Email [networks@pcw.co.uk](mailto:networks@pcw.co.uk)  
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# A question of power

How and when to use Power over Ethernet to support your peripheral devices

This month's Network Hands on is all about Power over Ethernet (PoE), concentrating on how it works and what you can do with it. I'll also discuss the IEEE standard governing the technology and the pitfalls to look out for when choosing and configuring PoE kit.

## What is Power over Ethernet?

The first thing to understand is that PoE has nothing to do with so-called 'Powerline' or 'Homeplug' networking, which use your mains wiring to transmit network data. It's almost the exact opposite.

What PoE does is eliminate the need for a separate AC power supply and an AC-to-DC transformer for individual network devices. Instead DC power is centrally generated and sent to compatible devices using spare wire pairs in the UTP (unshielded twisted pair) wiring used to cable up most data networks.

The benefits are obvious. Only one cable is required for both power and data, making it a lot easier to position wireless access points, surveillance cameras and other devices in locations where power outlets are unavailable. Similarly it cuts down on cable clutter and eliminates the need to find spare sockets for all those ugly AC adapters, or wall-warts as some call them.

PoE also allows power distribution to be centrally managed – an increasingly crucial consideration in this era of high energy costs. You can control the power to devices remotely and, by adding a central Uninterruptible Power Supply (UPS), protect network devices from the vagaries of the mains supply.

Of course there are downsides as well. The devices involved must be designed to receive their power over the Lan, although some enterprising vendors offer splitters to separate the



power for use with non-PoE enabled devices, such as the D-Link DWL-P50 (pictured above left), which can be bought for about £15.

There are strict limits to how much power can be delivered, primarily to prevent the cables from getting too hot, the plastic sheathing cracking and shorts appearing. Safeguards are also needed to protect sensitive device electronics where cables have been wired incorrectly or a non-PoE device gets plugged into a PoE-enabled port.

Fortunately most of these problems are addressed by the IEEE 802.3af standard, to which most PoE-enabled products adhere. However, check for conformance before ordering as there are still non-standard solutions around.

## What the standard says

The 802.3af specification covers the two components required for PoE – the powered device (the PD) and the power sourcing equipment, or PSE.

Power sourcing equipment can take two forms: mid-span hubs that inject power into the cabling between a

network switch and attached devices, or end-span hardware, where PoE support is built directly into the network switch.

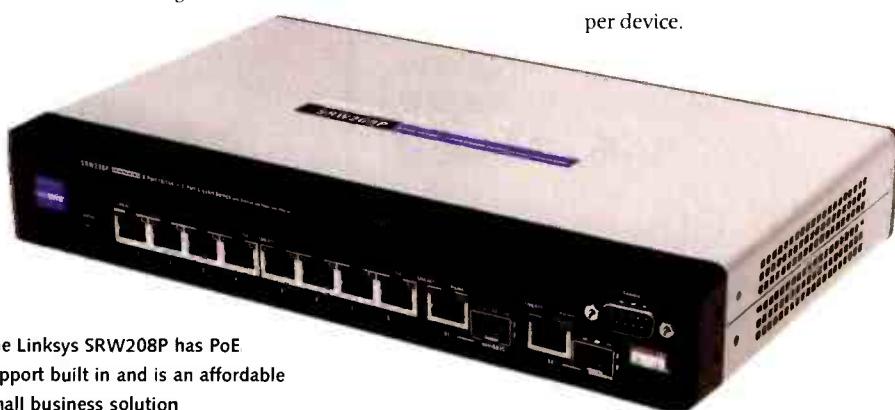
There are pros and cons to each. Mid-span hubs cause little disruption because they work with existing network switches. However, they take up space and you have to run extra cables. That's because each switch port requires a cable to the mid-span, where the power is injected, then another to carry the mixed power and data to the device. For this reason, mid-span hubs have two sets of UTP ports (in and out, pictured left), and come in similar range of port sizes to the switches they connect to.

Replacement switches are neater, but ripping out and replacing hardware can be costly, especially on a big network.

It's also worth mentioning that although there are no 'spare' pairs on a Gigabit Ethernet connection, it is possible to transmit 802.3af compatible power across such a link. However, I've only seen PoE support on expensive enterprise Gigabit Ethernet switches.

## PoE devices

Powered devices include wireless access points, cameras and IP telephones, which operate on little power. That's because the 802.3af standard specifies transmission of 48V with a maximum allocation of 15.4W per device.



The Linksys SRW208P has PoE support built in and is an affordable small business solution

You can't charge the battery of a notebook or run a desktop PC using PoE, although that may change as the IEEE is at work on a follow-up PoE Plus specification (802.3aF) that may eventually enable up to 50W to be carried over UTP network cabling, with some pre-standard solutions already available from PowerdSine ([www.powerdsine.com](http://www.powerdsine.com)) and others.

Distance also has an effect. The maximum allowed for by 802.3aF is 100m, but additional power will be dissipated as cable length increases such that only about 13W will be available at the full distance.

### A real PoE example

When first introduced in 2003, PoE equipment was costly and mostly aimed at large enterprises. Recently, prices have tumbled and cheaper small-business products have been introduced, some even falling within the range of the ambitious home user.

One is the Linksys SRW208P, an eight-port 10/100Mbps/sec Ethernet switch, which comes with two Gigabit Ethernet uplinks and web-based management, plus support for PoE on all eight Fast Ethernet connectors (see picture on previous page).

Selling for about £150, the SRW208P is an affordable solution if you want to add power to a small network. But like many low-end PSE products, it suffers a big drawback – a limit on the amount of power it can deliver at any one time. In fact it can only provide the full 15.4W specified by the 802.3aF standard to up to four ports at a time. Plug in more than four PoE devices and the amount each port can draw starts to drop. Use all eight connectors, and you're limited to just 7.5W per port.

Still, 7.5W is more than enough for many devices. Most basic IP phones can operate on 5-7W and the SRW208P also has built-in Quality of Service features, making it worth considering if you're deploying a small IP-based telephony system. Moreover, it's possible to see exactly how much power attached devices are consuming via the web-based management console, and prioritise PoE delivery on a port-by-port basis (see screen 1) to share out what's available more effectively.

It's very easy to install and set up with PoE enabled, by default, on all eight ports. All you really have to do is plug it in and turn it on, although you may want to fine-tune the networking features and power delivery once it's up and working.



On most PoE switches you can prioritise power delivery to share out limited resources

Similarly, at the device end all that's needed is to plug the hardware into the Lan. If a device isn't PoE enabled the PSE will notice it doesn't have the resistors specified by the 802.3aF standard and turn off power to that port. If it is, the device should simply power up as normal within a few seconds of being connected.

### What's it good for?

So it's easy, but why might you want to consider PoE on a small home or business network? After all, if you only have a few users it may not be worth the extra expense and bother.

In its defence, PoE doesn't have to be that expensive and, with low-cost products like the SRW208P, can work out cheaper than employing a Part P

qualified electrician to run extra sockets. I recently wanted to install a network camera by my front door and had no trouble at all running a UTP lead across to it. All the nearby power sockets, however, were down at floor level while the camera was high up outside. Quotes for a new AC outlet came in at about £200-£300 – a lot more than using PoE.

Remember power limits, though. 15W is enough to drive most fixed-lens cameras but you're unlikely to find products with pan, tilt and zoom features able to get power this way.

With wireless access points, too, the value of PoE is debatable, as on a small network there's usually no need to locate access points in out-of-the-way places to get adequate coverage. Moreover, you won't find PoE support on any of the access points or wireless routers aimed at the home and small-business market.

Which, at present, just leaves IP telephony as the main driver for PoE deployment, making it more a business than home user technology. This is all the more so given that most home users now favour wireless over cabled networks and, as much as they'd like to, network vendors have yet to come up with a way to distribute power over a wireless Lan. PCW

## Windows port filtering

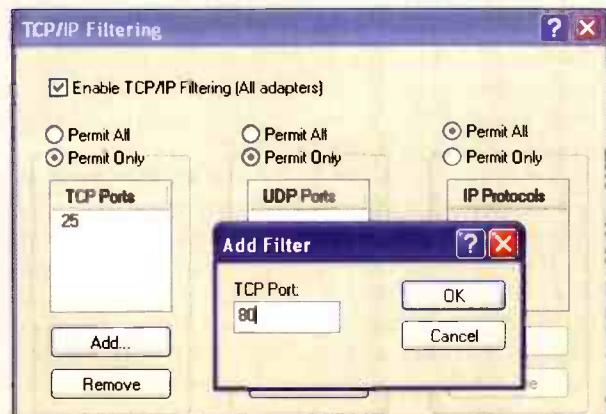
Thanks to reader Geoffrey Smith who emailed to point out that I'd overlooked an easy-to-use port-filtering tool in a recent article on that subject (March 2007, see [www.pcw.co.uk/2173555](http://www.pcw.co.uk/2173555)).

To get to this tool, open a Windows network connection and click on Properties before choosing Properties for the Internet Protocol (TCP/IP) entry. Click on the button marked Advanced; you should find TCP/IP Filtering under the Options tab. Highlight it and choose Properties again to get to the dialogue box (see screen below) from which you can tell Windows to filter traffic and allow communication only on certain ports.

On the downside you need to know which port numbers you want to leave open, with no useful list or explanations like those provided by a lot of firewalls. And if you turn filtering on for one adapter, it's applied to all, which could be a bit restrictive where the PC is connected to the internet and a local network. It's not a good idea to consider using this tool if you're also using the built-in XP desktop firewall or a third-party alternative.

Still, it's easy enough to use and can filter TCP and UDP ports independently, and block other unwanted protocols. Plus it's installed for you as part of the operating system and is available in Windows NT and 2000 as well as XP.

If you want to restrict IP port access on a Windows PC, you can use the TCP/IP port filtering option in the network connection properties





**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.

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# Amicable separation

Why relational databases separate data and interface; Psion tools and more uses of '&'

It is important to remember that relational database management systems (RDBMS) are, as the name suggests, systems for storing and managing data. They are not the application that runs against the database. They are not the UI (user interface) that people use to interact with the data. They are not the reports that are run against the database.

As the computing world began to use databases (a long time ago), it soon became apparent that separating the data handling from the application was a seriously good idea. Hence we developed 'Client-server' databases; the RDBMS runs on the server and the application on the client. The communication between the client and the server is very simple. The client sends a request for data expressed in SQL; the data is returned from the server as an answer table of data.

This separation is important because when a new way of presenting data comes along (such as the web browser) we can simply hook that new type of application into the existing databases. It also means that one database can have as many different applications connecting to it as we like.

In addition, the separation compartmentalises the development. Database designers can focus on the design of the data storage and handling. They need to know all about tables, primary keys, foreign keys, referential integrity and all that jazz, but they don't have to know anything about good UI design – that's handled by someone with those skills. Is this an advantage? Well, if you ever look at a web page designed by a database designer (and I include myself), you will be an instant convert to this concept.

At first sight, Access appears to be an exception to this rule. It not only

SCREEN 1				
App : Table				
AppointmentNo	InitialDate	Repeat	EndDate	
1	01/01/2007	No	01/01/2007	
2	02/02/2007	Weekly	05/03/2008	
3	03/05/2007	Monthly	01/01/2011	
4	04/05/2007	Yearly	01/01/2010	
*	(AutoNumber)		No	

handles the data but also provides form and report tools.

However, Access does separate the two functions. Within it, there is the Jet database engine, which is what actually stores and handles the data. It is possible to completely ignore the UI part of Access and simply address the Jet engine programmatically.

Ultimately, Access is really no different from RDBMS such as Oracle. If you send Oracle (the company) more money, it will also sell you Oracle Forms, which is a component of the Oracle Developer Suite. There is nothing to stop one company from selling you both the engine and the UI components, as long as the clear separation exists; Microsoft simply bundles the engine and the UI bits together.

So, this separation of church and state is very important, but it doesn't mean that the development of the database and the application can proceed totally in isolation, as the question below illustrates.

