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APRIL 2006

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# The Dell Difference

## 'You get fantastic quality and value because we change the rules'

**Rule 1**
You can't get a reliable PC at a great price ...
WITH DELL YOU CAN

**Dell recommends Windows® XP Professional.**

### The Dell difference gives you great value: like free double memory!

Dell rewrote the book. Today, like every day of our 21 year history, we change the rules to deliver high quality technology at affordable prices. The Dell difference is simple. We only deal direct, so we don't have expensive store overheads or inventory, which means we can offer quality, reliable computers for an amazing price. And with Dell it doesn't stop there: we employ 4000 research and development engineers to ensure we deliver you great products that you can rely on. It's no wonder that Dell is the world's number one PC company.[1]

1IDC 2005 Q3 Vendor Ranking

### Dell™ Dimension™ 3100

- **Intel® Celeron® D Processor 346** (3.06GHz, 256KB Cache, 533MHz FSB)
- **Genuine Windows® XP Media Center Edition 2005**
- 512MB DDR2 RAM (Was 256MB)
- 160GB Serial ATA Hard Drive (7200 RPM)
- 15" Flat Panel Monitor (15.0" v.i.s)
- Integrated Intel® Graphic Media Accelerator 900
- 16x DVD+/-RW Drive[3]
- Media Card Reader Flash 13-in-1
- 56K Data Fax Modem with exclusive AOL Broadband offer from £15.99 per month[1]
- 1 Year Collect and Return Service

**£331** Excl. VAT, Shipping & Handling
**£449** Incl. VAT, Shipping & Handling
**FREE DOUBLE MEMORY**

E-VALUE Code: PPUK4-D02315A

**Further enhancements**[2]

| | Incl. VAT |
|---|---|
| • 3 Year Basic Services Package | £99 |
| • Microsoft® Office Basic Edition 2003 | £106 |
| • Belkin 6 Socket Surge Protector | £17 |

### Dell Inspiron™ 9400

- **Intel® Centrino® Mobile Technology** with Intel® Core™ Solo Processor T1300 (1.66GHz, 2MB L2 Cache, 667MHz FSB)
- **Genuine Windows® XP Home Edition**
- 1024MB 667MHz DDR2 SDRAM (WAS 512MB)
- 60GB Serial ATA Hard Drive (5400 RPM)
- 17" Wide Screen XGA (1440x900)
- Intel® GMA 950 shared graphics memory up to 128MB
- Integrated 8xDVD+/- RW Drive[3]
- 56K Data Fax Modem with exclusive AOL Broadband offer from £15.99 per month[1]
- 1 Year Euro Collect and Return Service[5]

**£699** Excl. VAT, Shipping & Handling
**£881** Incl. VAT, Shipping & Handling
**FREE DOUBLE MEMORY**

E-VALUE Code: PPUK4-N02941

**Further enhancements**[2]

| | Incl. VAT |
|---|---|
| • 3 Year Basic Services Package | £200 |
| • Microsoft® Office Small Business Edition 2003 | £224 |
| • Dell Leather Carry Case | £47 |

## ACCESSORIES

**Axim™ X51-520 MHz with WiFi® and Bluetooth®**[2]

Intel® XScale® 520MHz processor. Microsoft® Windows® Mobile® 5.0. Brilliant 3.5" QVGA screen.128MB intel® strataflash ROM. Integrated Wifi and Bluetooth®.

~~£229~~ Now **£183** Excl. VAT
~~£269~~ Now **£215** Incl. VAT

2 Year Next Business Day Exchange Support **£44** Incl. VAT

**Dell 3400MP Micro-Portable Projector**[2]

The 3400MP projector features 1500 lumens (max)[4] brightness, 2100:1 contrast ratio, native XGA resolution and weighs only 1.09Kg.

**£829** Excl. VAT
**£974** Incl. VAT

2 Year Next Business Day Exchange Support **£44** Incl. VAT

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**Re-inventing Value.** DELL

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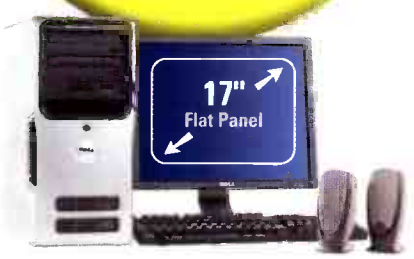
# Rule 2

**You can't get exactly the computer you want ...**

**WITH DELL YOU CAN**

# Quality PCs aren't

**Dell recommends Windows® XP Professional.**




## Dell Dimension™ 5150

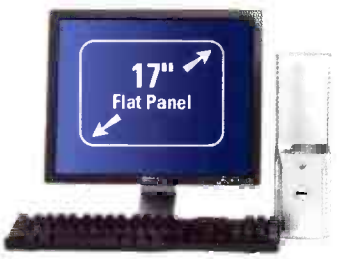
- Intel® Pentium® 4 Processor 630 with HT Technology (3GHz, 2MB L2 Cache, 800MHz FSB)
- Genuine Windows® XP Media Center Edition 2005
- 512MB DDR2 RAM (Was 256MB)
- 160GB Serial ATA Hard Drive (7200 RPM)
- Integrated Intel® Pro 10/100 NIC
- 256MB PCI Express™ ATI® Radeon™ X600 HyperMemory®
- Integrated Sound Blaster® Audigy® ADVANCED HD
- 16x DVD+/-RW Drive[3]
- Media Card Reader Flash 13-in-1
- 56K Data Fax Modem with exclusive AOL Broadband offer from £15.99 per month[1]
- 1 Year Collect and Return Service
- Internal Analogue TV Tuner & Remote

**£544** Excl. VAT, Shipping & Handling **£699** Incl. VAT, Shipping & Handling **FREE DOUBLE MEMORY**

**E-VALUE Code: PPUK4-D02516**

### Further enhancements[2]

| | Incl. VAT |
|---|---|
| • 3 Year Standard Service Package | £188 |
| • Microsoft® Office Basic Edition 2003 | £106 |
| • 5.1 5650 Speakers with subwoofer | £59 |




## Dell Dimension™ 5150C

- Intel® Pentium® D Processor 830 (3GHz, 2x1MB L2 Cache, 800MHz FSB)
- Genuine Windows® XP Media Center Edition 2005
- 1024MB DDR2 (Was 512MB)
- 160GB Serial ATA Hard Drive (7200 RPM)
- 17" Flat Panel Monitor
- 128MB PCI Express™ ATI® Radeon™ X600 HyperMemory®
- Integrated Sound Blaster® Audigy® ADVANCED HD
- 8 x DVD +/-RW Drive[3]
- Media Card Reader Flash 13-in-1
- 1 Year Collect and Return Service

**£714** Excl. VAT, Shipping & Handling **£899** Incl. VAT, Shipping & Handling **FREE DOUBLE MEMORY**

**E-VALUE Code: PPUK4-D025C6**

### Further enhancements[2]

| | Incl. VAT |
|---|---|
| • 3 Year Basic Services Package | £141 |
| • Microsoft® Office Basic Edition 2003 | £106 |
| • Dell Photo All-in-One Printer 924[7] | £70 |

## Dell Dimension™ 9150

- Intel® Pentium® D Processor 920 (2.80GHz, 2x 2MB L2 Cache, 800MHz FSB)
- Genuine Windows® XP Media Center Edition 2005
- 1024MB DDR2 (Was 512MB)
- 250GB Serial ATA Hard Drive (7200 RPM)
- 19" Flat Panel Monitor
- 256MB PCI Express™ ATI® Radeon™ X600 HyperMemory®
- 16x DVD+/-RW[3] and 16x DVD-ROM Drives
- Media Card Reader Flash 13-in-1
- Internal Analogue TV Tuner and Remote
- Dell™ 525 Speakers

**£740** Excl. VAT, Shipping & Handling **£929** Incl. VAT, Shipping & Handling **FREE DOUBLE MEMORY**

**E-VALUE Code: PPUK4-D02916**

### Further enhancements[2]

| | Incl. VAT |
|---|---|
| • 3 Year Standard Service Package | £188 |
| • Microsoft® Office Basic Edition 2003 | £106 |
| • 256MB PCI-Express™ nVidia® GeForce™ 6800 | £69 |

## ...AND MORE

### Dell 2300MP Micro-Portable Projector[2]

The Dell 2300MP Projector is an ideal combination of high brightness and XGA resolution. With 2300 Lumens (max)[4] it projects bright, captivating and stunning images from anywhere in a mid-sized room.

~~£899~~ NOW **£719** Excl. VAT
~~£1056~~ NOW **£845** Incl. VAT
2 Year Next Business Day Exchange **£125** Incl. VAT

### Targus Campus Backpac[2]

Ideal for students and today's mobile professionals with an active lifestyle. The padded computer compartment is specifically designed to protect notebooks with standard 15/15.4" inch screens.

**£29** Excl. VAT
**£35** Incl. VAT

### Dell Laser Printer 1710

This printer is ideal for home and small offices requiring fast, durable and efficient monochrome laser printing in a space-saving design.

~~£115~~ NOW **£92** Excl. VAT
~~£135~~ NOW **£108** Incl. VAT

### Kensington® Pilot Mouse Mini Wireless[2]

Maximum user comfort with programmable buttons, a scroll wheel, integrated rubber grips and DiamondEye™ optical technology allowing tracking on virtually any surface with 800dpi. Micro receiver stows to the bottom of the mouse when not in use, automatically shutting off the power, conserving battery.

**£25** Excl. VAT **£30** Incl. VAT

### Dell Ultrasharp™ 2001FP 20" LCD Monitor[2]

Dell 20" UltraSharp™ flat panel with height adjustable stand, portrait mode and 4x USB2.0 ports. UXGA resolution. Analogue/digital inputs.

~~£439~~ NOW **£351** Excl. VAT
~~£516~~ NOW **£413** Incl. VAT

### Kensington® Slim Microsaver Lock[2]

This heavy duty security device helps protect your flat panel monitor, projector or notebook computer from theft or unauthorised removal.

**£21** Excl. VAT
**£25** Incl. VAT

**Buy Now, Pay July 2006* Call for Details!**

Offer ends 1st March 2006

# always the most expensive

**FREE Double Memory**

## Dell Inspiron™ 1300

- Intel® Celeron® M Processor 370 (1.50GHz, 1MB L2 Cache, 400MHz FSB)
- Genuine Windows® XP Home Edition
- 1024MB DDR2 SDRAM (Was 512MB)
- 60GB Hard Drive
- 15.4" Widescreen WXGA (1280x800)
- Integrated 24xCD-RW/8xDVD Combo Drive
- 56K Data Fax Modem with exclusive AOL Broadband offer from £15.99 per month[1]
- 90 Day Collect and Return Service[5]
- Dell Wireless 1370 802.11b/g MiniPCI Wireless Card

**£399** Excl. VAT, Shipping & Handling
**£529** Incl. VAT, Shipping & Handling
**FREE DOUBLE MEMORY**

**E-VALUE Code: PPUK4-N02132**

### Further enhancements[2]

| | Incl. VAT |
|---|---|
| • 3 Year Basic Services Package | £94 |
| • Microsoft® Office Basic Edition 2003 | £110 |
| • 2nd 8 Cell High Capacity Lithium-Ion Battery | £49 |

## Dell Inspiron™ 630M

- **Intel® Centrino® Mobile Technology** with Intel® Pentium® M Processor 735A (1.70GHz, 2MB L2 Cache, 400MHz FSB)
- **Genuine Windows® XP Home Edition**
- 512MB 533MHz DDR2 SDRAM (Was 256MB)
- 60GB Hard Drive
- Intel® GMA 900 shared graphics memory up to 128MB
- Integrated 8xDVD+/- RW Drive[3]
- 56K Data Fax Modem with exclusive AOL Broadband offer from £15.99 per month[1]
- 1 Year Euro Collect and Return Service[5]
- Intel® PRO/Wireless 2200 802.11b/g MiniPCI wireless LAN

**£459** Excl. VAT, Shipping & Handling
**£599** Incl. VAT, Shipping & Handling
**FREE DOUBLE MEMORY**

**E-VALUE Code: PPUK4-N02631**

### Further enhancements[2]

| | Incl. VAT |
|---|---|
| • 3 Year Basic Services Package | £153 |
| • Genuine® Windows® XP Professional | £59 |
| • Logitech® QuickCam Zoom | £33 |

## Dell Inspiron™ 6000

- **Intel® Centrino® Mobile Technology** with Intel® Pentium® M Processor 760 (2MHz, 2MB L2 Cache, 533MHz FSB)
- **Genuine Windows® XP Home Edition**
- 1024MB DDR2 SDRAM (Was 512MB)
- 80GB Hard Drive
- 15.4" Wide Aspect UltraSharp™ WXGA (1280x800) Screen
- ATi® Mobility™ Radeon™ X300 64MB HyperMemory™
- Integrated 8xDVD+/- RW Drive[3]
- 56K Data Fax Modem with exclusive AOL Broadband offer from £15.99 per month[1]
- Intel® PRO/Wireless 2200 802.11b/g MiniPCI wireless LAN

**£699** Excl. VAT, Shipping & Handling
**£881** Incl. VAT, Shipping & Handling
**FREE DOUBLE MEMORY**

**E-VALUE Code: PPUK4-N02603**

### Further enhancements[2]

| | Incl. VAT |
|---|---|
| • 3 Year Standard Service Package | £247 |
| • Microsoft® Office Basic Edition 2003 | £110 |
| • Kensington® Pilot Mouse Mini | £35 |

## Dell PC Services

**Dimension™ / Inspiron™ Recommended Upgrades**

**3 Year Next Business Day Support Service.**

Protect against the cost of repairs and get your system up and running faster.
Prices From **£94** Incl. VAT
**Includes:**

- Access to our award winning technical support hotline
- 3 years of parts cover
- If necessary after phone based trouble shooting, a next business day visit from an engineer.

**System Set Up and Installation**

Busy? We can un-box, check and set up your system making sure it is optimally configured. We can even connect it to your network and transfer the data (up to 1GB) from the old machine.