## An appointment with design

Steve D emailed me. He is developing a front end in C# connected to SQL Server 2000. The front end has three fields (among others) that allow the user to enter an appointment date, select whether the appointment is a recurring one, based on a number of options – daily, weekly, monthly and so on – and finally enter the end date.

His question was about how to store the data so that the system can calculate, on a given date, which appointments are due. This turns out to be a very intelligent question with a complex answer.

Suppose I am the database designer and I completely ignore the

querying requirement, then the answer is clear. We store the data in a table like the one in screen 1.

(A real table would, of course, include other information, such as the name of the person making the appointment and so on, but we'll keep it simple.)

If the EndDate is the same as the InitialDate then the appointment is not repeated. We can calculate from this data that the second appointment will actually involve 57 visits:

02/02/2007  
09/02/2007  
.....

29/02/2008

Relational databases are supposed to store data with minimum redundancy, just as this table does. (To be pedantic, this table does have some redundant information. When we have a 'no' value in the Repeat column, the EndDate has to be the same as the InitialDate. But the repeated data is minimal.) So, as the database designer, I can argue that I have done my job properly. It is now up to the application designer to formulate the question that runs against the data store.

And in this case, the question is going to be a

SCREEN 2	
AppointmentID	AppDate
1	01/01/2007
2	02/02/2007
2	09/02/2007
2	16/02/2007
2	23/02/2007
2	02/03/2007
2	09/03/2007
2	16/03/2007
2	23/03/2007
2	30/03/2007
2	06/04/2007
2	13/04/2007
2	20/04/2007
2	27/04/2007
2	04/05/2007
2	11/05/2007
2	18/05/2007
2	25/05/2007
2	01/06/2007
2	08/06/2007
2	15/06/2007
2	22/06/2007
2	29/06/2007
2	06/07/2007
2	13/07/2007
2	20/07/2007
2	27/07/2007
2	03/08/2007
2	10/08/2007

**SCREEN 3**

swine to devise and execute. Suppose that, as the application designer, we want to know how many appointments to expect on 3 May 2008. We have to devise a query that looks at every row and calculates whether that appointment actually falls on that date. There are various ways to solve that problem but if we have a large number of appointments, it is going to be computationally a very expensive query that will have to run every time that question is asked about any date. Ouch.

OK, I'm still the database designer, but this time I'm aware of the problem facing the application designer. Can I find an alternative data structure that makes life easier for them? Of course. In addition to the table above, I can add one that explicitly holds the date of each appointment (see screen 2). The query to find the appointments for 3 May 2008 is now incredibly simple to write:

```
SELECT AppDate.AppDate, 
AppDate.AppointmentID
FROM AppDate
```

WHERE  
AppDate.AppDate=#5/3/2008#;

(Key: ↲ code string continues)

and will run much faster (see screen 3). On the other hand, we now certainly have a considerable quantity of redundant information in this database, since all the data in

With this new table, the database becomes very easy, and rapid, to query even for ranges of dates

the new table is derivable from the first one.

So we have two very different approaches. One stores the minimum of data but is slow to query; the other stores redundant data but is much faster to query. A very difficult question to answer is "which of these two solutions is better?" but I'll try my best to answer it next month.

#### & another thing...

In January, I wrote about the text concatenation operator '&' and how it can be used to turn multiple text strings into one ([www.pcw.co.uk/2168951](http://www.pcw.co.uk/2168951)). I described how, if you have three columns of text, you can build an update query to concatenate them into one. Even if one (or more) of the fields is empty, the concatenation will produce a string from the values it finds.

The & operator has another trick up its sleeve: it will automatically convert anything it is asked to concatenate into a string. If you ask it to combine '6' from a Number field and 'or half a dozen' from a Text field, it will obligingly do so, without complaining about incompatible data types (see screen 4). The only proviso is that the destination field for the concatenation has to be of type Text, not Number.

Incidentally, I also said in January that the + operator can also be used for concatenation, but that "if any of the strings being concatenated is null or zero-length then the entire string becomes null".

I have been asked why this is so. Well, remember that null means 'this

value is unknown'. Now imagine you're summing the contents of three number fields. The first has 2 in it, the second has 7 and the third contains a null value. What would you give as the answer to the sum  $2 + 7 +$  unknown value? If the third field contained a zero, then the answer would be 9, but we don't know if it contains a zero; we don't know what it contains. So we can't answer the question. If we humans can't give the correct answer, how can we expect a poor, simple operator to do so?

#### Psion scion

David McDaniel is looking for a program as similar as possible to the 'Data' program on the Psion 5mx because he would like to transfer his old data to his laptop. He wants something as basic as the Psion program, as much for its nostalgic value as its simplicity.

The easiest solution for moving the data is probably the Psiwin program that was supplied by Psion. This can be used not only to move the data to a PC, but can also help to convert it to various other formats (Csv, Access, Dbase, Foxpro).

For a program to handle the data, if it's contact information then Outlook may well be suitable. If it isn't, then a simple flatfile DBMS (such as the database component of Microsoft Works) could be appropriate. Anyone moving data from small devices in general (such as Psions, Palms, Nokia and Pocket PCs) may find the information at [www.filesaveas.com/pdaconvert.html](http://www.filesaveas.com/pdaconvert.html) useful. PCW

**SCREEN 4**

This is the Update query to concatenate a number and a text string using the '&' operator: the result is shown below



**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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# XNA: the great gaming hope

Quick and easy to use, XNA could bring the spontaneity back to games development

**X**NA is Microsoft's gaming library for the .Net Framework, which I previewed in this column in December 2006 (see [www.pcw.co.uk/2167413](http://www.pcw.co.uk/2167413)). XNA is now fully released, with the final code improving on what was already an easy to use library. It is a must-have for anyone interested in games programming. A launch event at Warwick University last year featured Lionhead's Peter Molyneux, creator of several well-known games, including Populous and Fable, and developers from Rare, whose titles include Viva Pinata, Kameo and Perfect Dark Zero.

The university link is that computer science students are a prime target of Microsoft's marketing. Computer science is suffering a severe decline in course numbers. "The number of people applying to courses has dropped by about 40 per cent in the past few years," said Rob Miles, a lecturer in computer science at Hull University. He hopes that including games programming on the syllabus will help to attract new students.

Serious games programming today is done in C or C++ for maximum performance. But many simple games are coded in Flash and run from websites, while Java is used widely for mobile devices.

XNA has more graphics power than Flash, since it draws on the same underlying DirectX API that most C++ game developers use on Windows. Microsoft has also ported the runtime to the Xbox, so you can run the same code on Windows and the console. XNA is a free download, but if you need to run on the Xbox 360, you have to subscribe to the XNA Creator's Club to get the requisite codes. You should also get hold of the Xbox 360 controller for Windows, since many of the examples assume its presence.



Easy games programming languages are nothing new. There were versions of Basic packaged as STOS and Amos for the Atari ST and the Amiga in the 1980s, while Dark Basic, like XNA, is a wrapper for DirectX. Dark Basic now also comes in a .Net version, called Dark GDK. Although these tools have been successful among hobbyists, none has seriously challenged C++ among professional programmers. A key question is whether XNA is powerful enough to be more than a toy. Judging by Microsoft's launch event, the answer is a definite maybe, with developers from Rare and Lionhead speaking warmly of its potential while admitting that for the time being, it is not being used for their own releases.

This is partly because XNA is new and unproven. There is a high-end professional edition in preparation but not yet released. Another factor is that every games studio already has an extensive re-usable library of low-level code. Moving to a different code base would be risky. On the other hand, the productivity gain is substantial, so the business case is compelling.

Rare's Nick Burton is a software engineer who programmed graphics for Kameo and other games in C++ and assembler. "We've wanted to see

something for education, for hobbyists," he said. "We've been well aware that writing games excludes a lot of people." The problem is the high complexity of games programming, which requires years of experience. This may be stifling some of the creativity that inspired computer gaming in its early years.

Peter Molyneux told us how he created Populous on the Amiga in a small bedsit. "My games programming made me a fortune. I'll describe how you can do the same with XNA."

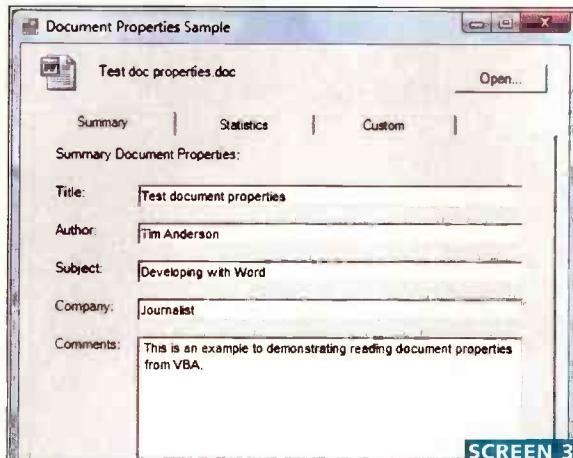
Undoubtedly, XNA programming is far easier than coding to the DirectX API. Burton explained how the Rare team created impressive XNA demos in under two weeks without previous experience of XNA or even C#. No-one pretends the performance is quite equal to C++, let alone assembler, yet the overhead may be less than 20 per cent, which can be swallowed quickly in the next round of CPU improvements.

It all sounds good, yet even Molyneux acknowledged that for now, games programmers still need C++ for commercial gaming. The other snag is that graphics coding is only part of the challenge. Another barrier to entry is 'assets' – the images, landscapes and designs needed to populate your game's virtual world. In the days of early arcade games, such as space

This XNA title, XNA Racer, features fast action and impressive shading effects

All done with XNA: Spacewar Evolved, Microsoft's C# tutorial





SCREEN 3

invaders, any fool could create a few spindly aliens and a blocky gun emplacement, whereas today, gamers expect cinema-like quality. It seems unlikely that the days when a blockbuster game could be created in a bedsheet will really return. That said, XNA really does bring simple games within any programmer's reach.

### Reading document properties

Reader Ernie Jones writes: "I am writing a macro in Excel to list all files in a directory, then put various characteristics of each file in cells along the row. I can't get the document author to appear. Since this could be a handy tool, I'd like to get it to work."

Ernie's first thought was to automate Word, loading each document and then inspecting the document properties. This is slow and error-prone. Up until Office 2007, Word documents used a format called OLE structured storage. Microsoft has a free download called *dsofile.dll*, which is a Com library for reading and writing the properties of an OLE structured storage document (see screen 3). The library works well with either Visual Basic 6.0 or VB.NET, and probably with any application that can use Com. Usage is straightforward: create a new instance of an *OleDocumentProperties* object, call its *Open* method to load a document, and then read the *SummaryProperties* collection. It is quicker and more reliable than automating Word.

Unfortunately, *dsofile.dll* has no understanding of the new Office document formats, such as Word's *.docx*. These are formed of several XML files compressed into a single zip. You can explore this if you have Word 2007. Save a document and then rename it with a zip extension. Right-click and choose Extract All. This creates a directory with the same

Read and write document properties with *dsofile.dll*

name as your document. The standard document properties are *core.xml* in a subdirectory called *docProps*.

This new approach is better for cross-platform support or working with standard XML tools but annoying if you have developed a system using the old OLE properties. One option would be to create a wrapper class in .NET that uses *dsofile.dll* for old documents, and the new System.IO.Packaging namespace for Office 2007 documents. This requires .NET Framework 3.0. Here is a snippet of code for reading docx properties:

```
Private Sub ReadDocProps()
    (ByVal sFileName As String)
    Dim doc As
    System.IO.Packaging.Package
    doc = System.IO.
    Packaging.Package.
    Open(sFileName)
    Dim props As
    System.IO.Packaging.
```

```
PackageProperties = doc.PackageProperties
With ListBox1.Items
    .Add(
        ("Creator: " + props.Creator)
        .Add("Title: "
        " + props.Title)
        'etc...
    End With
    doc.Close()
End Sub
```

(Key: ↵ code string continues)

It would not be possible to use this from VBA. You could create a .NET add-in for this, or use Visual Studio Tools for Office (VSTO). PCW

### Resources

For XNA downloads, see <http://msdn.microsoft.com/directx/XNA/>

*Dsofile.dll* is at <http://support.microsoft.com/kb/q224351/>

## Am I running on Vista?

Now that Vista is out and about, it can be handy to check whether your code is running on Vista or an older version of Windows.

In Windows Vista, the major version number of the operating system is 6. In .NET applications, you can check for Vista by checking whether *System.Environment.OSVersion.Version.Major* is 6 or higher. In C or C++ you can check this with *GetVersionEx*.

Unfortunately, this method is not reliable. If the user is running your application in a compatibility mode, the API may lie. Oddly, a .NET application running on Vista with compatibility set to Windows 2000 returns 5, whereas when compatibility is set to XP it returns 6. So how can you be really sure?

One idea is to look for an API function that's new for Vista, using the *LoadLibrary* and *GetProcAddress* API calls. The example below uses *CreateThreadpoolWait*, which only exists on Vista or Longhorn server. Note that you should not actually call the function, just check that it is there.

Microsoft's official advice about version checking is to check for specific features, rather than simply the version number of the operating system. Many needless compatibility issues are caused by applications running a simplistic check and bailing out, when in fact the feature they need is there all along. Even so, sometimes it is helpful to know what version of Windows is running.

Here's the code for VB.NET. For the second function to work, you need to add platform invoke declarations for the API functions

*LoadLibrary* and *GetProcAddress*.

```
Public Function IsVista() As Boolean
    Return
    System.Environment.OSVersion.
    Version.Major >= 6
End Function
```

```
Public Function IsReallyVista() As Boolean
```

```
Dim hmodule As IntPtr = LoadLibrary("kernel32")
```

```
If hmodule.ToInt32 <> 0 Then
```

```
Dim hProc As IntPtr = GetProcAddress(hmodule,
```

```
"CreateThreadpoolWait")
```

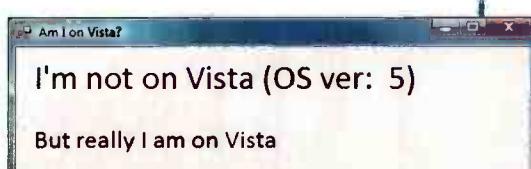
```
If hProc.ToInt32 <> 0 Then
```

```
Return True
End If
```

```
End If
```

```
Return False
End Function
```

(Key: ↵ code string continues)



This application is running on Vista, but *OSVersion* is reporting 5 because it is set to Windows 2000 compatibility. The second check reveals the lie

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# How to buy the best products tested by our Labs

This Buyer's Guide is a comprehensive listing of the best products PCW has tested across a range of areas, helping you to make the best decision when you're planning a purchase. Over the following pages you'll find products, their verdicts and ratings, plus information on where you can read the full review.

## CONTENTS

173 PCs	177 Printers
174 Graphics cards	TV tuners
Notebooks	178 Monitors
175 Motherboards	Digital cameras
Digital music players	Routers
176 Hard drives	179 Product index
DVD drives	

Prices are for guide purposes only and may be subject to change



## HOW TO BUY: PCs

Many of the choices you are faced with when buying a PC are covered in the following pages. You need to think about the graphics card, memory, 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



### Mesh Elite E6600

£999 ★★★★  
Reviewed April 2007  
[www.meshcomputers.com](http://www.meshcomputers.com)

Strong performance and a good price tag make this a very tempting PC.

### Evesham Solar Creation

£999 ★★★★  
Reviewed April 2007  
[www.evesham.com](http://www.evesham.com)

A decent Windows Vista Premium desktop for less than £1,000.

### Shuttle XPC P2 2500G

£2,150 ★★★★  
Reviewed [www.pcw.co.uk/2173083](http://www.pcw.co.uk/2173083) [www.shuttle.com](http://www.shuttle.com)

A little too expensive for our liking, but a powerful small form factor PC.

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.

BUYER'S GUIDE

78 PRODUCTS  
REVIEWED TO MAKE  
YOUR BUYING  
DECISION EASIER

## GRAPHICS CARDS

1	£100	Gainward Bliss 6800GS GLH	£176.19 ★★★★★	Reviewed July 2006 www.oclockers.co.uk	A terrific graphics card for those who like to dabble with overclocking.
2	£100-£200	3D Fuzion Geforce 7600GS	£75.20 ★★★★★	Reviewed November 2006 www.novatech.co.uk	A good value card for those on a tight budget.
3	£100-£200	Sapphire Radeon X1600 XT Ultimate	£110 ★★★★★	Reviewed September 2006 www.sapphires.com	Not totally fan free, but still one of the quietest cards around, and performs well.
1	£200-£349	Gecube Radeon X850XT Uniwise	£269.97 ★★★★★	Reviewed May 2005 www.gecube.com	A single-slot design using Gecube's own cooling system, and it offers good performance.
2	£200-£349	Gainward Bliss 7800GT GLH	£244.89 ★★★★★	Reviewed July 2006 www.oclockers.co.uk	A little expensive, but this card has plenty of overclocking potential.
3	£200-£349	Powercolor Radeon X850XT Platinum Edition	£320 ★★★★★	Reviewed July 2005 www.powercolor.com	Based on ATI's fastest Radeon processor, this card will run the latest games with ease.
4	£200-£349	Gecube X850XT Platinum Edition Uniwise	£307 ★★★★★	Reviewed January 2006 www.gecube.com	High-end performance and quiet cooling for AGP motherboards.
1	£350+	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	£350+	MSI NX7950GX2	£408.85 ★★★★★	Reviewed September 2006 www.msicomputer.com	A dual-core card that paves the way for DIY quad-SLI.
3	£350+	Sapphire Toxic X1900XTX 512MB	£421.83 ★★★★★	Reviewed August 2006 www.sapphires.com	This is a water-cooled, overclocked and blazingly fast graphics card.

## HOW TO BUY

Most graphics cards are based on either the Nvidia Geforce or ATI Radeon family of chips. Each has 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.

## 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.

## NOTEBOOKS

1	£100-£200	Samsung NP-Q35T006/SUK	£1,056.32 ★★★★★	Reviewed March 2007 www.samsung.com/uk/	A portable powerhouse with exceptional battery life.
2	£100-£200	Mesh Pegasus S271	£799 ★★★★★	Reviewed March 2007 www.meshcomputers.com	A good, solidly built all-round notebook with decent battery life.
3	£100-£200	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	£100-£200	Rock Xtreme CTX Pro	£1,807.75 ★★★★★	Reviewed February 2007 www.rockdirect.com	Rock debuts Nvidia's Geforce Go 7950GTX mobile graphics.
5	£100-£200	Acer Aspire 5652	£1,149 ★★★★★	Reviewed November 2006 www.acer.co.uk	A fast notebook with high-speed mobile internet.

## MOTHERBOARDS

1		<b>ECS PF88</b> £64.63 ★★★★★ Reviewed August 05 <a href="http://www.ecs.com.tw">www.ecs.com.tw</a>	The PF88 is feature-packed and compatible with both Intel and AMD processors.
2		<b>Aopen i915GMm-HFS</b> £79 ★★★★★ Reviewed July 05 <a href="http://www.aopen.com">www.aopen.com</a>	The HFS makes the ideal platform for building a quiet, power-efficient Intel PC.
3		<b>Asus A8N-SLI Deluxe</b> £98 ★★★★★ Reviewed April 05 <a href="http://www.asus.com">www.asus.com</a>	A good, all-round AMD SLI board, packed with plenty of features.
4		<b>ECS 915-A</b> £61.81 ★★★★★ Reviewed June 05 <a href="http://www.ecs.com.tw">www.ecs.com.tw</a>	All the features you'd expect from a modern Intel-based motherboard and outstanding value for money.
5		<b>Gigabyte GA-M61VME-S2</b> £39 ★★★★★ Reviewed Winter 06/07 <a href="http://www.giga-byte.com">www.giga-byte.com</a>	Building a cheap, quiet PC for your granny? Job done.
6		<b>ECS RS485-M-M</b> £43.06 ★★★★★ Reviewed January 07 <a href="http://www.ecs.com.tw">www.ecs.com.tw</a>	Good budget motherboard for PC builders with home theatre in mind.
7		<b>Epox 8HDA3+</b> £79.92 ★★★★★ Reviewed July 04 <a href="http://www.epox.com">www.epox.com</a>	An AMD board that stands out from the crowd thanks to its dual Lan and external Sata support.
1		<b>Gigabyte GA-965P-DQ6</b> £164.44 ★★★★★ Reviewed October 06 <a href="http://www.giga-byte.com">www.giga-byte.com</a>	A decent Core 2 Duo motherboard that's loaded with overclocking features.
2		<b>Asus M2N32-SLI Deluxe Wireless Edition</b> £136.59 ★★★★★ Reviewed <a href="http://www.pcw.co.uk/2156925">www.pcw.co.uk/2156925</a> <a href="http://www.asus.com.tw">www.asus.com.tw</a>	This is one of the new motherboards to support the AMD AM2 socket.
3		<b>Intel D975BX2</b> £180 ★★★★★ Reviewed February 07 <a href="http://www.intel.com">www.intel.com</a>	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 processors 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.

## 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.

## DIGITAL MUSIC PLAYERS

1		<b>Sony NW-S706</b> £180 ★★★★★ Reviewed April 2007 <a href="http://www.sony.co.uk">www.sony.co.uk</a>	Sony's superbly stylish player threatens to outperform the competition.
2		<b>Sandisk Sansa e280</b> £149 ★★★★★ Reviewed March 07 <a href="http://www.sandisk.co.uk">www.sandisk.co.uk</a>	Great range of features for a very reasonable price.
3		<b>Sandisk Sansa e260</b> £149 ★★★★★ Reviewed September 06 <a href="http://www.sandisk.co.uk">www.sandisk.co.uk</a>	User-friendly and feature-rich, this mp3 player is capable of being a nano-killer.
4		<b>Netac A200</b> £69.99 ★★★★★ Reviewed <a href="http://www.pcw.co.uk/2162508">www.pcw.co.uk/2162508</a> <a href="http://www.netac.co.uk">www.netac.co.uk</a>	Broadcast your tunes directly to an FM radio with this compact portable media player.
5		<b>Maxfield Max-Ivy</b> £125 ★★★★★ Reviewed <a href="http://www.pcw.co.uk/2173471">www.pcw.co.uk/2173471</a> <a href="http://www.maxfield.de">www.maxfield.de</a>	A super-sleek player takes on the Apple iPod nano.