**Please ask our Sales Team to advise you.**

**Rule 3**

**You can't get great advice and technical support online or over the phone ...**

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# Rule 4

**You can't afford the latest technology . . .**

**WITH DELL YOU CAN**

## Servers — Save £60 if ordered by the 15th February 2006

### Dell™ PowerEdge™ SC1420 SATA

- Intel® Xeon® Processor (2.80GHz, 2MB L2 Cache, 800MHz FSB)
- Dual Processor Support with 800MHz FSB
- 512MB DDR SDRAM Memory (for the price of 256MB)
- 80GB 7200rpm SATA hard drive
- Optional CERC SATA RAID Controller
- Embedded Gigabit NIC
- 1 Year Next Business Day Service

WAS £359 Excl. VAT, Shipping & Handling

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**E-VALUE Code: PPUK4-SC021421**

### Further enhancements[3]

| | Excl. VAT |
|---|---|
| • 1GB DDR2 400MHz memory | £86 |
| • Upgrade to 64-bit Intel® Xeon® Processor 3GHz, 2MB L2 Cache, 800MHz FSB | £20 |
| • 3 Year Bronze Next Business Day Support | £170 |

intel Xeon® inside™

**Dell recommends Windows® XP Professional.**

## Everything you need to print

### Dell Multi-Function Laser Printer 1600n[2]

Print, scan, copy, and stand alone fax with the Dell Laser Printer 1600n. Multifunction performance at a single-function laser printer price. Network as standard.

**£229** Excl. VAT **£270** Incl. VAT

3 Year Next Business Day Support **£94** Incl. VAT

### Dell Colour Laser Printer 5100cn[2]

The Dell Colour Laser Printer 5100cn offers powerful mono and colour printing performance at an affordable price. Up to 35 pages per minute (ppm) in monochrome, 25 ppm in colour A4 size paper - (Actual print speeds will vary with use).

**£559** Excl. VAT **£657** Incl. VAT

3 Year Next Business Day Support **£306** Incl. VAT

### Dell Colour Laser Printer 3100cn[2]

This network colour laser printer is ideal for medium sized workgroups that require affordable, high quality printing or presentations, business documents or spreadsheets.

**£289** Excl. VAT **£340** Incl. VAT

3 Year Next Business Day Support **£153** Incl. VAT

### Dell Premium Photo Paper[2]

With the Dell™ Premium Photo Paper, you can print high quality photos at home or in the office. Available in A4 (75 sheets) or 4"x6" (100 sheets)

**From £9** Excl. VAT

**From £11** Incl. VAT

### Dell Photo All-in-One Printer 944[2]

Load your pictures and view them on the LCD panel of this Dell Photo All-in-One 944 printer which allows you to print, scan, copy and PC based fax.

~~£93~~ NOW **£74** Excl. VAT

~~£110~~ NOW **£87** Incl. VAT

2 Year Next Business Day Exchange Support **£21** Incl. VAT

### Dell All-in-One Ink[2]

3 Pack Ink Cartridges Get 2 high capacity black cartridges and one high capacity colour for your Dell 924/944/964.

**From £47** Excl. VAT

**From £56** Incl. VAT

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Personal Computer World

April 2006

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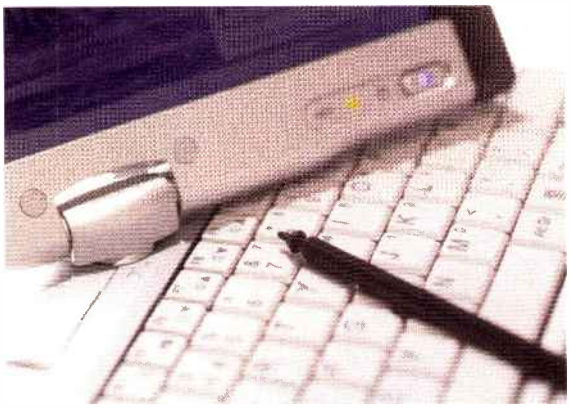

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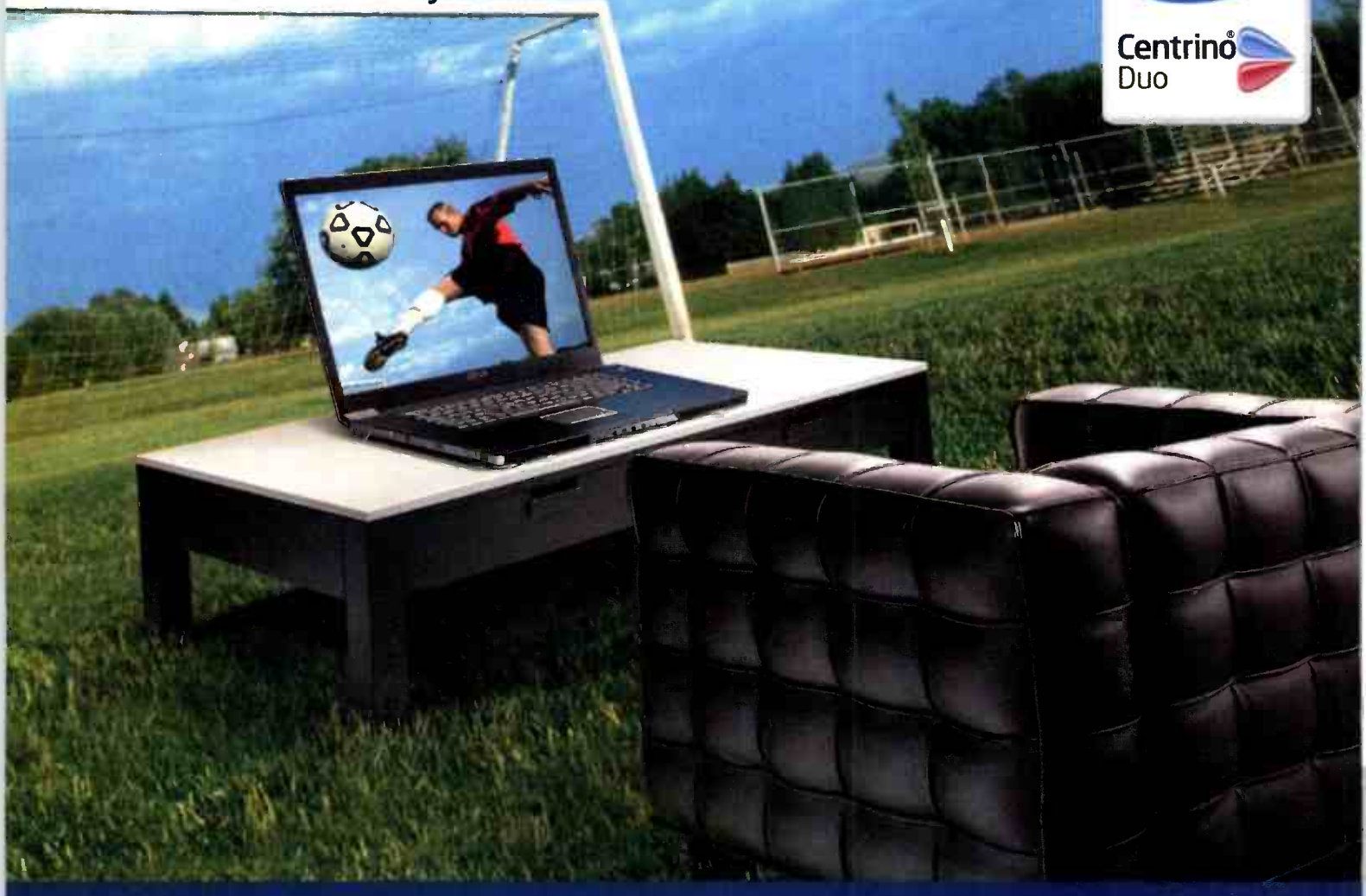
ASUS recommends Microsoft® Windows® XP Professional

# Be there, wherever you are



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Intel® 945GM Express Chipset
Intel® Wireless/PRO 3945 a/b/g
MS Windows® XP Home
LCD TFT 17" WXGA, Colour Shine
HDD 100GB / 1024MB(1024x1) DDR II SDRAM
DVD Super Multi ATI Mobility Radeon X1600 256MB
Video Camera Built-in (1.3 million pixels)
Hybrid (Digital & Analogue) TV Tuner built-in
Gigabit LAN 802.11g WLAN
Bluetooth built-in

**£ 1,399 inc VAT**

### Built-in Webcam for Wire-Free Video Communication

**> A6Ja-Q002H**

Intel® Centrino® Mobile Technology Duo
Intel® Core™ Processor Duo T2300 (1.66GHz, 667MHz, 2MB L2 Cache)
Intel® 945PM Express Chipset
Intel® Wireless/PRO 3945 a/b/g
MS Windows® XP Home
LCD TFT 15.4" WXGA, Colour-Shine
HDD 100GB / 1024MB(512x2) DDR II SDRAM
DVD Super Multi Double Layer
ATI Mobility Radeon X1600 256MB
Video Camera built-in (1.3 million pixels)
Bluetooth built-in
802.11g WLAN

**£ 1,199 inc VAT**

**> W5F-G001P**

Intel® Centrino® Mobile Technology Duo
Intel® Core™ Processor Duo T2400 (1.83GHz, 667MHz, 2MB L2 Cache)
Intel® 945GM Express Chipset
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dylan_armbrust@vnu.co.uk

Editorial

# The best technology news for experts and enthusiasts alike

*PCW will help you keep up to date both in print and online, promises Dylan Armbrust as he returns to the helm*

If you are a regular reader of *PCW*, you may have noticed a slight change this month. No, it's not another redesign, and we haven't raised the cover price, either. In fact, *PCW* hasn't really changed at all, except for one thing, – its editor, who is, of course, me.

For those of you who don't know me, I'd like to introduce myself. I am Dylan Armbrust, *PCW*'s new Editor in Chief. Some of you may remember me as editor of *PCW* from late 2000 to 2003. And some of you may even remember reading my byline from as far back as 1995 when I was a budding staff writer covering Windows 95, Intel's first range of Pentium chips, and the usual panoply of peripherals and components. I'd like to say how pleased I am to be returning to a magazine that has a special place in my heart. Not only is it an honour to return to a title with over 27 years of authority, but it's also good to know that we still have as strong a following as ever.

Covering the world of computers is a fascinating business. The old clichés of 'ever-changing', 'fast-paced' and 'revolutionary' naturally spring to mind and, to be frank, I don't think we'll ever stop using those terms when it comes to covering the development of technology. But now technology goes well beyond just talking about computers. It's about networks, content, information sharing, home entertainment, and anything that has, or somehow uses, a processor.

**'You can count on us to deliver the best news, reviews, features and buying advice'**

It's also about getting the best out of technology, whether it's at home, in a small office or even in a large corporate environment. It's great to know what new developments have arrived or are on the horizon, but it's even more important to know how they can fit into your life. Whether you're a keen technology enthusiast, expert computer user or enterprise IT consultant you'll want to stay abreast of any news that's important to your own environment. As I take on the mantle of *PCW*, you can count on me and the whole team to aim to deliver the best news, reviews, features, productivity and buying advice on the newsstand today.

But it doesn't just stop on the printed page. In today's age, you have to be Internet-savvy and we know that over 98 per cent of our readers are online and have been for well over a decade. And if our readers are that savvy, we have to be too. That's why you'll find our website offering worth a look. Not only will you find the latest IT news and reviews, but we also have our very own Test Bed blog (http://labs.pcw.co.uk), an interactive reader blog (http://interactive.pcw.co.uk), weekly newsletters on products and news, as well as our very own podcasts covering the latest technology developments. And that's just a small slice of what we offer today. Over the coming months we'll be adding even more content and services to our website to complement the magazine. That's not to say we'll be giving all our content away on the web, because we won't, but what you will find is more timely information and often in more depth than it's possible to squeeze on to a printed page.

I'd like to end my first editorial (well this time around, that is) by also asking for any feedback you have about the magazine. I welcome all comments, good, bad or indifferent about what you think of *PCW*, and its website and how we can improve it for you. Just email me at dylan_armbrust@vnu.co.uk. **PCW**

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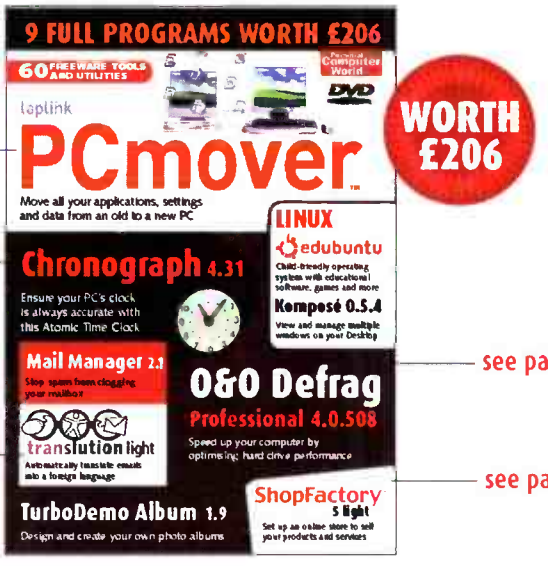


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## ON THE CD & DVD

### Laplink PCmover
Quickly and easily move your applications, settings and files from an old to a new PC with this migration program
For workshop see page 188

### O&O Defrag Pro 4.0.508
Keep your hard drive performance at optimal levels using this flexible defragging program
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### Turbodemo Album 1.9
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### Shopfactory 5 Light
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All pictures for illustration purposes only. *Shared Memory Architecture. **Sony Multi-burners R/W all standard formats Except DVD-RAM

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4 HRS

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intel Pentium M inside

3.5 HRS

2.5 KG

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AMD Turion 64

3 HRS

3.5 KG

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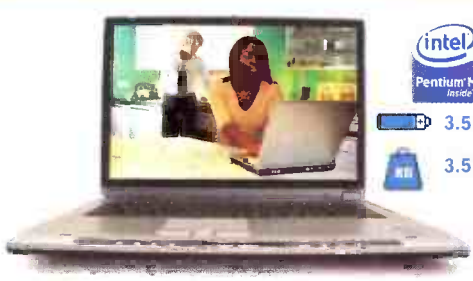

intel Pentium M inside

3.5 HRS

3.5 KG

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Wireless LAN 802.11b/g & Bluetooth module
Pin-hole Camera 1.3M pixel
Virtual 8 Channel 7.1 Surround Sound output
2x Speakers and SPDIF output
4-in-1 Card Reader supports MMC/SD/MS/MS Pro
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# NEWS

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# Intel Macs shake PC world

Apple has launched its first Intel-based Macs in a move that could have a profound effect on the PC world. The machines (see caption) use the new dual-core Core Duo notebook processors which are being adopted for home PCs as they do not need noisy cooling.