**P180 Silver Mid Tower Case - no PSU** Nine Hundred, Ultimate Gamer Case- no PSU



Mft Code: P180  
YOYO Code: 4136

Mft Code: Nine Hundred  
YOYO Code: 80346

£84.55 INC VAT

£68.99 INC VAT

**Socket AM2, DDR2, PCI-E AMD Motherboard**



Mft Code: AN9-32X  
YOYO Code: 80257

Mft Code: PSN32-E Plus  
YOYO Code: 21053

£119.91 INC VAT

£143.64 INC VAT

**IDOME SW510 50W Subwoofer Speaker**

£65.80 INC VAT  
YoYo Code: 4886

£65.80 INC VAT

**500GB 7200rpm SATA 2 Hard Disk Drive**



Mft Code: WD5000KS  
YOYO Code: 4147

Mft Code: ST3400620AS  
YOYO Code: 4205

£116.90 INC VAT

£82.40 INC VAT

**Core 2 Duo E6700 Socket 775 CPU**



Mft Code: BX805576700  
YOYO Code: 5143

Mft Code: ADA5000CUBOX  
YOYO Code: 1137

£343.86 INC VAT

£182.78 INC VAT

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**RX1950PRO**  
PCI-E Graphics Card

ASUS



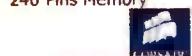
Mfr. Code: EAX1950PRO/HTDP/256M  
YOYO Code: 89817

**£123.43**

INC VAT

**2Gb(2x1Gb) XMS2**

Dominator, DDR2 PC6400, 240 Pins Memory



Mfr. Code: TWTH2X2048-6400C40

YOYO Code: 4972

**£200.59**

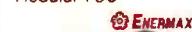
INC VAT

**IDOME DS500 50 Watt 2.0 Digital Speakers**



YoYo Code: 4885

**Galaxy 850W ATX2.2 Modular PSU**



Mfr. Code: EGA850EWL  
YOYO Code: 73127

**£179.09**

INC VAT

**LC14M HTPC Case**



MR. Code: SST-LC14B-M  
YOYO Code: 2057

**£151.34**

INC VAT

**Best Prices**

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**8800GTS 640MB PCI-E Graphics Card**

ASUS



Mfr. Code: EN8800GTS/HDP/768M  
YOYO Code: 8582

**£278.60**

INC VAT

**2GB(1x1GB) FlexXic**

1150MHz PC9200  
Memory



MR. Code: OCZ2FX11502GK

YOYO Code: 4982

**£361.53**

INC VAT

**EZ-Pack Cube Case Blik with Win + 24pin 650W PSU**



Mfr. Code: YOYO Code: 34870

**£48.65**

INC VAT

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**BUYER'S GUIDE > HARD DRIVES > DVD DRIVES**

**HARD DRIVES**

INTERNAL



**Seagate Barracuda ST3750640AS**

£352.44 ★★★★★

Reviewed August 06

[www.seagate.com](http://www.seagate.com)

An internal hard drive that provides you with a whopping 750GB capacity.

2



**Western Digital Raptor X**

£243.17 ★★★★★

Reviewed June 06

[www.wdc.com](http://www.wdc.com)

Two 75GB platters combine to create one of the fastest non-SCSI hard drives.

3



**Seagate Barracuda 7200.8 (ST3400832A) 400GB**

£186.96 ★★★★★

Reviewed July 05

[www.seagate.com](http://www.seagate.com)

This massive 400GB drive offers impressive capacity and an 8ms seek time.

4



**Hitachi Deskstar 7K250 (250GB Sata150)**

£88 ★★★★★

Reviewed May 04

[www.hitachi.co.uk](http://www.hitachi.co.uk)

Those needing a large Sata150 drive will find this a great bargain.

EXTERNAL



**Samsung Spinpoint P120S**

£80.11 ★★★★★

Reviewed February 06

[www.samsung.co.uk](http://www.samsung.co.uk)

This isn't the fastest drive on the market, but it is extremely cool and quiet.

5



**Maxtor OneTouch II Firewire 800 300GB**

£179 ★★★★★

Reviewed November 05

[www.maxtor.com](http://www.maxtor.com)

A good-quality 300GB USB and Firewire hard drive that comes with backup software.



**Western Digital My Book Essential Edition**

£149 ★★★★★

Reviewed June 06

[www.wdc.com](http://www.wdc.com)

A stylish external hard drive, but it lacks a network option.



**Lacie Safe Mobile Hard Drive 80GB**

£149 ★★★★★

Reviewed December 05

[www.lacie.co.uk](http://www.lacie.co.uk)

Featuring a fingerprint reader for security, this 80GB external hard drive would suit business users.



**Buffalo Linkstation 120GB**

£240 ★★★★★

Reviewed October 04

[www.buffalotech.com](http://www.buffalotech.com)

If you want easy-to-use external network storage, this is a great choice.



**Buffalo Ministation HD-PHS40U2/UC**

£70 ★★★★★

Reviewed April 06

[www.buffalo-technology.com](http://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 ND-4551A**

£35 ★★★★★

Reviewed May 06

[www.nec.co.uk](http://www.nec.co.uk)

An excellent DVD drive supporting every format and Labelflash technology.

2



**Pioneer DVR-110 Supermulti**

£40 ★★★★★

Reviewed March 06

[www.pioneer.co.uk](http://www.pioneer.co.uk)

Supports all major formats, including DVD-Ram. Good value for money.

3



**Toshiba SD-R6472**

£83.42 ★★★★★

Reviewed September 05

[www.span.com](http://www.span.com)

A slimline dual-layer DVD writer that performs well and is perfect for small form factor PCs.

4



**Philips DVDR16LSK**

£59.99 ★★★★★

Reviewed October 05

[www.philips.co.uk](http://www.philips.co.uk)

An excellent Lightscribe-capable dual-layer DVD burner that's very keenly priced.

5



**LG 12X Super Multi DVD**

£116.99 ★★★★★

Reviewed January 05

[www.lge.co.uk](http://www.lge.co.uk)

Good-value external USB2/Firewire rewriter with all-format media support.

**HOW TO BUY**

DVD burners can be divided into internal and external drives. Internal drives are cheaper, but require a level of knowledge so you can install them yourself. External drives can be hooked up simply via USB2 or Firewire.

Make sure your drive supports DVD+R, DVD+RW, DVD-R and DVD-RW discs. Newer double and dual-layer drives can write to new discs 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

## 1 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.

## 2



## Canon Pixma iP6700D

£149 ★★★★★  
Reviewed January 07  
www.canon.co.uk

A very competent printer, with the added bonus of an auto-duplex feature.

## 3



## Canon Selphy CP730

£170 ★★★★★  
Reviewed January 07  
www.canon.co.uk

A simple-to-use dye-sublimation printer that produces good photos.

## 4



## Epson Stylus Photo R360

£149.99 ★★★★★  
Reviewed January 07  
www.epson.co.uk

A good choice if you want to use an LCD control panel, with great-quality prints.

## 1



## Canon Pixma MP800R

£329 ★★★★★  
Reviewed July 06  
www.canon.co.uk

A capable MFD with built-in wireless networking that's easy to set up and use.

## 2



## Brother MFC-440CN

£179.99 ★★★★★  
Reviewed February 07  
www.brother.co.uk

A mid-range entry from Brother's new all-in-one range.

## 1



## Oki B2500 MFP

£149 ★★★★★  
Reviewed March 07  
www.oki.co.uk

Expensive toner, but a low RRP and great print quality.

## 2



## HP Color Laserjet 2605dn

£299 ★★★★★  
Reviewed September 06  
www.hp.com/uk

An affordable colour laser that would benefit any small business.

## 3



## Samsung CLP-300

£179.99 ★★★★★  
Reviewed February 07  
www.samsung.co.uk

Samsung combines inkjet-like convenience with laser-quality documents.

## 4



## Brother MFC-8860DN

£527.58 ★★★★★  
Reviewed November 06  
www.brother.co.uk

Fax, copy, print and colour scanning combined in a laser multifunction device.

## TV TUNERS

## 1



## Terratec Cinergy Hybrid T USB XS

£89 ★★★★★  
Reviewed June 06  
http://en.terratec.net

A dual-format USB TV tuner, complete with remote control and portable aerial.

## 2



## Elgato EyeTV

£69.95 ★★★★★  
Reviewed November 06  
www.elgato.com

A digital TV receiver and recorder for Mac OSX.

## 3



## Twinhan Magic Box

£69.99 ★★★★★  
Reviewed August 05  
www.twinhan.com

A stylish external USB2 tuner with good software and an attractive price.

## 4



## Terratec Cinergy 400 TV

£89.99 ★★★★★  
Reviewed March 05  
http://en.terratec.net

A PC Card-based analogue tuner with good software. It's a great buy for laptop users.

## 5



## Kworld Dual TV Tuner DVB-T 220

£49.99 ★★★★★  
Reviewed October 06  
www.kworld.com.tw

This device provides one analogue and one digital tuner at a decent price.

## HOW TO BUY

If you don't need colour, consider a monochrome 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](http://www.pcw.co.uk/forums)), and read the manufacturer's technical support site for any known problems.

## 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](http://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.

**YOYO**  
TECH.co.uk

House Of Technology

## 500GB USB Porsche

## 250GB Mini 1394

Ext HDD

8MB External HDD



Mfr Code: 301103EK  
YOYO Code: 4637



Mfr Code: 300998  
YOYO Code: 4974

£115.03  
INC VAT

£81.43  
INC VAT

## 20" Widescreen 8ms TFT Monitor

## 19" 2MS Webcam

ViewSonic

ASUS



Mfr Code: VA2012W  
YOYO Code: 80104

Mfr Code: PG191  
YOYO Code: 4742

£223.12  
INC VAT

£278.05  
INC VAT

## Aerocool Powerwatch Fan Controller Silver

£43.38  
INC VAT

£43.38  
INC VAT

## Z-5450 Digital 5.1 Speaker System

## IP3300 / 17ppm A4 USB Photo Printer



Mfr Code: 970181-0120  
YOYO Code: 4158

Mfr Code: 1437B018AA  
YOYO Code: 69458

£215.63  
INC VAT

£55.46  
INC VAT

## MX Revolution Cordless Mouse

## Natural Ergonomic Keyboard 4000

Logitech

Microsoft



Mfr Code: 931689-0120  
YOYO Code: 30860

Mfr Code: B2M-00008  
YOYO Code: 55996

£57.82  
INC VAT

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[www.yoyotech.co.uk](http://www.yoyotech.co.uk)

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London W1T 2JL

## MONITORS

1	20in		<b>Sony MFM-HT205</b> £649 ★★★★★ Reviewed June 06 <a href="http://www.sony.co.uk">www.sony.co.uk</a>	An elegant widescreen multimedia monitor, with superb image quality and a built-in TV tuner.
2			<b>Belinea 10 20 30W</b> £319.99 ★★★★★ Reviewed July 06 <a href="http://www.belinea.co.uk">www.belinea.co.uk</a>	A high-quality MVA panel with great specifications, but lacks a DVI port.
1	19in		<b>CTX W1961A</b> £139 ★★★★★ Reviewed April 2007 <a href="http://www.ctxeurope.com">www.ctxeurope.com</a>	A good entry-level screen for multimedia and Vista.
2			<b>Formac Gallery 1900 TNX</b> £235 ★★★★★ Reviewed March 07 <a href="http://www.formac.com">www.formac.com</a>	Good image quality and distinctive styling.
1	17in+		<b>LG Flatron L1732P</b> £239 ★★★★★ Reviewed February 06 <a href="http://www.lge.co.uk">www.lge.co.uk</a>	Fast response times make this 17in panel a good choice for gamers.

## DIGITAL CAMERAS

1	PROSUMER		<b>Nikon D80</b> £699.99 (body only) ★★★★★ Reviewed January 2007 <a href="http://www.nikon.co.uk">www.nikon.co.uk</a>	Nikon ups the ante with a 10-megapixel sensor, bigger screen and improved functionality.
1			<b>Fujifilm Finepix S9500 Zoom</b> £469.99 ★★★★★ Reviewed February 06 <a href="http://www.fujifilm.co.uk">www.fujifilm.co.uk</a>	A serious contender to entry-level digital SLRs, with a 10x zoom and 9-megapixel CCD.
1	COMPACT		<b>Canon Powershot A640</b> £329 ★★★★★ Reviewed January 07 <a href="http://www.canon.co.uk">www.canon.co.uk</a>	Outstanding image quality and a host of features make for an enticing camera.
2			<b>Casio Exilim EX-770</b> £230 ★★★★★ Reviewed March 07 <a href="http://www.casio.co.uk">www.casio.co.uk</a>	A superbly stylish compact digital camera.
3			<b>Fujifilm Finepix F31fd</b> £199 ★★★★★ Reviewed April 2007 <a href="http://www.fujifilm.co.uk">www.fujifilm.co.uk</a>	A quality digicam complete with face-finding technology.

## ROUTERS

1	WIRELESS/ MODEM		<b>Zyxel P-336M</b> £73 ★★★★★ Reviewed Winter 06/07 <a href="http://www.zyxel.co.uk">www.zyxel.co.uk</a>	Clearly demonstrates that Super G remains a valid choice, as it is both cheap and effective.
2			<b>Netgear 108 ADSL router</b> £159 ★★★★★ Reviewed April 05 <a href="http://www.netgear.co.uk">www.netgear.co.uk</a>	If you need a Super-G router with built-in ADSL modem, this offering from Netgear is great value.
1	WIRELESS		<b>Linksys WAG54G (wireless)</b> £76 ★★★★★ Reviewed August 05 <a href="http://www.linksys.com">www.linksys.com</a>	This 802.11g wireless model offers advanced features for home and professional users.
2			<b>D-Link DSL-G624M</b> £110 ★★★★★ Reviewed March 06 <a href="http://www.d-link.co.uk">www.d-link.co.uk</a>	Combines Mimo technology with Super G to give faster speeds and extended coverage.
1	VOIP		<b>Intertex IX66+ ADSL Airsip GW (wireless VoIP)</b> £269.08 ★★★★★ Reviewed March 05 <a href="http://www.intertex.se">www.intertex.se</a>	For a small business needing multi-user VoIP telephony, the Intertex IX66+ is hard to beat.

## 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.

## 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.

## 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	COMPANY	PRODUCT	ISSUE	SCORE	COMPANY	PRODUCT	ISSUE	SCORE
2K Games	Sid Meier's Railroads	Mar 07	3	Gizoo	IDE Sata Driver	Feb 07	4	Peak	Mpeg4 Pan/Tilt Internet Camera	Mar 07	3
Acer	Aspire 5101 AWLMi	Win 07	4	★ Google	Docs and Spreadsheets	Win 07	5	★ Pentax	Optio T-20	Win 07	4
Acer	p610	Win 07	3	Grisoft	AVG Internet Security	Feb 07	4	Prevx	Prevx 1	Mar 07	4
★ Acronis	Trueimage Home 10	Win 07	5	Hi-Grade	Notino W5600	Win 07	3	★ Qstarz	BT-Q815	Feb 07	4
★ Acronis	True Image 10 Home	Mar 07	4	HP	Laserjet p2015	Win 07	3	★ RH Computing	Mobile Net Switch	Mar 07	4
Adobe	Premiere Elements 3	Feb 07	4	★ HP	Proliant ML370 Generation 5	Feb 07	4	★ Ricoh	Caplio RS	Feb 07	4
Ahead	Nero 7 Premium Reloaded	Win 07	4	HP	Photosmart A618	Mar 07	4	Rimax	Alum TVIX Jukebox	Win 07	2
Aigo	A029	Mar 07	4	★ HP	Photosmart Pro B9180	Mar 07	5	Rock	Xtreme CTX Pro	Feb 07	3
Ambros	Shuttle SS31T	Feb 07	3	HP	Compaq nc6400	Mar 07	3	R-Tools Technology	R-Drive Image 3.0	Mar 07	3
Asus	A6Rp-AP026H	Win 07	3	HP	Compaq dc7700	Mar 07	4	Runtime Software	Drive Image XML	Mar 07	2
Asus	EN8800GTS	Mar 07	4	Imprivata	Onesign	Mar 07	3	★ Sage	ACT 2007	Win 07	4
Asus	M2N32 WS Professional	Win 07	4	Intel	D975BX2	Feb 07	3	Saitek	Eclipse II	Win 07	3
Atari	Neverwinter Nights 2	Win 07	4	Intervideo	WinDVD 8 Gold	Mar 07	3	Samsung	CLP-300	Feb 07	4
Avanquest	Small Business Manager	Mar 07	2	Lexmark	P350	Win 07	3	Samsung	K5	Win 07	3
Aventail	EX-750 Appliance	Win 07	3	Linksys	WRT300N-UK	Feb 07	3	★ Samsung	NP-Q35T006/SUK	Mar 07	4
Axis	212 PTZ	Feb 07	4	★ Linksys	Wireless-G PTZ WVC200	Mar 07	4	Sandisk	Sansa e280	Mar 07	4
Belkin	N1	Feb 07	3	Log Me In	Hamachi	Mar 07	3	★ Sapphire	Radeon X1950 Pro AGP	Mar 07	4
Billion	Biguard S10	Feb 07	3	Magellan	Roadmate 3050T	Win 07	3	Scansoft	Pdf Converter Professional 4	Win 07	4
Brother	MFC-440CN	Feb 07	4	★ Mamut	Enterprise E5	Feb 07	4	★ Sega	Medieval II Total War	Mar 07	5
BT	Internet Radio	Mar 07	2	Mandriva	2007 Free Linux	Win 07	4	Sony	AIT-5 (SDX-1100)	Win 07	4
★ Buffalo	Airstation Nfiniti WZRG300N	Feb 07	4	★ Medion	Gopal PNA465	Win 07	5	Sony	Nav-u NV-USOT	Win 07	2
★ Buffalo	Drivestation Duo	Mar 07	4	★ Meebo	Meebo.com	Mar 07	5	Sony	Vaio VGN-SZ3XWP	Win 07	3
★ Buka Entertainment	Pathologic	Mar 07	4	★ Mesh	D820 Value + (PC)	Feb 07	4	Sony	Vaio VGX-XL202	Feb 07	3
Canon	DC95r	Feb 07	3	★ Mesh	Pegasus S271	Mar 07	4	Sony	Vaio VGN-C1S/W.CEK	Mar 07	3
★ Canon	Powershot A640	Feb 07	4	Microsoft	Age of Empires III: War Chiefs	Feb 07	4	★ Sophos	Security Suite SBE 2.0	Feb 07	4
★ Casio	Exilim EX-770	Mar 07	4	★ Microsoft	Xbox 360 HD-DVD Player	Win 07	4	Steinberg	Cubase 4 and Cubase Studio 4	Win 07	4
Chillblast	Phantom	Win 07	4	★ Mio	Digiwalker CS10E	Win 07	4	Symantec	Norton Save & Restore	Mar 07	3
Dell	Dimension CS21	Feb 07	3	★ MSI	Megabook M670	Win 07	4	Terratec	Grabster AV400 MKII	Mar 07	4
Dell	Poweredge 1950	Feb 07	3	Navman	F20	Feb 07	4	★ Tesco	Complete Office	Feb 07	4
Dell	XPS M1210	Win 07	4	Navman	N40i	Win 07	3	★ Tesco	Internet Security	Win 07	4
D-Link	DIR-635	Feb 07	4	★ Navman	N60i	Win 07	4	★ Tomtom	One Europe	Win 07	4
D-Link	Web Smart Switch DES-1228	Mar 07	3	Navman	Travelassist	Mar 07	3	Toshiba	Satellite Pro A120	Win 07	3
EA	Cricket 07	Win 07	3	★ NEC	AD-7173A	Mar 07	4	★ Trendnet	TEW-631BRP	Feb 07	4
Electronic Arts	Tiger Woods PGA Tour 2007	Feb 07	4	Neodigits	Helios X5000	Win 07	3	Ubisoft	Dark Messiah	Feb 07	3
Epson	P-5000	Win 07	4	Netgear	Rangemax Next WNR834B	Feb 07	3	Ubisoft	Tom Clancy's Splinter		
Evesham	Axis STR Plus	Feb 07	3	Nintendo	DS Browser	Feb 07	3		Cell Double Agent	Win 07	4
Evesham	Solar XK	Feb 07	4	Novogo	S700	Win 07	4	Ulead	Photo Impact 12	Feb 07	4
Evesham	Lightbook	Mar 07	3	★ Oki	B2500	Mar 07	4	Viamichelin	X-950	Win 07	3
Exspect	Recharge4	Feb 07	4	Packard Bell	Easynote GN Skype Edition	Mar 07	4	Viewsonic	VX-1945wm View Dock	Win 07	3
★ Fujitsu-Siemens	Amilo Pi 1505	Win 07	5	Panda	Internet Security 2007	Win 07	4	★ Viewsonic	VG2230wm	Mar 07	4
Fujitsu-Siemens	Amilo Si 1520	Mar 07	3	★ Paragon	Hard Disk Manager 8	Mar 07	3	★ Watford	Performa 3500+RV	Feb 07	5
Garmin	Nuvi 310	Win 07	4	PC-Cillin	Internet Security 2007	Feb 07	3	Wyse	Streaming Manager	Win 07	3
Gigabyte	GA-M61VME-S2	Win 07	4	PC Nextday	Zoostorm 1-3301 Versatile PC	Feb 07	4	Ziplinq	Road Warrior Kit 2	Feb 07	2
Gigabyte	GV-NX88S640H-RH	Win 07	4	PC Specialist	Trident s500 (PC)	Feb 07	3	★ Zyxel	P-336M	Win 07	4

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1xPCI Express x1, 1x Parallel, 1x Serial,  
2x Front USB2.0, Front Audio, 4x Rear  
USB2.0, 2x SATA Raid 0,1  
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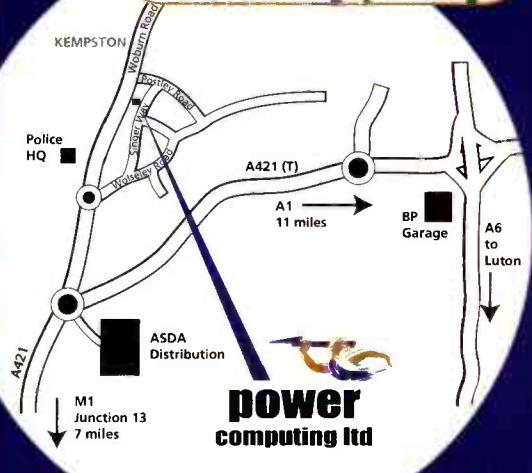
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2x Front USB 2.0 2x SATA	
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Integrated 3D Graphics	
Integrated 10/100 Ethernet	
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### BAREBONE MB BUNDLE 3

ATX Midi Tower Case PSU	
ASUS P5VD2-MX Socket 755 M/Board	
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1x Parallel 4x Rear USB 2.0	
2x Front USB 2.0 2x SATA	
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4x SATA Raid 0, 1	
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### Index

#### Business & Services

Digital Data 191  
CVS International 191

#### Consumables

Cartridge Express 184  
Manx 184  
MX2 185  
Ink Prices 185

#### Data Recovery

Dataquest 182  
Digital Data 191  
Data Clinic 191

#### Internet Services

Abel 191

#### Peripherals & Accessories

Pakuma 188

#### E-Commerce

EKMPowershop.co.uk 182

#### Laptop Batteries

ComputerBattery.co.uk 185  
Laptop Spares 191

#### Software

Computer Parts Cellar 190  
Software Partners 188  
Software Liquidation 188

#### Web Hosting

Web Fusion 186  
123 Reg 183  
1&1 184  
UK Hosts 191

#### Hardware

PC Connection 182  
Computer Parts Cellar 190  
Laptop Spares 191  
Wired2Fire 189  
Vampyre Computers 188

#### Servers

Serve 360 191

#### Recruitment

Gafoor Poultry 191

#### PCW Marketplace

Marketplace 191

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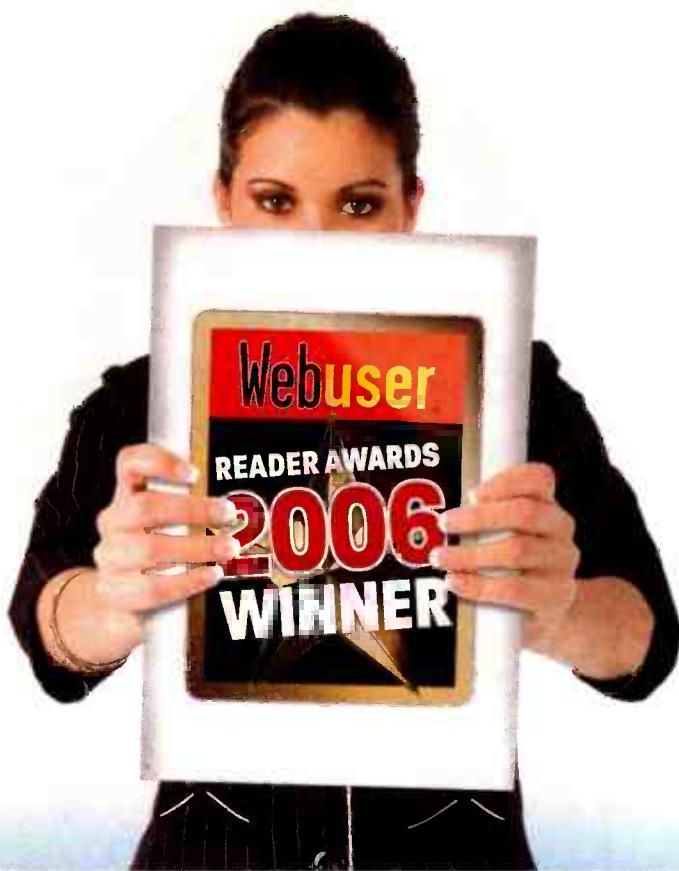
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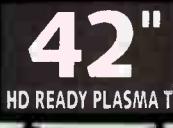
**£1099** P00030