Core Duos are also recommended for Intel's new Viiv Media Center PC platform which was launched only a few days later (see page 17). Apple has been cagey about how its new platform differs from Viiv but the answer seems to be not very much at all.

One crucial difference is that Mac PCs eschew the Bios, the firmware-held startup code that has been a feature of the PC platform since its earliest days, in favour of the more efficient Extensible Firmware Interface (EFI).

EFI gets rid of interrupts and other leftover elements from early PCs and takes over some tasks from the operating system. It has been available for years on servers but has yet to go big on desktops, probably because of legacy issues.

This may change with the advent later this year of Vista, the successor to Windows XP, which supports EFI. This could mean Vista will run on Mac PCs; but far more interesting is the issue of whether third-party vendors will offer systems capable of running Apple software.

**The new Core Duo-based Imac running Iphoto, one of the family-oriented applications bundled with Macs. It comes in both a 17in and a 20in version**

Apple gained a reputation for reliability largely because, for all but a brief period, its software ran only on its own machines – unlike Windows, which has to run on any PC. Mac hardware and peripherals have therefore tended to be more expensive and offer less choice.

But how are Apple's demanding graphics users going to react to the fact that however fast the company makes Mac PCs, there will always be a PC out there that is speedier and probably cheaper? The first Imacs, admittedly not targeted at the high-end, do not even offer the fastest Core Duo.

Arguably, Apple could make more money by offering its software to the open hardware market – and present Microsoft with its strongest competition yet, at least for home PCs. The ILife suite bundled with Macs beats anything that comes out of the box with a Windows PC for family-oriented tasks such as home video, photography and music.

Ironically Apple may fear becoming too successful, when regulators might start asking questions about how ILife ties users into profitable enterprises like Itunes. Bill Gates would be shot at dawn if he locked in Windows users to the same extent.

Apple CEO Steve Jobs, a multi-billionaire plutocrat on a par with Gates after his recent acquisition of the largest shareholding in Disney, has given no sign that he plans to change tack. But he may not have any choice: having introduced Mac software to the PC, he could be hard put to stop the couple breeding.

*Clive Akass*

• Read our review of the Imac at www.pcw.co.uk/2149310 and Apple ILife at www.pcw.co.uk/2149451.

# High-Def rivals at war as cut-price players ship

Vendors backing next-generation HD-DVD drives have dropped the price of players to as little as $499 (£282 approx) in what rival Blu-ray backers described as a panic pre-launch move. Both standards have major backers from the IT, gaming and Hollywood worlds, though Blu-ray is considered to have more support.

Peter Weedfeld, senior vice president of consumer electronics at Samsung, said: 'You drop your prices when you are fearful of what your volume sales will be. I've never heard of a standard and technology price being dropped before it launches.'

But Jodi Sally, vice president of marketing for the Digital AV group at HD-DVD backer Toshiba, said prices had been pitched at a level which research showed would accelerate adoption.

Meanwhile, Imation announced it will provide media for both technologies but TDK said it would offer only Blu-ray.

Jean-Paul Eekhout, TDK corporate strategy director, said Blu-ray would win because it offers more capacity – 25GB as opposed to HD's 15GB on the launch version – and would have burners on the market sooner.

Samsung and Toshiba will both ship players shortly as the entertainment industry gears up to provide HD content. The BBC is already shooting in HD and plans to make some content available for download. Sky will offer HD channels before autumn, though it is already listing them on its electronic programme guide.

# Outrage as Time relaunches

PC vendor Time is relaunching in the UK after going out of business last July owing millions of pounds and leaving many customers without machines for which they had paid. Now called Time UK Factory, it is starting a direct-sales operation called Timeuk.com.

The family that owned Granville Technology Group set up a complex legal structure around its businesses, including Tiny and Time. The new company will operate from the same factory, which the family bought back from the administrators.

A company run by the family owns the land on which the factory sits, and never went into administration. The Tiny brand was bought by Watford Electronics, which has no connection with the resurgent Time.

Time UK Factory will offer low-end laptops and PCs and has no plans to open high-street shops like its predecessor. Marketing manager Brian Trevaskiss, who worked for Granville before it went into administration, admitted it faces a major task to convince people to trust the brand.

'We are building a business from scratch,' he said. 'We're a smaller business and a smaller company. It's a lot tighter [management] team to stay in control of the business.'

He added: 'The plan is to take it steady and make sure customers that do choose to buy from Time get exceptional service and hopefully we can build the company back up.'

The old Time had a poor reputation for customer service.

The Department of Trade and Industry refused to confirm or deny that it is investigating Granville. But Kitty Ussher, Labour MP for Burnley and Padiham, said the DTI had assured her that it was. 'If, when they report, they raise matters that need further investigation then I will not hesitate to act,' she said.

Former customers who lost money will have no legal claim on the relaunched company. A spokeswoman for the National Consumer Council said customers come low in the pecking order when companies go under. 'It is a scandal that this type of thing can happen and it's not the first time. The law doesn't protect the individual consumer in a way it perhaps should.'

She advised people not to pay huge deposits, and to use a credit card for all transactions over £100. *Rob Jones*

## What's new at PCW Online

*PCW* now offers daily online product reviews, many of which are exclusive to our website. To get a regular fix of what we are testing, go to www.pcw.co.uk, where you'll find our daily news, reviews, blogs and podcasts. Or you can sign up for one of our two newsletters and get a weekly round-up of reviews.

The *PCW* newsletter, out every Friday, carries our top reviews, news stories and Test Bed blogs for that week. The Products newsletter, out every Wednesday, features a week's worth of reviews. Both have a link to our Product of the Week podcast where we discuss the best product we've seen and explain why it's so good, how it could be improved and how it compares to rival offerings.

We've also launched a new free service, powered by Uswitch, that lets you find the cheapest broadband, gas, electricity or phone provider in your area. Follow the on-screen questionnaire to compare dozens of providers; and services, you can switch on the spot. Plus, if you switch a service before 28 February, there's the chance to enjoy free European flights (subject to terms and conditions). Go to www.pcw.co.uk/uswitch.

# Wifi radio's world service

You may wonder what is the point of a dedicated Internet radio when you can receive all the channels you want via your PC.

But as manufacturer Acoustic Energy points out, you not only get thousands more stations than you can pick up on DAB, but it works whether or not your PC is on, so long as you have wireless access to the web.

The £199 device will appeal most to exiles who want convenient preset access to their home stations but it also offers something of the romance of short-wave radio, which with its long reach can bring you live sounds from faraway places. Only, unlike short wave, the sounds aren't drowned out by static. There's a full review at www.pcw.co.uk/2149575.

No PC is needed for this Internet radio

# Badly prescribed glasses are a pain in the neck

Opticians are prescribing the wrong glasses for many people who spend long periods at computer screens, according to a major manufacturer.

Many varifocal lenses are in effect trifocals, with the upper area focusing for distant vision, the lower for reading close up and the central region for the middle distance occupied by computer displays. They cause few problems for general use but have drawbacks in the office, although many opticians still prescribe them, said Peter Sanders, a consultant with The Norville Group.

Lens aberrations tend to be smoothed out to the lower edges during manufacture to give the widest clear field of view to distance vision, which can be critical for driving but means a comparatively narrow field of view at your desk.

PC users tend to tilt their heads to bring their screens into focus, causing neck and shoulder pain; others lean forward, causing back pain, Sanders said. He is one of a number of experts who believe the conventional view of eyestrain (astinopia, in optician-speak) should be extended to cover other physical symptoms under the term Computer Vision Syndrome (CVS).

Norville, which makes all types of lenses, is one of a number of manufacturers offering what are called enhanced-reading glasses, which are varifocal only over the middle and close-up ranges.

I tried a pair, and they were more comfortable than my old varifocals. I don't have to move my head to get focused and they seem to offer a wider field of view. *Clive Akass*

## In brief

### Soft centre

A utility from Lava Software can turn almost any PC into an entertainment system and file server, the company claims. Versions of PC-Mac-Net Fileshare v5.5 are available for Windows, Mac OS and Linux. They allow a computer to control movie and music playback on multiple remote PCs over local or wide-area networks. There's a free Lite edition at www.lavasoftware.com. Prices of the full edition start at $14.95 (£8.40) per computer.

### USB watch

A free utility at www.devicelock.com allows you to monitor the use of potentially troublesome USB drives on networks. Developer Smartline has also upgraded its paid-for Devicelock product with eight new features, including the ability to grant temporary access to USB devices when there is no network connection.

### Mail access

Two server-based applications provide full access to Microsoft Exchange mailboxes and public folders from a PDA browser or Wap-enabled mobile phone – devices not supported by the Outlook Web Access that comes with Exchange. OWA for PDA and OWA for Wap cost $195 (£110) and $175 (£99) respectively per server. Free trial versions are available.

→ **www.leederbyshire.com**

### Chinese cracker

There's been a stream of utilities from Russia over recent years as coders and small software houses in that country try to break into the Western market. Now the Chinese are getting into the act.

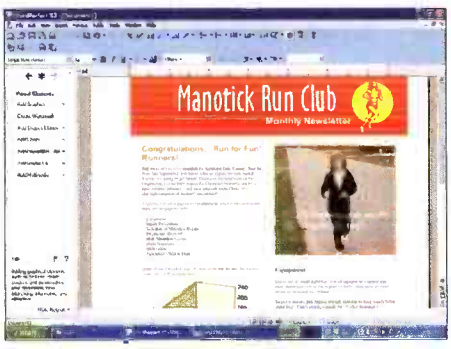
Liuxz Software is offering a Windows package called FTP Synchronizer 1.1 that synchronises files between a PC and a remote FTP server. In addition to updating files, it can be configured to remove obsolete ones from the server if they have been deleted locally. It is free for non-profit use. A Pro version costs $29.95 (£17) from www.ftpsynchronizer.com.

# Corel supports Office 12 files

Microsoft will be competing with itself when it launches Office 12 with completely new OpenXML file formats, Corel warned at the launch of its rival Wordperfect Office X3 suite.

Global product director Jason Larock said 250 million people using familiar formats would have to learn to cope with the new ones. Microsoft would also be asking them to get used to a new user interface.

He said no product could match Wordperfect's support for a variety of formats and Corel would include OpenXML when Office 12 is released. 'We work with Microsoft now and we will continue to work with Microsoft, which owns 90 per cent of the market. We would cut ourselves off if we didn't support the format.' But he admitted X3 doesn't support the Open Document Format, proposed as a rival standard, 'because no customer we are dealing with has asked us to do so.'




**Wordperfect X3 supports a variety of formats**

X3 does allow the import and export of pdf files, something Microsoft has promised for Office 12.

Corel's pdf implementation looked good, judging from Larock's demonstration. Extracting coherent text from pdf files can be hard; Corel seems to be taking a leaf out of OCR packages by making intelligent guesses about text flow across columns.

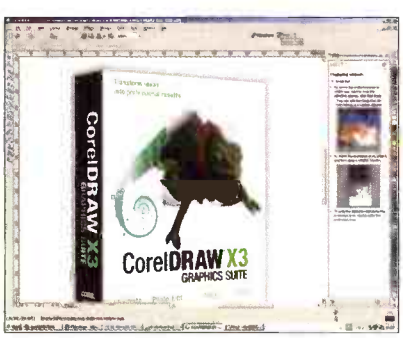
Other features of X3 include an email client called Wordperfect Mail and an updated user interface and online resources. Details are at www.pcw.co.uk/2148693.

# Graphics launch turns into lizard's wake

Corel introduced an X3 version of its flagship graphics suite on the same day as Wordperfect. But the launch turned into a wake after the luckless creature went the way of all flesh the day before it was due for a moment of glory.

The company had adopted a new chameleon logo for Coreldraw X3 graphics suite and chose the reptile house at London Zoo as an appropriate launch venue.

Chris the chameleon was deputed to star as a living logo. But Amanda Bedborough, executive vice-president of Corel International, said at the start of the event: 'I am afraid Chris died last night.' So journalists had to be content with a Chinese-made toy chameleon that glowed in colours when squeezed.




**Coreldraw X3, with a boxshot showing the chameleon logo**

The X3 suite includes four programs: Coreldraw for illustration and page layout, Photopaint for image editing, Capture for screen grabs and Pixmantec's Rawshooter Essentials for editing photos taken using the Raw file format.

In addition you get a handbook with expert advice and a collection of 10,000 digital images.

New features of Coreldraw include the integration of Powertrace, which converts bitmaps into editable vector images and enhanced features for cutting out image areas.

Both Draw and Photopaint integrate an Image Adjustment Lab for making the best of poor images.

The X3 suite will be available in February at £386.57 for the full product and £99.87 for the student and teacher edition. You can upgrade from a variety of Corel products for £149.

# Onenote revamp reads your voice and pictures

The next version of Onenote, a lesser-known gem among Microsoft's Office applications, will have some interesting features judging from the beta code. The main trick of the current product is to synchronise a recording of a conversation or meeting with your notes, so that you can find a recorded passage simply by clicking the relevant words.

The next version, to be launched with Office 12, includes a client that provides the basic Onenote functionality on a Windows Mobile smartphone or PDA, and will sync files both ways with a PC. And there is much more.

It will have optical character recognition so you can snap business cards and press cuttings with a camera, drag them into Onenote, then find them by searching on keywords as if they were text.

The product also has speech recognition so you won't need to take notes during recording. Much will depend on how well the audio is captured, but in theory you should be able to search the recording directly for keywords.

A trial version of the current Onenote is at www.tryonenote.com.

# Viiv 2006 with Jonathan Ross

Intel has launched Viiv (rhymes with 'five'), a platform it hopes will be to Media Center PCs what Centrino is to notebooks. But whereas Centrino brought with it a range of low-drain processors, the first version of Viiv seems little more than a rebranding of existing technologies.

At a lavish and amusing launch the company had a hard time explaining what all the fuss was about. So did presenter Jonathan Ross, who wasted no opportunity to bite the hand he freely admitted was paying him a large fee.

He had been told that Viiv would allow him to download new tracks, watch live webcasts of gigs all over the world, and see new movies as soon as they were released. 'I already get new tracks as soon as they are available,' he said, referring to his stints as a radio DJ. He could also get to any gig he fancied; and, as presenter of the BBC's *Film 2006*, he saw all the latest films. 'So that's it,' he cracked. 'Viiv will give people a taste of what it is like to be me.'

Ross refrained from pointing out that non-Viiv PCs can also download films and music, and that the film industry has yet to release major movies straight to the web.

**The latest Elonex Lumina TV is based on the Viiv platform and comes with 32in or 40in LCD screens**

When Intel first began talking about Viiv, a couple of years back, we were told it would be a generic entertainment PC capable of running Windows XP Media Center Edition (MCE) or similar software. Now, it seems, Viiv PCs have to run MCE on top of Intel's driver stack.

Mike Bond, of Intel's digital-home group, said this was because Microsoft now charges virtually no premium for MCE and had agreed to provide a programming interface for third-party designers to add their own shell. MCE and Viiv have different DRM (Digital Rights Management) systems, but he said these were complementary.

The aim of Viiv is to make the networked Media Center PC as elegant and as easy to use as a TV. All Viiv PCs support Raid to protect data, but are not obliged to include the extra storage required to make it work; they use dual-core chips, including low-drain Core Duos, and 'Instant On' (see story right).

Oddly, most of the PCs at the launch were Core Duo-based Napa notebooks.

The lack of anything grippingly new in Viiv does not mean it will fail as a brand. Like the Imac, it is aimed not at techies following every shift in the wind of change, but at people who don't mind what is in a PC so long as it works. *CA*

● See labs.pcw.co.uk/2006/01/intels_viiv_lea.html for more.

# Intel announces 45nm breakthrough

Intel has created 153Mbit S-Ram memory modules using a 45nanometre process, the next stage of miniaturisation after the 65nm used in current leading-edge Pentiums. S-Ram chips are always the first be made on a new Intel process, allowing designs to be honed before the techniques are applied to processors. But the test modules do include logic circuits, proving that the process will work on processors, according to Intel senior fellow Mark Bohr.

The breakthrough means that 45nm processors will be available towards the end of next year and will go mainstream over the following 18 months.

Intel is still moving from 90nm to 65nm products, and expects shipments of the latter to outnumber their predecessors for the first time during the third quarter of this year. It has already shipped more than a million 65nm dual-core chips.

Each six-transistor memory cell on the prototype 45nm S-Ram modules covers just 0.346 square micrometres, so around 20,000 can be squeezed on to a cross-section of a human hair. The billion-transistor modules measure 119 square millimetres.

One of the problems of miniaturisation is that insulation between the elements of transistor switches tends to break down, which means they draw 'leakage' current even in an off state, reducing power efficiency.

Yet the 45nm chips offer a fivefold *decrease* in leakage current, Bohr said, but he declined to say how. 'We are not prepared to discuss specific techniques.'

He did say that switching times could be improved by 20 per cent by sacrificing this saving and that the new process reduced the power taken by 30 per cent. But he could not put a figure on how these improvements would increase the overall power efficiency, a factor becoming almost as important as processing speed. 'That would depend on the design and the number of transistors used,' Bohr said in an online press briefing.

A 32nm process is scheduled to go into production in 2009, meaning Moore's Law (that transistor densities will double every two years) will hold good for another four years.

# Instant karma on fast boots

Viiv at first sight offers solutions to two problems that have made entertainment PCs unsuitable for the living room: tortuously slow boot-ups and fan noise.

But neither solution is quite what it seems. The spec calls for the use of dual-core processors: Intel's Core Duo, the Pentium D, or the Pentium Processor Extreme Edition released before Christmas. The Core Duo can provide processing power with minimal noisy cooling but the faster-clocking D and Extreme processors push out a lot of heat.

Viiv's Instant On feature is a refined sleep mode: pressing the Off button immediately blanks out the screen, but the PC keeps working, more or less noisily, depending on the processor.

If another machine is drawing content from the PC, it will stay on; otherwise processing is suspended while power is being drawn to keep the contents of Ram intact. It can then continue where it left off when you power up again. The PC can also be powered up at a request from a linked machine.

Britain's Department for Environment, Food and Rural Affairs has urged people not to leave gadgets in standby mode because it wastes the equivalent of the output of two power stations in the UK alone. But if you physically unplug your Viiv PC to do your bit to fight global warming, it will still take an age to boot up. *CA*

● Gordon Laing – see page 31.

# Dual-core FX

AMD has launched a dual-core version of its Athlon64 FX processor, targeted at gamers, that it says offers the highest performance of its consumer range. It is available now at a bulk price of $1,031 (£580 approx) per chip.

Bob Brewer, corporate vice-president of AMD's desktop microprocessor solutions sector, said the FX-60 'is designed to deliver the ultimate in performance for our customers who demand nothing short of the best'.

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British Airways to axe over third of its managers

30/11/2005

British Airways (BA) chief executive Willie Walsh ©AFP/British Airways/File

LONDON (AFP) - British Airways is to get rid of more than one third of its managers over the next two years under a restructuring programme that aims to slash costs across the group.

The job cuts of almost 600 managerial posts, or 35 percent of the total, were set to save the airline 50 million pounds (73 million euros, 86 million dollars) as part of its drive announced in January 2004 to achieve a 300 million-pound cost reduction programme by March 2007, BA said in a statement Wednesday.

The restructuring will see a total of 597 management posts lost by March 2008. The number of senior managers will be reduced by half to 207 and there will be a 30 percent reduc-

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Hurricane Katrina to cost Lloyd's 1.9 billion pounds

30/11/2005

Residents wade through a flooded street in New Orleans ©AFP/File James Nielsen

LONDON (AFP) - Lloyd's, the world's biggest insurance underwriting market, raised its estimated pre-tax loss from Hurricane Katrina to 1.9 billion pounds (2.8 billion euros, 3.3 billion dollars) from 1.4 billion. Lloyd's also forecast that Hurricane Rita would cost it 535 million pounds and that Hurricane Wilma would add 483 million to the total.

As a result, the market said that chances of posting a profit for 2005 were weak.

"The net loss from Katrina is now estimated at 1.9 billion pounds," Lloyd's said Wednesday in an official statement. "This compares with the provisional estimate of 1.4 billion

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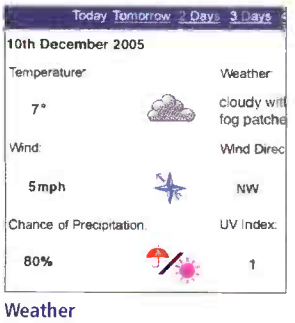


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## 11n could be outclassed

The 802.11n wireless spec could be out of date before it is fully ratified. It looks impressive but there are potential problems; for example, its increased range could worsen contention with neighbouring networks.

It is common in cities to find four or five Wifi networks within range, which means they are competing to use a limited number of channels.

The problems can be reduced by intelligent use of transmit power and directional beams, but the Wifi industry has consistently been more interested in sales than optimal engineering. Vendors boast of power and range as if these are measures of worth; and Wifi has been widely promoted as a substitute for a wired network when it should preferably be a complement to one.

Wifi has never quite shaken off its legacy as a data link for warehouses, so refinements such as security and quality of service have had to be bolted on.

Potentially rival technologies, mobile Wimax and UWB (see story, right), will be coming onto the market within the same timescale as 11n. Wimax has been designed to offer wide-area roaming access at similar speeds to Wifi, and Intel says it will implement Wimax on all notebooks, as it does now with Wifi.

UWB offers fast communication between devices within the home, for which its short range is an advantage – you are not interfering with your neighbour.

None of which means 11n is doomed: Wifi has too much momentum for that. But it could have a fight on its hands. *CA*

## 3G notebooks

Dell is to embed support for 3G links in some notebooks to provide corporate customers with Internet access on the move.

Chipsets from US manufacturer Novatel Wireless will be a made-to-order option in Dell's next-generation Latitude range. They will support the EV-DO and HSDPA flavours of 3G, enabling use across Europe, the US and Asia; they also support GSM and GPRS link.

# Trouble for Wifi at 600Mbits

Several companies are expected to release next-generation wireless networking products shortly, based on the first draft of a specification offering rated speeds up to 10 times greater than those of current Wifi products.

The 802.11n draft, approved by an IEEE committee, allows for a maximum theoretical speed of 600Mbits/sec; but, as with all networks, the real throughput is likely to be less than half the rated speed. Even that makes 802.11n faster than most wired networks.

However, analysts warned that the new wave of products based on the draft might be incompatible with those using the final specification, which is not expected to be approved until 2007 at the earliest.

So-called 'pre-N' vendors have been jumping the gun on the 11n standard for over two years by using multiple in multiple out (Mimo) technology to increase the rated 54Mbits/sec of 11a and 11g Wifi products by a factor of two or more.

The problem goes back further to the days of dial-up modems, when the technology moved faster than the standards process and many people ended up with 'pre-standard' modems that could not connect at full speed with new products.

**Broadcom is selling its pre-N chipset under the Intensi-fi brand. Its radio chip (on the right of the picture) implements multiple 2.4GHz and 5GHz transceivers; on the left is the media-access controller**

Pre-N Wifi products offer few problems at the moment as they default to standard 11a or 11g when operating with incompatible wireless networks. Usually this means they work at full speed at home or in the office, and at the slower 'official' rate in hotspots.

But within a couple of years, if the world and its hotspots move to the approved 11n standard, pre-N modems could still have to revert to slower speeds while owners of compliant devices are swapping data significantly faster (see story left).

Wifi chipset makers Broadcom, Marvell and Atheros are offering draft-compliant 11n that should appear in products over the coming weeks. Rival Airgo issued a statement saying there was no guarantee these products could be firmware upgradable to conform to the final spec. Analysts Gartner warned companies to avoid 'pre-N' products, and labelled claims of draft-compliant chipsets as 'misleading' and 'premature'.

# UWB links to fight it out in the market

The IEEE organisation has given up trying to reconcile two specifications for Ultra Wideband (UWB) links and left the competing backers to fight it out in the market.

The decision is likely to speed adoption of products supporting the fast, short-range wireless technology, but it means that not all of them will interoperate.

A task group spent more than three years mulling over proposals from the Intel-backed Wimedia Alliance and the Motorola-backed USB Forum. Wimedia uses a technology called Multiband OFDM and its rival favours direct-sequence.

**UWB has been a long time in coming... NEC staged this demonstration of a USB2 link, in which UWB replaces the wires, at IDF Fall in 2004**

Both are designed to pass high-bandwidth content such as high-definition video between devices. UWB wireless implementations of USB2 (see picture) and Firewire links have been demonstrated, but the technology is likely to be used by consumer devices, such as video recorders and TVs, as much as by computers.

A joint statement from the two camps said: 'A more prudent course of action is necessary to allow the market to move forward.'

Eric Broockman, chief executive of Wimedia member Alereon, pointed out that there are precedents for the move. 'Bluetooth technology was brought to fruition in much the same way – independent groups worked to create competing standards solutions and the market decided which version was the strongest and most likely to support innovation.'

# GPS goes walkies

Satellite navigation gets streetwise with the latest version of the Navicore GPS system for Symbian-based phones. It includes separate modes for cyclists and pedestrians, as well as cars.

Cyclists are automatically given routes that do not include motorways, and directions for pedestrians ignore one-way systems. One of the advantages Navicore claims for the system is that it is not car-bound: you can take it with you as a guide after you park.

The basic Navicore system consists of a tiny GPS receiver that links with Symbian Series 60 phones that the company says predominate in Europe. They include recent Nokias, the Siemens SX1 and Panasonic's X700.

**The system links with Symbian-based phones**

The software, including mapping information down to individual streets and seven-digit postcodes, comes on 256MB SD (Secure Digital) cards; the UK version leaves 106MB free on the card for other uses.

The base price for the UK version is £199.99 inc VAT, and SD card and existing users can upgrade for £54 via CD or £61 on a card. A system covering all Western Europe costs £279.99.

For more details, see www.pcw.co.uk/2149540.

# Post pics for less

A free service called Shozu can clip a third or more off the cost of sending pictures from a high-resolution phone camera, the developer says.

The standard way of sending a picture using MMS costs around 35p and the resolution is likely to be reduced to far less than that of your camera. Sending it at full resolution as an email attachment can be costly and slow, and you can't answer or make calls at the same time.

Shozu provides a software client that sends the file more efficiently and therefore more cheaply than email, and it suspends the transfer if you receive or make a call, said chief executive Mark Bole. The service has been sold to mobile operators and handset makers but it is now available to individual users. Shozu will automatically post pictures to online sharing sites such as Yahoo's Flickr, Webshots and Text America. You can add captions and will soon be able to post to your own site.

Once the picture has been posted, you can get Shozu to send it as an attachment to any number of emails at no cost.

Shozu supports Symbian, Microsoft Mobile, UIQ and Java-based handsets.

## Blackberry jam

A crucial date for US Blackberry users is 24 February, when a court hearing will take place that could close down the popular email-on-the-move service unless developer Research in Motion settles a patents dispute with NTP.

New Blackberry – page 24


DrayTek Broadband Firewall/Routers

Vigor3300V

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

Vigor3100 SDSL

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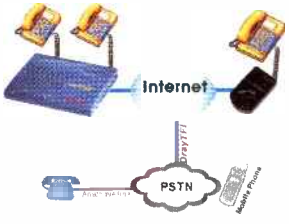
Vigor2900

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

Vigor2800 Series

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

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Specification subject to change. Facilities vary with model.

## PC in a lectern debuts at show

3Touch showed an electronic lectern, the upper surface of which consists largely of a 1,280 x 1,024 touchscreen driven by a fully fledged Pentium 4-based PC with an 80GB hard disk.

To one side of the screen is an area big enough to place A4 documents and an optional camera can sit above this to act as an overhead projector.

The Liberty lectern is designed to deliver presentations to a classroom, a lecture hall or across a network. The list price is £7,749, excluding the camera. The device comes with a suite of programs allowing you to screen to multiple rooms, or run a conference in dispersed locations simultaneously (www.3touch.com).

## Flexi-cameras

Economatics (www.economatics-education.co.uk) showed a selection of cameras on flexi-stands that can be used as scanners, photocopiers or for overhead presentations. Prices start at £239.

## All-rounder

Denford (www.denford.co.uk) showed this 360° IP camera that leaves no corner of the room unwatched and helps to deter mayhem if the teacher leaves a class. But you can bet we haven't heard the last of the traditional protest from kids: 'It wasn't me, Miss'. It costs around £900.

## Picture coding

There were many examples at Bett of novel graphical ways to teach kids coding, including one in which they could program the steps of a virtual dancer. Crocodile Clips was one of several exhibitors with kits allowing children to build robots and model vehicles and program their movements.

# Next class... computer games

Computer games should be taught at school because they are as much a part of modern literacy as reading and writing, according to researchers at the Bett educational technology show.