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**£599** P00002



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**£699** P00009



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**£3599** P00036

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## ON THE CD

Webroot Spy Sweeper 5 • Novapdf Lite 3.3 • Ashampoo Music Studio 2007 • Secured Email • Website X1



## ON THE 8GB DVD

Webroot Spy Sweeper 5 • Novapdf Lite 3.3 • Ashampoo Music Studio 2007 • Secured Email • G Data Internet Security 2007 • Website X1 • Fedora Core 6 Live • Mandriva One 2007 Metisse • Knoppix 5.1.1

## SOFTWARE LISTING

### ON THE CD

#### FULL VERSIONS

Webroot Spy Sweeper 5  
Ashampoo Music Studio 2007  
Novapdf Lite 3.3  
Secured Email  
Website X1

#### TRIAL VERSIONS

Adobe Soundbooth beta 2  
Ashampoo Burning Studio 6.4  
ConceptDraw Project 3  
Paragon Drive Backup 8.5  
System Mechanic Pro 7.0.5  
ThinkFree Desktop  
3.2.0785.07

#### FROM THE MAGAZINE

AmoPlaylist Copy 1.9  
CleanUp 4.5.2  
DBPowerAmp Converter 11.5  
DVDisaster 0.7  
EasyCleaner 2.0.6.380  
IE Tab 1.3.1  
Max Registry Cleaner 6  
MOSSummer 1.2.0.5  
MediaMonkey 2.5.4  
Mp3tag v2.37a  
Registry First Aid 5.02  
Registry Mechanic 6  
Synchronize It 2.82  
FREWARE INCLUDING  
avast! Home 4.7.936

#### Comodo Firewall Pro

2.4.9.126  
Flock for Windows 0.7.9.1  
Fresh Diagnose 7.50  
Google Desktop 5.0.7  
Magnifying Glass Pro  
ScrapBook 1.1  
Unlocker 1.8.5  
WPanorama 7.0.1

#### LINUX & OPEN SOURCE

Damn Small Linux 3.2  
Fedora Core 6 Live  
Knoppix 5.1.1  
Mandriva One 2007 Metisse  
Smoothwall Express 3 alpha  
SystemRescueCd 0.3.2

#### RESOURCES

Developers  
Internet

#### GAME DEMOS

Battlestations Midway  
Europa Universalis III  
Tortuga  
UFO Afterlight

### ON THE 8GB DVD

#### EVERYTHING ON THE CD PLUS...

FULL VERSIONS  
G-Data Internet Security 2007

## 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 April 2007, cover disc ABT, First floor, 13 Clifftown Road, Southend on Sea, Essex, SS1 1AB quoting reference: 'PCW Vol 30 No 5'.

### PROBLEMS INSTALLING / RUNNING THE SOFTWARE

Check the support page on the disc or check the manufacturer's site.

### GENERAL DIFFICULTIES

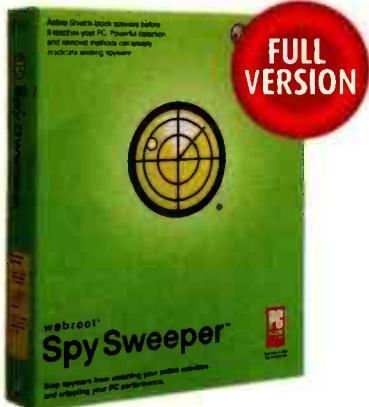
Call 08700 885 995 (9.30am to 5pm Mon, Tues, Thurs & Fri; open until 8pm on Wed and 10am to 2pm Sat). Or go to [www.vnusupport.co.uk](http://www.vnusupport.co.uk) or email us at [pcw@vnusupport.co.uk](mailto:pcw@vnusupport.co.uk).

For software requiring registration, PCW cannot guarantee that serial codes will be available later than three months from the on-sale date of the magazine. Please avoid disappointment by registering your software promptly.

## 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, 15MB hard disk space

**Contact** [www.webroot.com](http://www.webroot.com)

**Registration** Follow instructions during installation

**Need to know** Includes six months of free updates and spyware definitions from date of installation

# Webroot Spy Sweeper 5

Lock malware out with this comprehensive anti-spyware tool

It's been a while since we've had a headline-grabbing virus or worm outbreak, but don't let that lull you into a false sense of security – the web isn't getting any safer. Last year Sophos detected 41,536 new pieces of malware, and, of those, Trojans outnumbered viruses and worms by four to one. Your regular anti-virus tool might keep you safe, but adding extra protection could be more reliable. Especially when it's as comprehensive as Webroot Spy Sweeper.

At the heart of the program is a powerful spyware detection engine, capable of detecting and removing more than 160,000 malware threats, and particularly convenient to use. Spy Sweeper gives you an estimate of how long a scan will take, for instance, so you're not sitting around waiting for it to finish. Scans are highly

configurable, making it easy to decide exactly what you want to check. And you can set a priority for the scan, putting it at the top of the list if you want Spy Sweeper to finish quickly, or the bottom if you want to conserve processing power and run other programs at the same time.

Of course, if you pick up a Trojan in a scan it is really too late; it might have downloaded more files, stolen confidential data, grabbed your passwords and more. That's why Webroot Spy Sweeper also includes comprehensive real-time protection. It monitors your start-up programs looking for suspicious new items, checks ActiveX controls for potential dangers, and blocks many Internet Explorer attacks, helping prevent brand-new and unknown malware from infecting you in the first place.

## Turn your anti-spyware protection up to the maximum



**1** You can install Spy Sweeper 5 and leave it to protect you from malware. But it also has some interesting settings that could improve your protection level. Click Options > Sweep, for instance, and you can enable sweeping inside the System Restore folder and turn on rootkit detection. These will slow the scanning process but could still be worth it, especially for your first scan.

**2** Spy Sweeper's spyware detection engine is less intrusive than most, but it's still not something you'll want running in the background while you're doing other CPU-intensive things, such as playing games. And that's why it pays to have scans run automatically, when you're not around. Click Scan > Add a Scheduled Sweep > Next, then tell it when and how frequently you'd like it to run.

**3** Click Shields to view Spy Sweeper's real-time protection settings. Twelve shields are enabled by default, but there are others you can turn on. Click Windows System to enable the Keylogger shield, for instance, then select Startup Programs and choose 'Alert for all startup items'. You'll get more false alarms, but you're also more likely to trap unknown malware before it causes real harm.

## UPGRADE OFFER

### NEW FEATURES

One year of updates and support for £13

Two-year licence for £20

## EXTEND YOUR SPY SWEeper LICENCE

This version of Spy Sweeper will protect you from malware for six months from the date you install it, plenty of time to see just how well it works. But if you want to continue using the program after that, you'll have to extend your licence. Webroot offers one year of updates and support for only £19.95 (about £13), or for the best value pay only £29.95 (about £20) for a two-year licence, saving £10 (about £7). Click Options > Update > Update Spy Sweeper to see both offers or find out more.



#### INFORMATION

**System requirements** Windows 2000/XP, 2MB disk space  
**Contact** [www.novapdf.com](http://www.novapdf.com)  
**Registration** Get your key from [www.novapdf.com/free-registration.php?src=21](http://www.novapdf.com/free-registration.php?src=21)

## Novapdf Lite 3.3

Create industry standard Pdfs from Windows applications

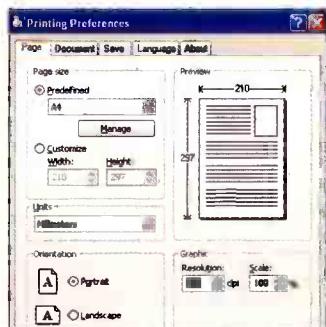
In an ideal world every application would be capable of saving its data in Adobe's Pdf format. This format produces compact files that can be read on just about every platform – perfect for distributing data online. However, the world isn't ideal just yet, so while we're waiting you can at least use Novapdf Lite.

The program is straightforward to use. Once installed, it creates a virtual printer called Novapdf Lite v3. Load or create a document in any Windows application, then use that program's print option, and send the document to the Novapdf printer. Tell Novapdf where you want to save the document, and it will create a Pdf file, then display it so you can confirm all is well. And, for the most part, that's all you need to do.

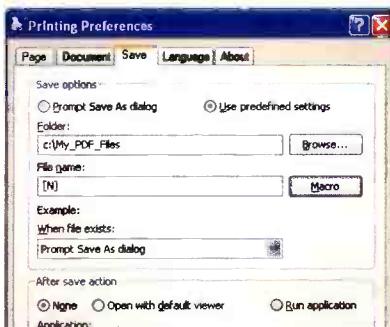
If you do need more control, then click Preferences on the Windows Print dialogue to see what other settings are on offer. The most useful one is probably resolution, which defaults to 300dpi, but can range from 72 (low-quality but small files) to 2,400dpi (large files but high-quality print resolution), according to your needs.

The Document tab lets you add a subject or custom keywords to the document, along with the title and author that are added by default. And the Save tab gives you the option to provide Novapdf with a folder and file name template, so it doesn't have to present you with a Save as dialogue each time, which is very useful if you're looking to create a lot of files in the fastest possible time.

## Customise Novapdf for even better Pdf-creating performance



1 Novapdf isn't difficult to use: click File > Print in an application, choose the Novapdf printer, and specify a folder and file name. But you can get better results with a little work. Click Preferences in the Windows Print dialogue, for instance, and choose 150dpi as the resolution. If the file is text-only and intended for on-screen reading then it will still look good, but will now be much smaller.



2 Once you're happy with Novapdf's results, click the Save tab and select None as your 'After save action'. Novapdf won't display the Pdf file after it has been created, saving you a little time. Then try clicking 'Use predefined settings', and specify a folder where your Pdf files are saved. They will then be created there automatically, with the name of your document, without you having to specify them.



3 Novapdf automatically sets the title of your Pdf file to whatever is specified by the printing application. However, this is not necessarily what you want. Similarly, Pdf files can have other details, such as subject or custom keywords. If you want to specify any of these, then select the Document tab and fill in the appropriate box.

## UPGRADE OFFER

### NEW FEATURES

- 40/128-bit encryption
- Automatic Pdf bookmarks
- Embed TrueType/Opentype fonts
- Text/graphics compression
- Create Private Profiles
- Send Pdf via email

## MOVE TO NOVAPDF PROFESSIONAL 4

Make the move to Novapdf Professional 4 and you'll benefit from security features, such as 40/128-bit encryption and the ability to restrict whether or not your files can be viewed, printed, modified, copied or annotated. It can create bookmarks automatically from document headings and give you control over text and graphics compression. And Private Profiles save all these settings, so this extra configurability doesn't slow you down at all. Best of all, if you order Novapdf Professional 4 now, you need only pay \$29.95 (about £16), a 25 per cent discount off the normal price. Visit the Novapdf registration page ([www.novapdf.com/free-registration.php?src=21](http://www.novapdf.com/free-registration.php?src=21)) to place your order.



FULL  
VERSION

#### INFORMATION

**System requirements** Windows 2000/XP,

15MB disk space

**Contact** [www.ashampoo.com](http://www.ashampoo.com)

**Registration** Check 'Get full version key' during installation, or click Internet > Buy/Register > Obtain a free full version key

**Need to know** This version works with Wma, Ogg, Flac and Wav formats, but there's no support for creating mp3 files

# Ashampoo Music Studio 2007

An easy way to extract, burn, convert, edit or repair audio files

**B**uilding a large collection of music files is easy. Managing it? That's something else. Fortunately Ashampoo's Music Studio 2007 comes packed with easy-to-use tools that will keep your audio collection in order.

There's a flexible file format conversion option, for instance. Add mp3, Wma, Ogg, Flac or Wav files, and the program will convert them to either the Wma, Ogg, Flac or Wav format. You can allow the program to automatically select a quality setting to match the original, manually select one of several profiles from 'CD Quality' to 'Low Quality', or choose a custom setting where you specify the sample rate, encoding type (VBR or CBR), bit rate and more.

Music Studio comes with a normalisation option, which rewrites a group of files so they

share the same volume. And you can edit the file tags to enter details such as title, artist, album, genre, custom comments, and more. Keep in mind that, while this version of Music Studio can read mp3 files for the conversion function, there's no mp3 write support. And so normalisation, editing and other features work with Wma, Ogg, Flac and Wav files only.

The 'Broken File Assistant' is a more unusual function, which aims to repair audio files that have been corrupted. It can't add audio information that isn't there, but you may find it enables you to play at least part of a broken file. The collection is finished off with a CD copying module and the ability to copy music to disc yourself, as an audio CD, Wma or mixed-format disk, on CD, DVD and even Blu-ray disks.

## Build great audio CDs in minutes with Music Studio 2007



**1** If your CD copying tool makes copying audio CDs difficult, then give Music Studio 2007 a try. It cuts out the unnecessary extras so you'll get the job done in minimum of clicks. Select Burn Files > Burn an Audio CD first, then choose your DVD writer from the list of optical drives. Place an empty, writeable CD-R or CD-RW in that drive, and click Next.

**2** Now specify the files you'd like to add to the CD. You can do this by manually adding files, specifying a folder, or pointing Music Studio 2007 at a playlist, whichever is most convenient. A caption beneath the list of files will tell you how much time your tracks have used up so far, and how much the CD has available.

**3** If you change your mind about including a particular file, then click it and select Remove. You can also select a file, then use the up and down arrows to move it around in the track listing. There's also an option to save your selection as a playlist when you're done. To copy your CD, just click Next > Start. Quick and easy.

## UPGRADE OFFER

### NEW FEATURES

- Full mp3 support
- Record from any audio source
- Organise music files
- Edit audio files
- Mix music tracks
- Add special effects

## MOVE TO ASHAMPOO MUSIC STUDIO 3

Move to Ashampoo Music Studio 3 and you'll gain full mp3 support, and so be able to rip to mp3, edit and repair mp3 files, and more. A new audio recording option enables you to record directly from any audio source. A file organisation tool allows you to rename or move files based on patterns such as 'artist' or 'title'. And powerful new editing tools let you mix tracks, add special effects, fade in and out, and more. And although Ashampoo Music Studio 3 is normally priced at £14.99, as a registered Music Studio 2007 owner you can upgrade for only £7.49, an impressive 50 per cent discount. Click Internet > Upgrade to Ashampoo Music Studio 3 to place your order.



#### INFORMATION

**System requirements** Windows 98/Me/2000/XP, 6MB hard disk space  
**Contact** [www.websitex5.com](http://www.websitex5.com)  
**Registration** Not required

# Website X1

Build and upload a stylish website in minutes

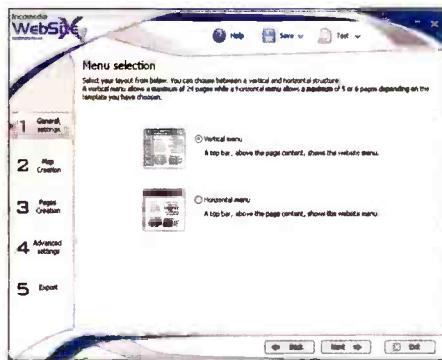
**C**reating a great website is a difficult process. You need top design skills to make sure it looks good; a quality interface so visitors can find what they need without getting frustrated, detailed knowledge of what search engines expect to ensure your site wins out against the competition, and a whole lot more. It's an intimidating list of requirements, but don't give up just yet. Website X1 is here to help, and it lets you create quality websites with no previous design experience.

The program is essentially a web design wizard that walks you through every step involved in getting your site online. You'll start by entering core details such as the site name and your email address, then move on to choose

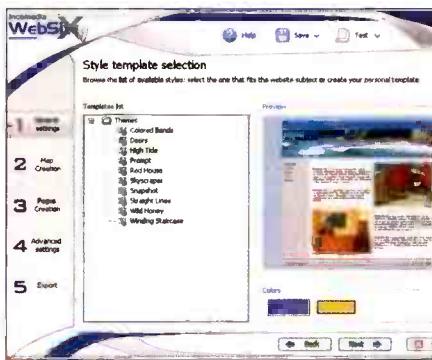
a navigation style (vertical or horizontal menus). After that you're able to pick a style template from the selection on offer. If you've used tools like this before, you'll know the templates are usually a weakness, but not here: the Website X1 examples are visually appealing.

Once you've decided how the site will look, Website X1 enables you to create and organise individual pages. Adding content to these is just a matter of dragging 'objects' onto the page itself. At their simplest, these can be text or images, but you can also add flash animations, videos, sounds or thumbnail galleries with the minimum of work. Preview the results, then upload the site to your web space with Website X1's integrated FTP client, and it's ready to share with others.

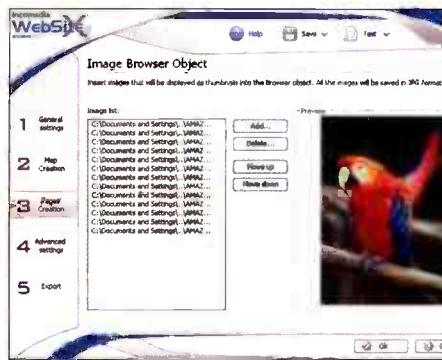
## The beginner's guide to website design



1 Launch Website X1, then click Next > Next, enter basic details such as the site title, and click Next. Here you get to choose vertical or horizontal menus. Keep in mind that Website X1 only allows you one level of pages, so choosing the horizontal menu option will limit you to five or six in total, while the vertical option allows a maximum of 24.



2 Click Next, then browse the list of style templates to find one that best suits your needs. Each style template can be customised further by choosing one of the colour schemes at the bottom of the page, so be sure to try each one before you make a final decision. Click Next once you've picked a style.



3 Click New Page in the Map Creation section to build as many pages as you need. A personal site might have Family, Gallery, CV and Links, say. Click Next to see a grid representing your page, and just drag a text, image or other object onto it to suit your needs. Finally, use 'Export website on internet' to get it online.

## UPGRADE OFFER

### NEW FEATURES

Add a site introduction  
 Up to four page levels  
 Rollover/HTML code objects  
 Slideshow with image transitions  
 Data form support  
 Create 3D buttons

## MOVE UP TO WEBSITE X5

The latest version of Website enables you to build even more versatile sites. You can use an image, video or Flash animation as a site introduction or splash screen, for example. The site itself can have up to four levels of pages, and each page may now contain lots of new objects, such as rollovers, slideshows, data forms and more. You can further customise site navigation by creating your own 3D buttons, including defining the mouseover effect. But the best advertisement is to see the impressive sites others have created with this, at the Website X5 Gallery ([www.websitex5.com](http://www.websitex5.com)).

## Secured Email



If you send confidential data or attachments via email, there's no way of telling who might intercept them on the way or when they reach your recipient.

Secured Email aims to solve this problem through an easy-to-use Outlook add-on, which encrypts your text and attachments with a 256-bit AES algorithm. This alone would be secure enough for most people, but the Secured Email authors then take a 'shared secret', a word or phrase known to both you and the recipient, and use it to generate a new and different 160-bit encryption key. The combination ensures that

### INFORMATION

**System requirements** 256MB Ram, Windows 2000 SP4/XP, 20 MB hard disk space, Outlook 2000 or later/Lotus Notes 6.0 or later, Internet Explorer 6.0 or later  
**Contact** [www.securedemail.co.uk](http://www.securedemail.co.uk)  
**Registration** Not required

Your secure emails can be read by anyone who has the Secured Email Reader – if they know your passphrase

even if the 256-bit encryption algorithm were cracked (something that's never happened), an attacker still couldn't read your messages.

Don't imagine this encryption power makes Secured Email difficult to use, though; it couldn't be easier. Once you've created the shared secret and passed it to your recipients, any Outlook message can be encrypted by simply clicking the 'Send secured' button. Your recipients will also need the Secured Email Reader, but that can be downloaded for free, and once installed it lets them reply to you securely for free, just as long as they're also using Outlook 2000 or later.

FULL  
VERSION

## UPGRADE OFFER GET HOLD OF EPRIVACY SUITE

The Eprivacy Suite takes Secured Email and adds a new module called Secured eF<sup>2</sup>, which uses the same industry strength encryption to secure both local and networked files and folders. It's entirely transparent so you've nothing else to learn, and there are handy extra options, such as the ability to create self-extracting encrypted files or time-locked files that can only be opened during the period you specify. Buy a copy of Eprivacy Suite and you'd expect to pay £75.20, but you can upgrade for about just £10. So hurry over to [www.securedemail.co.uk/vnues](http://www.securedemail.co.uk/vnues) and place your order now.

## G Data Internet Security 2007



G Data has made sure Internet Security 2007 has an answer for just about every security problem you're likely to face.

The suite comes with powerful new virus-scanning engines, there's a new rootkit detection module, and Outbreakshield provides fast protection against new malware.

The G Data personal firewall monitors incoming and outgoing internet connections to keep you safe from hackers and Trojans. It can be set up with the minimum of effort by choosing one of four profiles, or you can select a 'User defined' mode and customise the firewall with flexible networking rules.

FULL  
VERSION

### INFORMATION

**System requirements** 256MB Ram, Windows 2000/XP, 50MB disk space  
**Contact** [www.gdata.de/portal/GB](http://www.gdata.de/portal/GB)  
**Registration** Follow instructions during installation  
**Need to know** The suite works for three months after installation, or until 1 July 2007, whichever comes first

G Data Internet Security 2007 works fine with the default settings, but there's plenty of configuration options if you need them

There's also an anti-spam module, working with just about any Pop3 client to keep your inbox free of junk. You can leave the Bayesian filter to do its spam-blocking job, or fine-tune the process yourself.

The suite now includes a web filter option, which speeds up your browsing by blocking banners, pop-ups, Flash animations and animated graphics. Security features include the optional blocking of Javascript and VBScript, and easy deletion of your browsing tracks.

Add parental controls, including content filtering and monitoring of internet and PC use, and you have a particularly versatile suite.

## UPGRADE OFFER HOW TO GET A G DATA LICENCE

G Data Internet Security 2007 will keep your PC safe from harm for three months after installation or until 1 July 2007, whichever comes first. But, if you want to keep using it after that, you'll need to upgrade your licence. Another year of use will cost you €54 (that's about £36) for a single PC. However, if you have a home network, then it might be worth considering the three PC licence, which costs only €72 (about £48). Visit [www.gdata.de/portal/GB](http://www.gdata.de/portal/GB) to find out more or to place your order.

# COMPETITION

## WIN!

## Sapphire X1950XTX & X1900XT graphics cards

This month PCW has teamed up with Sapphire to give you the chance to win a superb 512MB Sapphire X1950XTX graphics card, worth £300.