The theory is being put into practice in a project where pupils as young as 11 are given a chance to create their own games using a simple graphical interface. It's the result of a partnership between a company called Immersive Education and the Centre for the Study of Children, Youth and Media at London University's Institute for Education.

David Buckingham, director of the centre, said games are a subset of literacy, which is the ability to read or write for any purpose that is interesting or useful. He said writing games helped children to learn in a variety of ways, confronting them with ideas such as narrative, rules, chance, economy and conflict.

Judging from some of the text in a game created by a youngster called Rosie, and demonstrated by Immersive Technologies chief executive Chris Lloyd, it does little to improve spelling or details such as starting off a sentence with a capital letter.

Rosie deserved full marks for the game itself, and one suspects she may be bright enough to make mistakes deliberately – some kids seem to consider good spelling uncool. But shouldn't they be encouraged to write correctly? 'That's just how Rosie spells,' said Lloyd, stressing that the game was teaching her other things.

## Video aids small schools

**Videoconferencing is being used to teach pupils over a broadband link**

Last month we featured a billionaire-class videoconferencing system from HP called Halo. It showed how technology can save a lot of time and travel by enabling widely dispersed people to interact as if they are in the same room. (Read an online version at www.pcw.co.uk/personal-computer-world/news/2148556/telepresence-billionaires.)

But you don't need a $500,000 setup and $10,000-a-month service to get similar benefits, as teacher Jaz Dhillon demonstrated at Bett, where she took a class live over a broadband link.

And she is not restricted to one class at a time. Sometimes she teaches two or three groups in different schools simultaneously, helping to keep small village schools viable.

'It's great for small schools with maybe 35 pupils where there may be only one or two children at a particular age. Without this system they would either not get the attention they need or they might have to go to a school outside the area,' she said.

The system can also be used to give children extra coaching in subjects in which they have fallen behind. Dhillon, who works for a Birmingham schools organisation called Athena, said she has no difficulty in establishing a relationship with the students as if they are in a real classroom.

She was using a system from Polycom, market leader in mainstream business videoconferencing. Teaching systems for individual pupils can cost as little as £150.

Videoconferencing is about to become much more viable with DSL upstream speeds moving to 448Kbytes/sec.

## 3D printers at cutting edge

It is a measure of how much schools are changing that Bett is the best toyshop in town for the duration of the show. We have mentioned the Dimension 3D printer, available from Techsoft, in our reports of previous shows. But there were plenty of other devices at Bett capable of translating 3D drawings into real objects in wood, metal or plastic.

The computer-controlled router (pictured below) is also from Techsoft, and you can see the kind of thing that can be made with it. Boxford was showing a combined lathe and mill that can carve out metal.

Expensive products like these are usually bought as a communal asset for a group of schools rather than a single establishment. There are more pictures of other machines on our Test Bed blog for January (www.pcw.co.uk/labs).

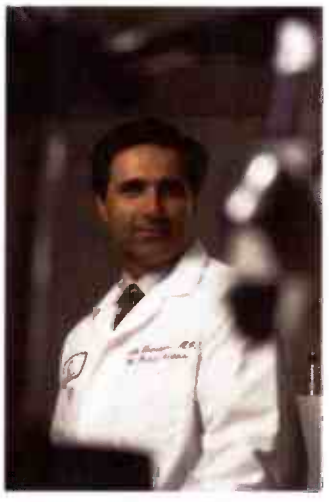
# $6.5m to power bionic eye

US researchers have been granted $6.5m to develop a nano-battery capable of driving an artificial retina that could allow some blind people to see.

The artificial retina was developed by a team led by Mark Humayun at the Doheny Eye Institute at the University of California. It relies on the fact that some diseases, such as age-related macular degeneration, affect the light-sensor cells but not necessarily the underlying neural 'circuitry', which can still transmit signals.

Tiny bio-electrodes in the retina stimulate the nerve cells, sending signals to the brain which are perceived as patterns of light.

A 4 x 5mm prototype, which has already been implanted into the eyes of six patients, has 16 of these electrodes in a 4 x 4 array. It offers only very limited vision but users can distinguish some shapes.



**Humayun led the team that developed the retina at California's Doheny Eye Institute**

One patient had has a retinal implant for more than three years and it is still working well, researchers say.

A 60pixel commercial version, half the prototype size, is under development and a 1,000pixel version is in the pipeline. In order to perfect the system, researchers also need to figure out what information the brain expects to receive from the retina.

The artificial retina gets its information by wireless from a camera attached to the user's spectacles. The problem of how to power the retinal implant remains.

Susan Rempe, principal investigator at Sandia National Laboratories, one of the recipients of the grant, said one approach would be to study the electro-chemistry of electric eels to 'give us a better understanding of how power is naturally created in biological organisms in order to design and build the nano-battery'. The batteries will eventually be used for other bio-implants.

# Nano-magnetic future for chips

US researchers have created logic gates out of nano-magnets, which could lead to a new era of low-drain, instant-on computers, according to the Massachusetts Institute of Technology's *Technology Review*.

The polarisation of a nano-magnet can be 'flipped' by altering that of similar particles nearby – and it stays that way until power is applied. Not only does this increase battery life but it also means a computer will retain its state when turned off and carry on where you left off when switched back on.

The logic functions performed by groups of nano-magnets can be controlled by software, according to researchers at Indiana's Notre Dame University. But computers relying entirely on the technology are unlikely to appear within a decade; early versions are likely to combine magnetic logic with traditional transistors.

**Dragon NaturallySpeaking**
***The Voice Interpreter*** that recognises your voice as well as your accent.
You dictate; it writes and instructs your computer...

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***The PDF Editor*** you can trust.
You think; it creates, converts, annotates...

**OmniPage**
***The Document Converter*** that simplifies your life.
You import; it converts and archives in PDF format...

**PaperPort**
***The Document Administrator*** that provides reliable back up.
You produce; it organises, classifies and searches for your (e-) documents...

**Systran Translator**
***The Translator*** that stays faithful to you.
You compose; it translates your words as well as your ideas...

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## Late CES news

Our March issue carried some news from the Consumer Electronics Show in Las Vegas. However, we were going to press as the show opened, so could not squeeze everything in. Here are some late stories from the show. You'll also find much more in our CES blog at vnuuk.typepad.com/ces/2006/01/index.html.

## New Blackberry

A new Blackberry handheld unveiled at CES is already on offer by T-Mobile in Britain. The 8700g has a bright 320 x 240 colour display and a 300MHz Intel processor.

It has 64MB of flash memory – twice that available in the 7290. The Blackberry system will now push email from any Pop3 or Imap email.

The T-Mobile price is £189.99 or £79.99 with an 18-month contract (Relax 200), which includes 12 months' half price line rental. Monthly charges start at £17.99 with up to 3MB of email.

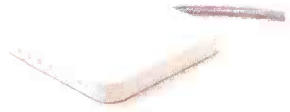
→ **www.t-mobile.co.uk**

## Flipping great

Apple asked Belkin to design Flip in the familiar Mac style. It is a super-slim KVM switch that sits under a Mac Mini, allowing it to share a keyboard and monitor with a PC.

You simply plug it into a USB port on each machine and you can switch between them.

→ **www.belkin.com**



## Lone Skype

Netgear has unveiled a phone that enables Skype users to place phone calls without a computer, provided a Wifi access point is within range. The company said it would be shipping worldwide before April.

→ **www.netgear.com**

# Advance of the killer robots

Robot guards capable of patrolling public areas and chasing criminals could soon be developed by scientists in South Korea – and an armed robot for military use is in the pipeline, too.

Companies involved in the research include two that exhibited robots for home use and entertainment at the Consumer Electronics Show in Las Vegas. They are Hanool Robotics, which has built unarmed robots for the Korean military, and Mostitech, which began manufacturing a basic home security robot in 2004.

Lee Ho-gil, head of the country's Center for Intelligent Robotics, told the *Korea Times* that development work on the 'robocops' will begin next year if plans are approved.

South Korea's defence and information ministries are co-operating on a separate five-year $32.4m project to develop a heavily armed insect-like battlefield robot armed with a variety of weapons. It will have six or eight legs with wheeled 'feet' capable of coping with rough terrain.

'The robots will be directed by a remote control system or move autonomously via their own artificial intelligence systems,' Oh Sang-rok, a ministry of information and communications project manager, told reporters.

Korea's government believes robotics could become a $100b industry by 2020, officials said. A new national science and technology development plan calls for the establishment of a robotics science park near Korea's capital of Seoul, which will house 20,000 engineers, scientists and other experts. Nearby Japan is also investing heavily in robotics research.

The International Federation of Robotics predicted that more than seven million robotic devices would be sold worldwide between 2005 and 2008. While most of these will be domestic machines, such as floor cleaners, about 50,000 will be in the professional category, which includes defence and security. *Simon Burns*

# HD camcorder records to an SD card

Sanyo's Xacti VPC-HD1 camcorder, which records 720p mpeg4 video onto an SD card, was among the most striking of the many high-definition (HD) products at CES.

A 2GB card holds about 42 minutes of video at the highest definition or more than two hours at standard resolution.

**CES gave Dell a chance to show off a new 30in LCD monitor**

The device incorporates a 5megapixel stills camera, a 10x optical zoom and has separate attachable wide-angle and telephoto lenses. It will be available shortly for $799 (£452 approx).

Predictably, a lot of HD screens were on show, with both Panasonic and Samsung claiming to have the world's largest 1080p plasma TVs – Panasonic's 103in model was just an inch larger than Samsung's. Other types of screen were also beginning to challenge plasma for size. Samsung had an 82in LED-based LCD TV, plus LCDs from 15 to 57in.

**The eye-catching Sanyo Xacti VPC-HD1 camcorder**

And Sony had seven new Bravia LCDs, ranging from 26 to 46in.

Dell also got in on the act, showing a 30in LCD monitor without a built-in TV (pictured left) and a concept 20in notebook.

# Creative Vlogs set to rival Apple's Ipod

Video blogs were big at CES, with Serious Magic offering a $49 (£27 approx) package called Vlog It, which helps you to create your own blog, as the company says standard video-editing software is too complicated for vloggers

Write your Vlog script, which appears on a teleprompter and then drag and drop your video at the appropriate part of the script.

A trial download is available at www.seriousmagic.com and a version of the product will be bundled with Creative webcams.

Creative launched into new territory at CES with a public beta of its answer to Apple's Itunes, Zen Cast. Zen Cast Organiser ties you to Creative's Zen Vision and Zen Vision: M portable media players (see review page 47), in the same way Itunes ties up with Ipods.

Zencast.com is a little like an RSS feed, where it aggregates information, but in future you'll be able to add your video blogs. There's a review of Vlog It at www.pcw.co.uk/2149500.

**Zen Cast tries to rival Itunes**

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With up to 12 hours† battery life, the brightest screens and stunning design, innovative Sony VAIO Professional Notebooks can give you that competitive edge you're looking for.
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Find out more at www.sony.co.uk/vaioprofessional
*Applies to Sony VAIO Professional BX, TX and S Series. †Battery life achievable on VGN-TX1 model with extended battery pack. Standard battery life on VGN-TX1 up to 6 hours. Model featured is the ultra portable VGN-TX1, weighing just 1.25kg. For further customer information please call Sony on 08705 424 424.
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Sony recommends Microsoft® Windows® XP Professional for versatile Mobile Computing.
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INTERACTIVE

# LETTERS

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

Send your email to letters@pcw.co.uk

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LETTER OF THE MONTH

## A plea to Pocket PC developers

**I was intrigued to read about the Nintendo DS in your mobile gaming round-up (*PCW*, February 2006), so I unwrapped the one my son had put on his Christmas list and had a go.**

**Two hours later I was still hooked; the touchscreen games were brilliant. 'Perhaps I'll take this one for myself', I thought. But then it hit me: I have a modern Pocket PC with a touchscreen, a fast CPU and ATI graphics, so all I need to do is go online and explore the wealth of DS-style touchscreen games they must have made for the Pocket PC.**

**I was gravely disappointed; instead of 'Wario Ware: Touched' clones, I get clones of old PC games and, instead of a 'Project Rub' clone, I get ancient puzzle and card games. I would have thought PDA games designers would have looked at the PDA format and designed games around its potential instead of trying to squeeze in games designed for big-screen PCs with lots of keys.**

If the Nintendo DS offers touchscreen games, why can't a Pocket PC?

**Surely after playing on a DS they would have seen the parallels and made a few clones. The DS has a touchscreen, a microphone and Wifi connectivity – so do modern Pocket PCs. You could even argue that the portrait layout of a Pocket PC is equivalent to two small landscape screens on top of each other, like the DS. The similarities are too many to ignore so please give me some DS action on my Pocket PC.**

**Jake Dovey**

### GREEDY WINDOWS

It is really exciting to read about Microsoft and the development of Windows Vista. As an IT geek, it thrills me. But it has its costs. Vista will not run on the majority of today's PCs. Typical Microsoft. A small 'Hello world' application compiled on Visual C++ as a Windows application resulted in an executable four times bigger than any of my Dos applications without doing anything.

For the desktop, the apps eat up all the resources made available via new technology. A new 64bit system will not give you much benefit after Microsoft has eaten its part. The company can make intelligent, compact programs such as Windows Mobile. This isn't fancy, but it is demanding on the developer.

While Microsoft is thinking 'bigger is better' in the American way, I would prefer compact, efficient and smart like the European or Asian way. My Toyota is compact and takes me where I want with plenty of power. I will not trade it with a bulky American car with accessories I don't need and where the power is needed only to move the surplus metal. I like Vista because I hope it will give the alternatives a boost.

**Svein Olav Hagen**

*Kelvyn Taylor replies: Our 'Shrink Windows' feature on page 104 will no doubt meet with your approval!*

### QUICKER QUICKTIME

While browsing through the March edition of *PCW*, I stopped to read the Letters section. In particular I was reading the letter written by Paul Ackroyd (Slow, slow, Quicktime, slow).

I couldn't help but check up on his comments that he could not install Quicktime 7 without installing Itunes at the same time. While I agree with his comment about bloatware, I couldn't help but chuckle over the fact that in your screenshot on the very same page, it clearly displays the option (in the very bottom, centre of the photo) to get the Quicktime Standalone Player.

Clicking this link (www.apple.com/quicktime/download/standalone.html) allows the standalone player (20.2MB) to be downloaded without Itunes.

Thought that may be of interest – keep up the good work!

**Sebastian Ward**

*Kelvyn Taylor replies: Thanks to the many eagle-eyed readers who pointed out my error.*

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.

## BLACKLISTED SERVERS

For several months I have experienced problems with one email sender who advises me that his emails are being returned two to three days after despatch, with the comment '...unable to deliver'. No other explanation was given. Needless to say, I was unaware of this, but when advised I examined my security setup and found nothing wrong (Norton Internet Security 2005 listed the sender's email address as OK to receive).

Two weeks ago a further sender had all mail bounced back, followed by another last week.

I asked my ISP (Tesco.net) if there was any filter being applied and was told I should go to a site address within Tesco.net and remove a 'spam' filter that had been applied to my Internet address. This had been done without my knowledge. It was suggested I remove the 'check' against the filter and try again.

I asked someone to send me a line of text to test that I could now receive OK. The test failed with the email being returned.

Again, I approached Tesco.net support services. Its reply was as follows: 'Unfortunately Tesco are blocking emails from Wanadoo, Yahoo and Hotmail. These domains are blacklisted by the third-party mail-filtering service that we use, as sources of spam. We are unable to remove the blacklisting. It is the responsibility of the blacklisted ISP to clean up its act and ensure its domain is not a haven for spammers. Once this has been done they will be removed from the blacklist.'

I wonder if its action is legal and what Microsoft's reaction is likely to be, given that Hotmail is blocked. I am annoyed that no warning was given that this blocking was to take place, which meant I could not alert any of my addressees.

*Kelvyn Taylor replies: Several of the larger ISPs use server-side spam solutions that use the Sorbs database to identify potential spam sources and reduce the strain spam puts on their email servers. As far as we're aware, there's nothing 'illegal' about this, but it is annoying, especially if users aren't told about it up front.*

## SENIORNET UK

Following on from a thread on *PCW* Interactive (http://interactive.pcw.co.uk/2005/07/it_help_for_the.html) about 'seniors' not getting much IT support, I thought you might be interested in our website (www.seniornet-uk.org) that addresses some of the items.

Albeit small at the moment, we are looking for the site to grow and provide UK 'seniors' with assistance in better understanding email, broadband, Internet and so on. Full details can be found on the website.

**Mike McNamara, Seniornet UK**

*Kelvyn Taylor replies: We're glad to see that a reader letter has prompted such a positive and practical development, and we'd like to wish you all the best with your efforts.*

## COMPUTERTOWN UK: CALLING ACTIVISTS

I was wondering how many 'Computertown UK' activists are still around. I helped to set up the Gateshead and Newcastle upon Tyne 'Computertown UK!' meetings in 1980. Anyone still out there after 25 years?

**John Bone**

*Kelvyn Taylor replies: Computertown UK was a scheme – based on an American initiative called Computertown USA – to promote computer literacy to the public, for example by participants setting up their PCs in public places such as libraries so people could get hands-on experience. If any readers (or ex-staff) have recollections or experiences of this project you'd like to share, please drop us a line. A couple of ex-*PCW *editors involved in the project, Peter Rodwell (www.albany.edu/piporg-l/FS/pr.html) and David Tebbutt (http://teblog.typepad.com/david_tebbutt), are still out there.*

## OVERPRICED AND OVER HERE

I wanted to upgrade my Macromedia Studio MX2004 to the latest Studio 8 version but have decided not to because of the large difference between the US price and the sterling equivalent. Bearing in mind this product is available as a software download, the differences in costs should be minimal. Yet the upgrade is $399 (£225.18) for US customers and £299 ex VAT for the UK; an exchange rate of $1.33 to the pound! Currently the market exchange rate is 1.75.

Value is even worse if you only want to upgrade Dreamweaver: $199 (£112.32) and £168 ex VAT – an exchange rate of 1.18. The site refuses to let me buy in dollars and insists on using the international site where the charge is in sterling. The product is the same, support is the same, but the UK user is overcharged. Great product Macromedia, but why alienate UK users?

Strangely, Adobe, the new owner of Macromedia, has a much fairer exchange rate on its Acrobat products.

**Gary Starling**

**Seniornet offers IT help to the over-50s**

## PICK UP THE PHONE

I'd like to respond to Maurice Hall's letter in the February 2006 issue. He rightly concludes that excessive prices are being charged to ship a lightweight package from the UK mainland to Northern Ireland.

Living in the Republic of Ireland I have had a similar experience. After buying my first digital camera and realising it had very little memory I decided an upgrade was in order. My camera has an SD (Secure Digital) card slot, so deciding what to buy was not hard, however where to buy was a completely different matter.

The difference between the price of any PC component in the UK compared to Ireland is substantial. I browsed the Internet for a solution.

I decided to purchase my SD card from Savastore and, like Mr Hall, discovered it had doubled in price when I got to the checkout.

I picked up the phone and talked to a very helpful customer service representative at Savastore who told me he could complete my transaction, send my shipment by post and save me the high shipping cost. I accepted. I realise it is becoming increasingly difficult to find phone numbers on websites, but persistence pays off. Thankfully the Savastore number is now displayed on the home page.

**Frank Eccleston**

This powerful image-editing package has an intuitive interface making it suitable for beginners but, thanks to the huge range of tools available, it will also keep advanced users happy. You can fix flaws such as red-eye as well as perspective and other settings. The package also includes Corel Photo Album to import and sort photos direct from your digital camera. For more information on Paint Shop Pro X, go to www.corel.co.uk.

# THE ADVISER

## PCW GIVES ADVICE ON YOUR RIGHTS

→ **Send details of your dispute to theadviser@pcw.co.uk.** Please provide a daytime telephone number so we can contact you if necessary.

## COVER YOURSELF

- Keep good records; store all receipts in one safe place as proof of purchase is vital.
- Create a folder in your email client to store emailed receipts – and print a copy. Print spec sheets from websites as proof of an order.
- Get written quotes specifying components used.
- Use a credit card for purchases of £100 or more – credit card companies are liable if the vendor goes out of business.
- Do not try to repair faults – this invalidates your rights in the majority of cases.
- Think before buying expensive hardware outside the EU, because if something goes wrong, enforcing your rights is difficult. Shipping faulty kit back will be costly.
- Never cancel a direct debit or standing order as a means to resolve a dispute over payments or service. You may get a poor credit rating and face court action.

## HOW TO COMPLAIN

- Keep records of who you speak to, along with any paperwork and emails.
- Stay calm – companies will respond defensively to abuse and shouting, regardless of whether you are in the right.
- If the dispute reaches an impasse, insist on escalating the complaint. Get a director's name and send correspondence by recorded delivery.

## PIXELS RIP

**I bought a Samsung LCD monitor from Savastore.com. A few days after receipt I noticed three dead pixels and another two pixels flickering on and off. The dead pixels are in the centre of the monitor and they are very irritating to the eye. One of the dead pixels is very bright green, another is very bright red, and the third is black.**

**I notified Savastore of these defects by phone and email on several occasions but received no reply. It is obvious that the monitor is faulty and is not of satisfactory quality. In addition, this defect might have health and safety implications with regard to my eyes. I have contacted Samsung, but it didn't want to admit that the monitor was faulty.**

**Dr Sinan Al-Jassar**

When discussing the issue of dead pixels on LCD displays, there is only one certainty; consumers get a raw deal. Display manufacturers work to an internationally agreed standard called ISO 13406-2. Within this standard are three classes that describe how many pixels can be defective in every million (for an explanation of how sub-pixels combine see http://en.wikipedia.org/wiki/Dead_pixels).

Only Class 1 displays are guaranteed to be free from pixel and sub-pixel defects, and these are usually more expensive than products in other classes. Most consumer devices are Class 2, so a small number of defective pixels, depending on the size and resolution of the monitor, are permitted. The standard is considered legally binding because manufacturers make acceptance of the ISO standard a condition of sale, although to our knowledge it has never been tested in court.

Defective pixels and sub-pixels can arise in the manufacturing process or during shipment and normal use, so our advice when buying an LCD monitor is to buy it from a shop and ask to see it switched on. If you buy online and find the display contains dead pixels, send it back within seven days under the Distance Selling Regulations, noting that you may have to pay for the item to be collected if this is stated in the company's terms and conditions.

Samsung told us that the defects described by Dr Al-Jassar fall within the accepted limits for Class 2 devices. The company said it could not comment on the health and safety concerns associated with defective pixels, and assumed these were incorporated into the guidelines set by the International Standards Organisation. It offered on this occasion to replace Dr Al-Jassar's display. We suspect that other consumers with this problem will receive short shrift.

Manufacturers are not keen to stress to consumers that displays are effectively sold on the basis that they may contain some defects. On the random selection of product specs we viewed from a range of LCD manufacturers, reference to the standard and class of the device on offer was buried deep in the spec sheet. With more LCD devices, such as televisions and handheld games consoles, being sold, we hope that the industry will agree to look again at ISO 13406-2 – but don't hold your breath.

## OFFICE POLITICS

**I recently bought the Professional version of Microsoft Office from an online dealer with a new PC I had bought. I first installed it on another older computer, but the software seemed to conflict with the previous version of Office installed on that PC. Then when I tried to install it on the new PC, the product key was rejected.**

**I read the whole of the CD's cover to see what was going on and it told me that this disc and code were only eligible for one single activation on one PC. I couldn't believe it as, when I was in PC World I overheard one of the**

**Check before you buy Office that you have chosen the appropriate version**

**other customers asking if he needed to buy an extended licence for Business Edition; the assistant told him it would only be needed for more than three PCs so I thought when I bought Pro it should be the same.**
**Mitchell Raftery**

As we suspected, Mr Raftery has purchased an OEM version of Office Professional. OEM versions become tied to the first PC they are installed on if the licence permits only a single installation. Strictly speaking, consumers shouldn't buy OEM versions as a separate product, but they are sometimes sold to those who construct PCs from kits or components because they are recognised as 'system builders'. The question is, when does an individual adding components to a PC become a system builder?

The retailer has done nothing wrong under the Sale of Goods Act, as it sold a copy of Microsoft Professional, not the Microsoft Office Business Edition that Mr Raftery mistook it for. It could be seen to be a breach of Microsoft's licensing, but that would be a matter between the retailer and Microsoft UK. Our advice is to check exactly which version of Office is appropriate before making payment. You'll find details of content and licensing conditions of retail, pre-installed (OEM), volume and academic editions at www.microsoft.com/office/editions/howtobuy/compare.mspx.

The good news is that, as Mr Raftery's mistake was obviously an innocent one, Microsoft has agreed to send him a retail copy of Office Professional.

## Waiting for Wanadoo

**Wanadoo has been billing me for a broadband connection that it has been unable to supply since October 2005. I attached the company's Livebox router to my PC as set out in the instructions, activated my account and then unplugged the device so it could reboot and detect the new settings. Unfortunately, Wanadoo had started to update the Livebox firmware when I disconnected and the interruption resulted in a failed firmware update that derailed the sign-up process. Wanadoo sent a rescue CD to correct the firmware error but not the wireless dongle required to link the Livebox to my PC because it has no Ethernet port. The problem is that the wireless adapter still hasn't been sent, despite Wanadoo taking a charge from my credit card on top of charges for the broadband service.**
**John Reilly**

The root cause of this problem is stock, or rather the lack of it, compounded by a lack of reliable communication – for which leading ISPs are sadly developing a reputation. Wanadoo placed an order for the adapter, which triggered an automatic charge to be added to Mr Reilly's invoice. Every time he called the company to enquire about a delivery date, it seems a fresh order was erroneously placed, triggering further charges.

Following a call from The Adviser, staff at Wanadoo contacted Mr Reilly to say that the item was out of stock – nearly eight weeks after his initial order for the broadband service. During that time charges of £55 have been taken from his account. Wanadoo has now sent a USB version of the Livebox and Mr Reilly has his broadband account,. The money the company said it would refund to his account for the period during which no service was supplied under the contract has now been transferred.

If you find that a service promised under a contract is not being supplied, then you can ask to have charges refunded. However, never cancel automatic payment instructions in the hope that the problem will go away.

## KNOW YOUR RIGHTS

- In England and Wales, the retailer must prove that faults found within six months of purchase are not inherent.
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# Gordon Laing

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## Viva Viiv – but what is it exactly?

*Gordon Laing asks whether Intel's new technology will really bring the benefits it promises for home entertainment systems*

When Intel talks about premiering a new kind of PC to usher in an era of entertainment choices, it's hard not to be curious. This is the promise of its new Viiv (rhymes with 'five') platform.

So what is Viiv exactly? According to Intel's marketing, Viiv PCs can record, pause and rewind live TV, be operated by remote control, feature instant-on and off, along with easy access to on-demand movies, music, games and photos on a TV. Sound familiar? Yeah, I thought so. Viiv sounds like almost any existing entertainment PC.

Indeed, a key component of Viiv PCs is the operating system which happens to be Windows XP Media Center Edition (MCE). And where Intel talks about using a remote control or recording TV there's a disclaimer stating: 'requires TV tuner card and/or remote which may be sold separately'.

But hang on a minute – equip almost any PC with a TV tuner, remote control and Windows MCE, and you can already enjoy these benefits. For instance, beyond timeshifting TV, Windows MCE offers on-demand content through its Online Spotlight service while instant-on and off is available to any PC that implements suspend-to-Ram standby. So does that mean existing Windows MCE users now effectively own Viiv PCs?

**'There's more to building an entertainment PC than just having Viiv on the front'**

Not quite. Intel may well be hungry for a slice of the media PC market, but it hasn't just rebranded an existing platform – there are specific components required to enjoy Viiv compliancy, along with a handful of new features.

Every Viiv PC needs three core components: a dual-core Intel processor, one of six Intel chipsets and one of three Intel network connections.

A Viiv PC has several advantages, according to Intel. First, while almost-instant-on and off are possible with suspend-to-Ram, Viiv goes further. Its new Quick Resume technology is more intelligent, blanking the video instantly as it goes into standby to give a more responsive feel, but only giving the impression of being off if it's recording a show or streaming to another appliance.

Speaking of networking, Viiv systems should also work seamlessly with Viiv-compliant streaming adapters, and the requirement of a dual-core processor will ensure that any re-encoding to support certain formats can be achieved smoothly. There's also new online content validated for use with Viiv PCs, although it's not yet certain how much, if any will be locked out to existing Windows MCE owners who don't have Viiv hardware.

Ultimately though, Viiv is predominantly about tying down the hardware specification in order for the system to run more reliably and give a more consumer-like experience. These are no bad things, and my own DIY entertainment PC has its fair share of wobbles. But for me the interesting thing about Viiv is what's been left out.