This is the most powerful member of the highly acclaimed Sapphire X1900 series, aimed at the hardcore enthusiast who demands state-of-the-art performance. The card features 512MB of GDDR4 memory and enhanced clock speeds of 650MHz (core) and 1,000MHz (memory), making the X1950XTX the fastest single card in the X1900 series.

But that's not all: two runners-up will each receive a Sapphire X1900XT graphics card worth £150, which has a similar specification to the X1950XTX card except that it features 256MB of GDDR3 memory and slightly lower processing speeds of 625MHz (core) and 1,450MHz (memory).

This card still offers one of the fastest levels of performance in the industry today and unrivalled image quality.

The Sapphire X1950XTX and X1900XT both share the same revolutionary ATI Radeon architecture. This includes 48 pixel shader processors and eight vertex shader processors, together with a 512-bit ring bus-based internal memory controller. Together these components deliver true DirectX9 Shader Model 3.0 compatibility.

The huge dynamic range of these processor families enables ultra-realistic effects – such as dynamic soft shadows and the physical simulation of fluids like rain or water – to be processed faster than ever before.

Image quality is superb, with 64-bit floating point High Dynamic Range (HDR) rendering, blending capability and high-quality anisotropic filtering (AF) combined with anti-aliasing (AA). The architecture also supports ATI Avivo video playback technology that delivers vibrant high-fidelity images and video playback to the latest high definition video standards.



For more information on Sapphire's products, go to [www.sapphiretech.com](http://www.sapphiretech.com).

For your chance to win, answer the following question and enter at [www.pcw.co.uk/competitions](http://www.pcw.co.uk/competitions). The competition opens on 22 February 2007 and closes on 23 March 2007.

How many pixel shader processors does the ATI Radeon X1900 architecture include?

- 1) 48
- 2) 64
- 3) 8

This competition is open to readers of PCW, except for employees (and their families) of VNU Business Publications, and Sapphire Technology. PCW is the sole judge of the competition and the Editor's choice is final. Offer applies to residents of the UK and the Irish Republic only. Entrants must be over the age of 18 and only one entry per household will be accepted. Winners will be selected at random from all correct entries received. No cash alternative is available in lieu of prizes. VNU will use all reasonable endeavours to notify the winner(s) within 14 days of the close of the competition. VNU reserves the right to substitute the prize for one of greater or equal value if circumstances make this unavoidable. Prizes will be dispatched by the competition sponsor(s) and the winner(s) name(s) and address(es) will be provided to the competition sponsor(s) for this purpose. No purchase of the magazine is necessary to enter the competition. VNU will use all reasonable efforts to ensure that the prizes are as described on this page. However, VNU cannot accept any liability in respect of any prize, and any queries regarding a prize should be taken up directly with the sponsor of that prize.

The winners of the February competition are Sirojiddin Arifov, Thomas Zunder, Kaitlynjo Newton, Robert Lowe, Brian Redpath, Andrew Longhurst, Cheryl Porris, Ian Booth, Irene Hunter, Kieran West, Eddie Finnie, Steve Walsh, Julie Lambert, Kiera Bleddyn, Paul Fuller, Malcolm Galloway, Andrew Patterson, Christine Jackson, Mark Garth, Jim Baird, Paul Wright, Maria-Theresia Maddison, Gemma Sweeney, Alan Logan, Jim Sullivan, Lorna Templeton, Richard Ferrer, Terence Robson, Carol Gardner and Gordon Baker, who all win a copy of AVG Anti-Malware.

## ENTER ONLINE AT [www.pcw.co.uk/competitions](http://www.pcw.co.uk/competitions)

# On the web

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→ <http://labs.pcw.co.uk> → <http://www.reportlabs.com/testbed>

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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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Our tests and reviews are independent, with no outside influence from manufacturers. Vendors are not allowed to see the results of our tests before publication, ensuring you can completely trust the independence of what you read. Prices: All prices include VAT unless otherwise stated.

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tel 020 7316 9000 Fax 020 7316 9313 [www.pcw.co.uk](http://www.pcw.co.uk)

Group Editor in Chief Dylan Armbrust

Deputy Editor Kelvyn Taylor

Associate Editor (News) Clive Akass

Online Deputy Editor Will Stapley

Group Support Assistant Sofie Jakobsson

Contributing Editor Nigel Whitfield

Editorial contributors Tim Anderson, Barry Fox, Jörg Geiger, Peter Jackson, Ian Kennedy, Arlton Hoffmann, Guy Kewney, Gordon Laing, Christian Lanzerath, Niall Magennis, Manuel Masiero, Ken McMahon, Tim Nott, Barry Shilliday, Alan Stevens, Stephen Wells, Mark Whitehorn

### ONLINE EDITORIAL

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News Clive Akass

Staff writer Emil Larsen

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Stores supervisor Alan Rider

### ART & PRODUCTION

Art Editor Jonathan Ross

Group Production Editor Debbie Oliver

Senior Sub-Editor Caroline Boyle

Sub-Editors Jody Elphick, Matt Andrews, Harry Burrows

### Art & Production contributors

Julie Fuller, Lynn Jones, Bruce Mackie, Susie Norris

### PUBLISHING

Publishing Director Duncan Tickell

Deputy Managing Director John Barnes

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Marketing Manager Louise Pacey

Circulation Manager Emma Smyth

Marketing Executive Rahila Ehsan

Marketing Assistant Emma Freebairn

New Media Manager (CD/DVD) Chris Wiles

### ADVERTISING

Sales Manager Robert Beckman 020 7316 9606

Major Client Managers Mark Rankine 020 7316 9305;

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Sales Executive Carrie Bassett 020 7316 9144

US Sales Representation Global Media USA LLC,  
565 Commercial Street, 4th floor, San Francisco,  
CA 94113-3031, USA Tel: 001 415 249 1620  
[www.vnuglobalmedia.com](http://www.vnuglobalmedia.com)

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Global Media Europe Ltd, 32-34 Broadwick Street, London,  
W1A 2HG. Tel 020 7316 9264 [www.globalreps.com](http://www.globalreps.com)

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7th floor, Suite 7, 2 Fu Hsing North Road, Taipei,  
Taiwan 00 886 2 8772 5145. Contacts: Nitin Joshi, Tilly Mao

### CENTRAL PRODUCTION

Production Director Joanne Hurst

Production Manager Rachel Hutchings

Production Controller Stuart West

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joanna\_mitchell@vnu.co.uk for more information.

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## 10 tips for buying safely

- 1 Get written quotes from shops specifying components used, or print off and keep spec sheets from websites.
- 2 Use a credit card if possible for purchases of £100 or more; you could get compensation from the card company if a supplier goes out of business.
- 3 Keep good records, storing receipts, correspondence in one place.
- 4 In England and Wales, the onus is on retailers to prove that faults found within six months on purchases are not inherent.
- 5 Goods ordered online, by phone or post can be returned under the Distance Selling Regulations without explanation within a reasonable time – this is widely accepted as being seven days.
- 6 Open and inspect all goods as soon as possible after delivery and make sure they work.
- 7 Companies are not obliged to repair or replace goods damaged by accident or misuse, unless it is caused in transit by a delivery service.
- 8 Companies cannot charge for a service that isn't being delivered, but never stop a direct debit while under contract.
- 9 Consumers should not suffer financial loss for repairs that are not their fault, so claim back carriage charges.
- 10 If a dispute arises, take advice from Consumer Direct at [www.consumerdirect.gov.uk](http://www.consumerdirect.gov.uk).



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# Personal Computer World

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### Quad-core PCs

If you're fed up with budget PCs that struggle to cope with almost everything you throw at them, perhaps you will be tempted by one of these no-expense-spared quad-core models.



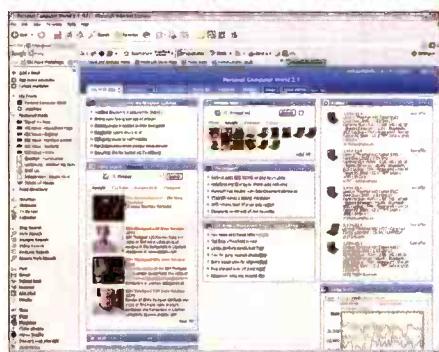
### Budget digital SLR cameras

We raved when digital SLRs finally broke the £1,000 barrier a couple of years ago, but now for almost half that price you can get a superb brand-name 10megapixel model. We take a look at the top five entry level products.



### The dawn of ultra-fast broadband

We've been promised Ethernet-like broadband speeds for years, so is it about to finally happen? We look at the forthcoming massive upheaval as BT finally ditches its ancient infrastructure in preparation for the next generation of voice and data services.



### The interactive web

In a nutshell, Web 1.0 was passive, Web 2.0 is interactive. We take a look at how new technologies and services allow you to customise the web and create novel applications to suit your taste - even if you're not a programmer.



There's lots more in May's PCW  
**DON'T MISS IT...**

## APRIL 2002

Five years ago this month we were abuzz with broadband and the repercussions for just about everyone. Pipex gave broadband in Britain a shot in the arm when it offered an ADSL link for £25 ex Vat, the cheapest ADSL deal on offer at the time.

PCW editor Dylan Armbrust speculated that teleworking via broadband would become a viable option for many of us, resulting in fewer cars on the motorways, less full trains and an extra hour's sleep since we wouldn't have to commute – a dream some of us are still waiting for.



From the archives: Take a look at the important events in technology five, 15 and 25 years ago.

We tested Microsoft's original Xbox games console which Jason Jenkins concluded was noisy and expensive. However, as a customised PC with a 733MHz Pentium III and Nvidia 233MHz GeForce 3 graphics card, it was powerful.

Other new kit came from Armari. Its Hyperthreading (HT) workstation used two 2.2GHz Xeons to break all previous labs records, even without HT enabled. Turning on HT, thus tricking the system into seeing one physical processor as two logical ones, proved a double-edged sword: in 3D Studio we saw an increase of 17 per cent, but in Sysmark performance dipped by five per cent.

## APRIL 1982

Many of us grew up learning to program in Basic, but in April 1982 the language received something of a PCW backlash. Not only did Guy Kewney berate it for teaching us bad practice and making it more difficult to move on to more powerful languages at a later date, but he also said we would do better to use Logo instead – we therefore included a feature on Logo that sang its praises.

Not content with hyping the competition, in a separate piece, Borge Christensen laid into BBC Basic.

"[It] is definitely not a structured Basic," he said. "Not even in a moderate meaning of the word. My advice to the BBC would be this: while the hardware people are improving the heatsink... have the software folk finish their homework."

Finally, PCW predicted the arrival of the hard disk drive. Not because it offered instant access and high capacity, but because the cost of filing 5.25in disks was prohibitively high. Oh, well. Our theory may have been a bit off-centre, but at least our prediction was spot on.



## APRIL 1992

Windows NT was on our minds in 1992 and we wondered whether it could take on OS/2, a joint-development between Microsoft and IBM. Our guess was that Microsoft would succeed. NT eventually formed the basis for Windows 2000 and XP.

One writer was lucky enough to visit Bill Gates' new usability lab set up to perform pre-release testing of software. Gates had been caught out before when Word 1 was released: customers didn't like that it worked with

a mouse – they would even actively avoid buying the version of Word that was sold with a mouse. The labs were Gates' way of making sure the company didn't suffer again from being too innovative.

Dell made a big splash in our hardware benchtest section with its new portable which, according to our reviewer, "makes other sub-£3,000 portables look like yesterday's news". By today's standards, Dell's 325NC looks like a brick, but at the time we were impressed by its 640 x 480 colour TFT screen, 8MB hard drive, 4MB of Ram and two-hour battery life.



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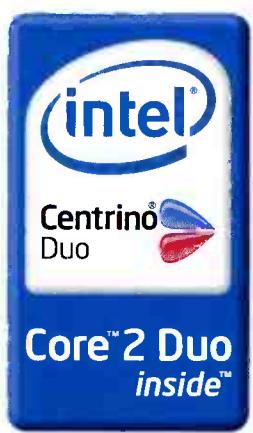
PCW, November 2006.

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