Among the many benefits listed by Intel, there's no mention of operating noise or specific connectivity to consumer displays. In my experience with entertainment PCs and people who use them, two of the biggest complaints are a system which makes too much noise and doesn't offer an easy or high-quality connection to a TV.

Intel may be an influential company, but it can't force the use of quiet cooling systems or the standard fitting of UK TV-friendly RGB Scart outputs. It can make recommendations and provide guidelines, but beyond the basics of needing an Intel dual-core processor, Intel chipset and Intel network adapter for Viiv compliance, the rest is up to the manufacturers and OEMs. Strangely there's not even any requirement for wireless.

So Viiv is to entertainment PCs what Centrino is to laptops: a brand which ties together key components for greater service validation and hopefully a smoother user experience. While these are welcome, I just wish Viiv could have at least enforced the use of quiet cooling as a minimum. If you buy a Viiv PC, it may work fine with other Viiv devices, but there's no guarantees it'll run quietly, feature the kind of TV connectivity you'd like or even look good.

Like Centrino for laptops, Viiv will no doubt dominate the hardware branding of entertainment PCs – but don't assume this will mean the ultimate system. There's much more to building a great entertainment PC than having Viiv on the front. **PCW**

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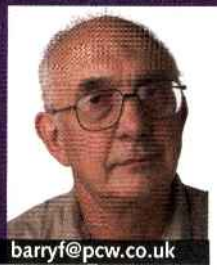

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## I guess that's why they call it the blues

*Despite the CES hype about the imminent arrival of blue laser, the uncertainty over copy protection is causing delays, says Barry Fox*

The Consumer Electronics Show (CES) in Las Vegas has absorbed Comdex and become absurdly over-large, spread across widely spaced venues interconnected by traffic jams.

All the news is posted on the Internet, so you may ask: why not stay at home and access the news via websites? Some media pundits do just that – and they miss what the websites will never tell.

In the UK, market pressure has already forced BSkyB to provide its High-Definition TV (HDTV) satellite receivers with the HD analogue component video outputs, to maintain compatibility with the millions of high-definition LCD and plasma screens without HDCP (high-bandwidth digital copy protection) copy-protected digital inputs.

So will Blu-ray and HD-DVD players do the same? Will blue-laser discs be regionally coded like DVDs? If so, will the coding be tied to the unhackable 128bit Advanced Access Content System (AACS) used by Blu-ray and HD-DVD to prevent digital copying?

**'The AACS process has been tortured. Just look at the list of members to see why'**

The AACS Licensing Administrator is the official source of information. Its website invites 'feedback... addressed to comment@aacsla.com', but emails are returned as undeliverable with 'no mailbox here by that name'. The website also names a Betsy Damus of Edelman PR as the contact for press enquiries; but Damus replies that she is 'not an AACS spokesperson'. AACS-LA is pretending to be open to comment and question, when in fact it is effectively closed.

In Vegas I made a beeline for technical guys from the Blu-ray and HD-DVD groups. Andy Setos, president of engineering at 20th Century Fox, and Chris Buma, Philips program manager for A/V disc recording, admitted that, despite all the CES puff about blue laser being ready to launch, the licensing program for AACS was still not finalised.

'The AACS process has been tortured,' admits Setos. 'You only have to look at the list of members to see why. Eight companies; that's one heck of a room, with round-the-clock meetings. It has been frustrating because 99 per cent of AACS is from IBM, the NNL-tree encryption technology which was white-papered two years ago.'

The uncertainty over AACS is delaying the decision on HD analogue outputs. Says Setos: 'We expect component and composite analogue connections. We look forward to AACS rules which will accommodate analogue connection. Fox wants to respect early adopters. We don't support downscaling resolution. It cheats the consumer.'

Buma said there is 'a proposal to study' the use of regional coding on blue-laser discs. He confirmed that even if there is regional coding, it won't be tied to AACS protection, and 'the current version of Blu-ray player has no regional coding'.

Mark Knox, Toshiba's adviser to the HD-DVD promotion division, confirms the same for HD-DVD. 'As of today there is no regional coding for HD-DVD. If there is, it will not be under AACS protection. So it only needs one teenager to hack it. The movie release windows are collapsing anyway.'

Microsoft has endorsed HD-DVD. Vista, the next version of Windows that will replace XP and Media Center, gives it native support. In his keynote address Bill Gates showed what Vista can do. For a taste of the blistering speed at which he clicked through audio and video libraries, see www.microsoft.com/events/executives/billgates.mspx.

Gates also boasted that 6.5 million people are now using Media Center PCs, and 130 manufacturers are selling them in 33 countries.

I hot-footed it to Microsoft's press information booth and asked what hardware Gates had been using, and what hardware people will need to enjoy what Gates was enjoying. 'We can't yet say,' they said. Intel, Dell and HP couldn't say either, as: 'It will be mid-2006 before Microsoft releases a recommended hardware specification for Vista.'

I clicked through the setup menus on several Vista PCs being used on the show floor. The demonstrations were more limited than Gates' grandstanding, but all the PCs had at least 1GB of Ram and a 3GHz Pentium processor. Dell's demonstrators reckoned Vista will need 'nothing less than 1GB, ideally 2GB'. Intel said: 'We'll be recommending a dual-core processor – absolutely.'

So there's something to bear in mind if you are thinking of buying a Media Center before the Vista hardware spec comes out. **PCW**

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# Guy Kewney

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## A plot to encourage ostentation

*High-definition TV is wasted on most of us, believes Guy Kewney, so what's the point of Media Center PCs?*

People are entitled to question shiny new technologies that cost twice as much as the old ones. For example, why do I really want high-definition TV (HDTV)? And what's so good about doing my web surfing on the family entertainment box?

If you're one of the people who thinks you will appreciate HDTV, this column is going to annoy you, because I suspect it's wasted on most of us.

For example, look at the sales of Ipods and Itunes downloads. Doesn't this make you suspect that high-fidelity audio isn't the bulk of the market? It doesn't mean there's no market for quality audio, but it does mean you'd be wrong to suspect most people want full-frequency range recording.

Most people in Europe watch TV and prefer the biggest screen they can afford. Widescreen TV has worked very well if its purpose was to

**'The Media Center PC is definitely high definition, but what else is good about it?'**

allow electronics manufacturers to render all those 4:3 analogue displays obsolete, and force consumers to upgrade to 16:9 models, but what else? OK, you can watch movies in the same format in which they were made. But to do that, you have to accept that old 4:3 material is going to waste 30 per cent of the new wide display.

When it comes to digital TV, the definition people accept is not always as good as ordinary terrestrial analogue TV; it's mpeg2 from a cable or satellite source, and the compression ratio is fierce. Only if you're watching a sport where you have to be able to see the ball are you likely to be viewing at anything near full data rate, low-loss video. Most people simply don't notice this.

In a recent test in Oxford, $O_2$ gave people the option of watching TV on their handheld phones. The experience was remarkably popular, for various reasons, and indicates that the move to HDTV is going to be matched by a move away from it. In Australia during the same test, the 3 mobile network offered viewers the option of watching live cricket on their phones – and nobody needs to spell out just how low-definition a phone video is.

So why should we get excited about the Media Center PC? It's definitely high definition, but if you accept HDTV is an unproven market concept in Europe, what else is good about it? You get a large, widescreen flat display worth about £2,000 and a free computer, because the whole thing sells for about £2,000. In other words, if you're in the market for a TV, you might as well buy one. Yes, that's a bit of an exaggeration, but the object is to get people to buy something where Microsoft controls the Digital Rights Management (DRM).

If, as informed sources are now predicting, Microsoft wakes up and smells the Ipod coffee, it will be for the same reason. Microsoft doesn't want to have its own Itunes for the extra revenue it will bring. Instead, it needs a pivotal role in the music industry as gatekeeper of music transactions.

It's four years since I explained Microsoft's ambitions in DRM with Windows Media and version 10 of the player; nothing has changed since. Microsoft's strategy is to place itself on the toll bridge, where if you want to buy or sell music, you have to use Microsoft technology. The strategy works well enough, but only so long as nobody else builds a bridge with lower tolls.

That's what Apple has achieved with the Ipod and Itunes; a way of licensing music sales, which has some drawbacks and some advantages over Microsoft's version, but which is starting to look like the de facto standard.

The Ipod is now a video Ipod, which means Apple is expanding its role into video. But low-resolution, mobile video, not HDTV.

It would be fanciful to assume the hype of HDTV is a plot by Microsoft to corner the market in DRM. If it is a plot, then it's to sell expensive gear to people who don't understand that they don't need it; and if you ask me, it's not going to be a runaway success. After all, two HDTV channels means the best part of 80Mbits/sec over broadband. And for what?

In a world where half the people with widescreen TV sets configure them to fill the screen from edge to edge, filling the picture with short, squat inhabitants of high-gravity planets, I can't see the average TV viewer caring about HDTV except as ostentation. But I can see Microsoft getting excited about encouraging such ostentation. **PCW**

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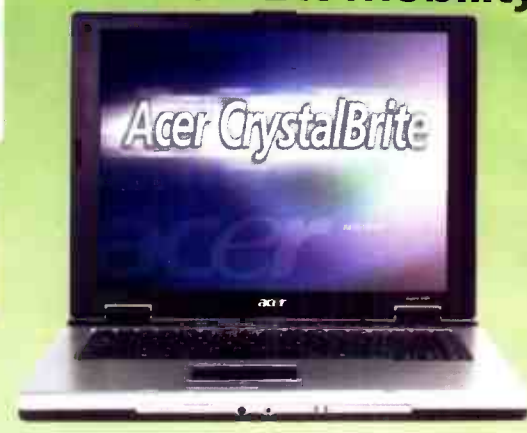


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Suggested street prices valid from 16/02/06 to 16/03/06

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Acer recommends Windows® XP Professional.

# Acer Aspire E360

## New Power for your Entertainment

- AMD Athlon™ 64 Processor
  - Cool'n'Quiet™ Technology
  - Enhanced Virus Protection Technology¹
- Genuine Windows® XP Home Edition or Genuine Windows® XP Media Center Edition 2005
- up to 1024MB DDR
- up to 500GB SATA HD
- Audio O/B
- DVD-RW
- 56K Modem / LAN
- nVidia G6600 256MB PCI Express Graphics Card
- Optical Mouse
- 9 in 1 Memory Reader
- USB Multimedia keyboard
- 1 Year collect and return

NEW

**Acer Aspire E360 Media Center PC**

**£999** INC VAT

**£ 850.21** EX VAT

AMD Athlon™ 64 Processor 4200+
Genuine Windows® XP Media Center Edition 2005
500GB 7200RPM SATA HD, 1024MB DDR II (2x512),
DVD-RW, nVidia G6600 256MB PCI Express graphics card, Speakers,
Modem, 9-in-1 Card Reader, Microsoft Worksuite®, Hybrid DVB-T +
Analog TV Tuner, USB multimedia keyboard, Modem, LAN, Optical Mouse,
9-in-1 Card Reader

# Acer LCD TV

## An Exceptional Point of View

HD-Ready

### AT 3201W

- 32" Widescreen Multimedia TFT
- Resolution 1366 x 766
- Brightness 500 nits
- Contrast Ratio 800:1
- Viewing Angle 170°
- Response rate 12 ms
- 3D Surround Sound
- DVI (with HDCP), D-Sub
- 10W Speakers

**£849** INC VAT

**£722.55** EX VAT

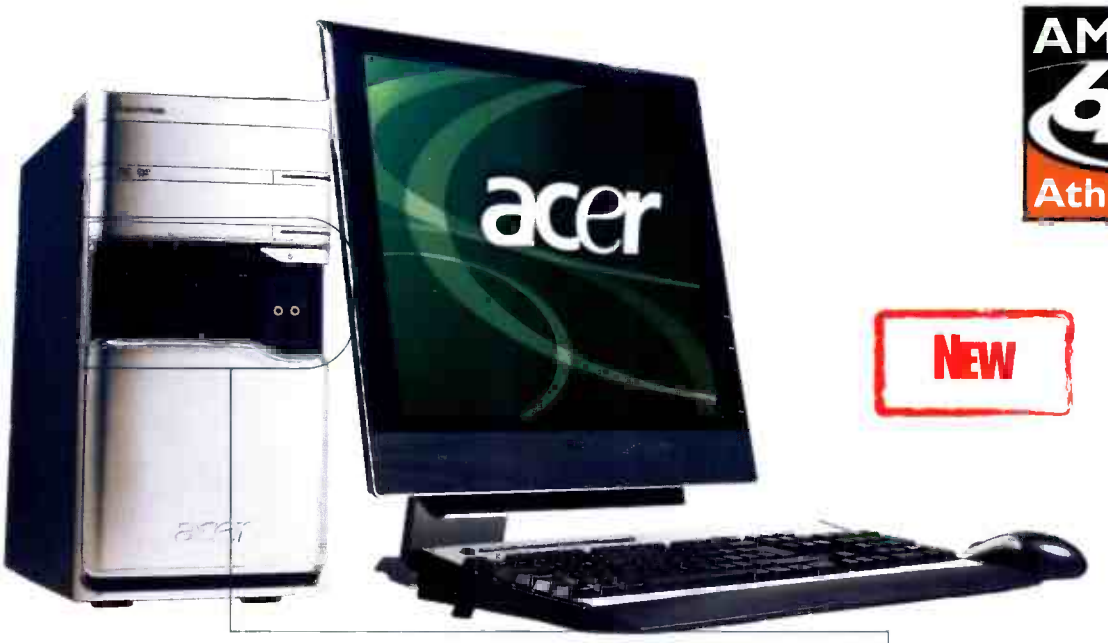
HD-Ready

### AT2601W

- 26"Widescreen Multimedia TFT
- Resolution 1280x768
- Brightness 450 nits
- Viewing Angle 170°
- Contrast Ratio 600:1
- Response time 16ms
- 3D surround sound
- HDMI, D-Sub, Composite AV
- 5W Speakers
- Card Reader

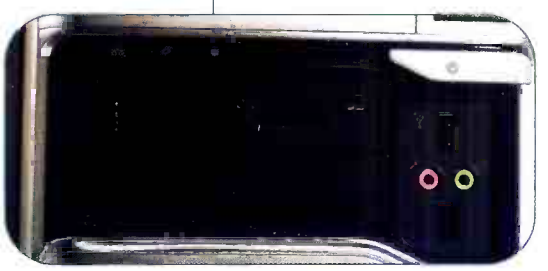
**£699** INC VAT

**£594.89** EX VAT




AMD 64 Athlon™

NEW



## Acer Aspire E360 Gaming PC

**£ 699** INC VAT

**£ 595** EX VAT

AMD Athlon™ 64 Processor 3500+
Genuine Windows® XP Home Edition
200GB 7200RPM SATA HD, 1024MB DDR II (2x512),
DVD-RW, nVidia G6600 256MB PCI Express graphics card, Speakers,
Microsoft Worksuite®, USB multimedia keyboard, Modem, LAN, Optical Mouse,
9-in-1 Card Reader

Suggested street prices valid from 16/02/06 to 16/03/06

[1] is enabled by Microsoft® Windows® XP SP2

# Acer Gamers Line Monitors

## Acer AL1951AS

- 19" Multimedia TFT
- Acer Crystalbrite Display
- Resolution 1280 x 1024
- 16.7 million colours
- Viewing Angle 150°
- Brightness 400 cd/m²
- Contrast Ratio 700:1
- Response Rate 8ms
- Speakers
- TCO '99
- Analogue D-Sub Digital (DVI-D) input
- Slim Format
- 3 Year Warranty

**£ 269** INC VAT
**£ 228.94** EX VAT

## Acer AL1751AS

- 17" Multimedia TFT
- Acer Crystalbrite Display
- Resolution 1280 x 1024
- 16.7 million colours
- Viewing Angle 150°
- Brightness 400 cd/m²
- Contrast Ratio 500:1
- Response Rate 8ms
- Speakers
- TCO' 99
- Analogue D-Sub Digital (DVI-D) input
- Slim Format
- 3 Year Warranty

**£ 199** INC VAT
**£ 169.36** EX VAT

Pictures are intended simply to illustrate the product

# Acer Aspire 5000

## Expanding the Potential of 64-Bit mobility

The slim and stylish **Acer Aspire 5000** models feature the all-new AMD Turion™ 64 Mobile Technology with AMD PowerNow!™ support for exceptional system battery life and HyperTransport™ technology that ensures the world's fastest communication between components. Designed for self employed professionals and power users from small and medium businesses, the **Acer Aspire 5000** it is also the perfect choice for all private users looking for a space saving home computer that provides great entertainment, easy access to Internet and more than enough power for demanding home multimedia applications.

AMD Turion 64 MOBILE TECHNOLOGY

**Made for mobility with AMD64 performance**

- AMD Turion™ 64 Mobile Technology
  - AMD PowerNow!™ Technology
  - HyperTransport™ Technology
  - Enhanced Virus Protection Technology[1]
- Genuine Windows® XP Home Edition
- Empowering Technology
- 15.4" WXGA CrystalBrite TFT LCD
- 512MB or 1024MB DDR333
- 60GB or 100GB ATA/100 Hard Disk drive
- DVD Dual-Double Layer
- Connectivity: 10/100 Ethernet wired or 802.11g wireless LAN, 56K Modem
- 3x USB 2.0 Ports
- 1* Year Carry In (International travellers warranty - ITW)

[1] is enabled by Microsoft® Windows® XP SP2

**Acer Aspire 5003WLMi**

**£699** INC VAT

**£595** EX VAT

AMD Turion™ 64 Mobile Technology ML-32 (1MB L2 Cache, 1.60GHz)
Genuine Windows® XP Home Edition
Empowering Technology, 15.4" WXGA CrystalBrite Widescreen display, 128MB integrated graphics, 1024MB DDR, 100GB HDD, DVD Dual Double Layer, wired and 802.11g, Acer Arcade

NEW

Wi Fi® CERTIFIED

* Without compromising the legal guarantee of the consumer

Pictures are intended simply to illustrate the product.

# Acer PDA n35

**Acer n35 GPS Bundle**

**£249** INC VAT

**£211.91** EX VAT

Samsung Processor at 266MHz, 64MB SDRAM, 32MB NAND Flash Memory, SD(SDIO)/MMC Slot, 3.5" transflective TFT, 256MB SD Card, Destinator 3 Software, Microsoft® Windows® Pocket PC 2003 Premium, Integrated GPS receiver

**Acer n35 PDA GPS Solution**

acer

4.0

acer POINT

The **Acer TravelMate 4400** notebook was designed specifically to allow companies to realise their productivity potential by introducing them to a 64-bit mobile future. Combining the power of AMD Turion™ 64 Mobile Technology with first-class graphics abilities, dockability, next-generation wireless connectivity and a suite of productivity-enhancing tools, the lightweight **Acer TravelMate 4400** comes with 64-bit leadership built in, reflecting Acer's dedication to constant improvement and providing everything users need to surpass even their own expectations.

- AMD Turion™ 64 Mobile Technology
  - AMD PowerNow!™ Technology
  - HyperTransport™ Technology
  - Enhanced Virus Protection Technology[1]
- Genuine Windows® XP Professional
- 15.0" XGA TFT Display
- Empowering Technology
- 64MB Integrated Graphics
- 56K Modem, 10/100/1000 LAN, WLAN 802.11g
- 4x USB 2.0, S-Video, Firewire, Infrared, 1x Type II
- 6-in-1 Card Reader
- 1* Year Carry In
  (International travellers warranty - ITW)

# Acer TravelMate 4400

## The leading edge of 64-Bit mobility

[1]is enabled by Microsoft® Windows® XP SP2

**Acer TravelMate 4401LCi**

**£649** INC VAT

**£ 552.34** EX VAT

AMD Turion™ 64 Mobile Technology ML-28
Genuine Windows® XP Professional
Empowering Technology 15.0" XGA TFT Display, 64MB Integrated Graphics , 256MB , 40GB, CDRW/DVD Combo, Gigabit Ethernet & wireless 802.11b/g, 6-in-1 card reader, Acer GridVista, Acer Arcade

AMD Turion 64 MOBILE TECHNOLOGY

ATi

# Acer LCD Monitors

*Display Passion - Ferrari Monitors*

## F17 - TFT LCD 17"

- 17" Multimedia TFT LCD
- CrystalBrite Display
- Resolution 1280 x 1024
- Brightness 400 cd/m²
- Contrast Ratio 500:1
- Viewing Angle 140°/130°
- Response rate 8 ms
- TCO '99
- Digital (DVI-D)
- ISO 13406-2
- Speakers
- TV Tuner

**£309** INC VAT
**£263** EX VAT

## F19 - TFT LCD 19"

- 19"Multimedia TFT LCD
- CrystalBrite Display
- Resolution 1280x1024
- Viewing Angle 140°/130°
- Brightness 400 cd/m²
- Contrast Ratio 550:1
- Response time 8ms
- Digital (DVI-D)
- TCO '99
- ISO 13406-2
- Speakers
- TV Tuner

**£379** INC VAT
**£323** EX VAT

## F20 - TFT LCD 20"

- 20" Widescreen TFT LCD
- CrystalBrite Display
- Resolution 1680 x 1050
- Viewing Angle 160°/160°
- Brightness 300 cd/m²
- Contrast Ratio 800:1
- Response time 8ms
- Digital (DVI-D)
- TCO '99
- ISO 13406-2
- Speakers
- TV Tuner

**£549** INC VAT
**£467.23** EX VAT

www.acer.co.uk

4V

Acer recommends Windows® XP Professional.

# February *2006*

Acer, like Ferrari, is the technology driver of tomorrow. Both produce desirable, eye-catching and devastatingly fast products that embody the passion, spirit and experience of years leading the competition. The magnificent carbon fibre casing of the Ferrari 4000 conceals the very latest AMD 64-bit technology, full wireless connectivity and widescreen monitor. Powerful, dark and purposeful, the Ferrari 4000 has the presence of a true champion.

AMD Turion 64 MOBILE TECHNOLOGY

## NEW Ferrari 4000 NOTEBOOK TECHNOLOGY DRIVER

- AMD Turion™ 64 Mobile Technology ML-30
  - AMD PowerNow!™ Technology
  - HyperTransport™ Technology
  - Enhanced Virus Protection Technology[1]
- Genuine Windows® XP Home Edition
- Empowering Technology
- 512MB (2x256MB)
- 80GB hard drive, 5400RPM
- Integrated DVD-Super Multi double-layer drive
- 5-in-1 card reader for optional MultiMediaCard™, Secure Digital card, Memory Stick®, Memory Stick PRO™ or xD-Picture Card™
- 15.4" WXGA TFT display with Acer Crystalbrite
- ATI MOBILITY™ RADEON® X700 graphics with 128MB
- 802.11g WLAN, Bluetooth®, gigabit LAN, V.92 modem
- 1* Year Carry In (International travellers warranty - ITW)

Ferrari
OFFICIAL LICENSED PRODUCT

**Ferrari 4002WLMi**

**£ 999** INC VAT
**£ 850.21** EX VAT

acer ADVANTAGE

AcerAdvantage New Edition warranty upgrade to 3 years pick up & delivery including accidental damage insurance

**£ 116** INC VAT
**£ 99** EX VAT

42

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acer

www.pleasing.it - ADV
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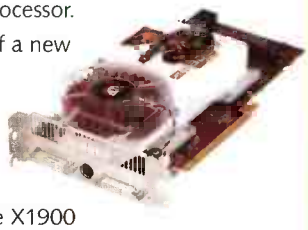
Acer used recycled paper for the production of this flyer.

# Trusted tests from the UK's best Labs

EDITED BY
WILL STAPLEY

REVIEWS

## WHAT'S NEW THIS MONTH



Following AMD's release of the dual-core FX60 desktop processor, rival Intel has responded with the first dual-core mobile processor. Marketed under the Intel Core Duo brand, it forms part of a new Centrino standard – codenamed Napa. As far as performance goes, it's a surefire winner and manages to out-do many desktops. Acer shipped us the first Napa notebook, the Travelmate 8204WLMi – turn to page 44 for a full review. To those of you following the battle between ATI and Nvidia, it will come as no surprise that this month brings a new breed of cards – the X1900 series from ATI. Cramming in 384 million transistors, it's the fastest single-core graphics card and not as expensive as you might think. Read our review on page 55.

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Prices include VAT unless otherwise stated

## OUR SCORING

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

## OUR AWARDS

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

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

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

The business awards are used for products that are more suited to home offices or small businesses.

Editor's Choice

Recommended

Great Value

Editor's Choice Business

Recommended Business

Great Value Business

**'There's no doubt that Intel's new Napa platform is the fastest mobile specification currently available'**

Read the review on page 44

NAPA NOTEBOOK

# Acer Travelmate 8204WLMi

Personal Computer World RECOMMENDED

## Dual-core mobile computing for the power hungry

Acer's Travelmate 8204WLMi is ideal for those who need a powerful PC while travelling around

Rumours have been circulating about the latest update to Intel's Centrino platform, and we can now reveal it in all its glory. Codenamed Napa, the mobile platform consists of a brand new Yonah processor – the first dual-core mobile CPU. Various versions are available, including a single-core CPU, but the one used by this Acer notebook is the Intel Core Duo T2500. The two cores share 2MB of Level 2 (L2) cache and run at 2GHz – the fastest Pentium M is the 780, which has a single core running at 2.26GHz.

The Travelmate 8204WLMi is modelled around Acer's unmistakable Ferrari notebooks, although the garish red livery isn't used here. The carbon-fibre lid adds extra protection for the 15.4in screen, which has a native resolution of 1,680 x 1,050.

Sensibly, Acer has decided to provide the 2GHz Core Duo T2500 processor with plenty of support. The Travelmate 8204WLMi has 2GB of DDR2 Ram and a powerful ATI Mobility Radeon X1600 graphics card – this has 256MB of Ram on board and shares a further 256MB with the system memory.

With such an impressive specification, we were eager to rig up the Travelmate 8204WLMi to the test bed and run our range of benchmarks. The results were astounding, especially in the Sysmark 2004 SE test. Previously, the fastest notebook with a mobile processor we'd seen was the Evesham Voyager C720 (www.pcw.co.uk/2146394), which notched up a score of 180 in Sysmark 2004 SE. Impressive though this result was, the dual-core Acer breezes past this record. It cleared the 200 mark with ease, finishing with a Sysmark 2004 SE score of 231. When you consider the Athlon FX-57-powered Evesham Decimator 78FX desktop PC (www.pcw.co.uk/2143446) achieved a score of 229 in Sysmark 2004 SE, you start to realise just how fast this notebook runs.

The Mobility Radeon X1600 graphics provided by ATI can't quite match up to Nvidia's Geforce 7800 GTX mobile alternative, but the 3Dmark05 score of 4,380 indicates this Acer notebook will still be able to cope with the majority of games.

Battery life, as determined by our Mobilemark test, sits at two hours, 53 minutes during standard usage – not bad considering the processor power. For a full breakdown of our various benchmark scores for the Travelmate 8204WLMi and other notebooks we've reviewed, visit www.reportlabs.com.

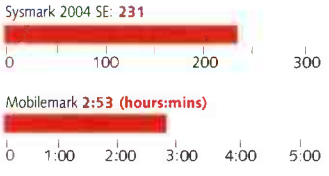
Other notable features housed on the notebook include an integrated multiformat dual-layer DVD drive, 120GB 5,400rpm hard drive, 4-in-1 memory card reader and a Bluetooth VoIP (Voice over IP) phone for making Internet calls. You'll also find a reversible 1.3megapixel camera on the top of the lid, which will come in handy when making video calls.

Norton Antivirus, Cyberlink PowerDVD and NTI CD-Maker are among the software titles included. Acer also ships its Empowering Technology suite of security, recovery and power-management tools.

After running this dual-core Yonah-powered Acer notebook through our benchmarks, there's no doubt that Intel's new Napa platform is the fastest mobile specification currently available. What's more, the price tag of £1,761.33 isn't at all bad when you take into account its remarkable power capabilities. If you want desktop power on the go, this is the notebook for you. But, as ever, if you wait a little longer you'll be able to get your hands on a faster model – a 2.33GHz Yonah CPU is expected mid-2006.

*Will Stapley*

## Performance




## Details

**Price** £1,761.33
**Best price** www.pcw.co.uk/bestprices
**Contact** Acer 0870 853 1005 www.acer.co.uk
**Specifications** Intel 2GHz Core Duo T2500 processor • 2GB of DDR2 Ram • ATI Mobility Radeon X1600 • 15.4in display • 120GB hard drive • Dual-layer DVD writer • 802.11a/b/g • Gigabit Ethernet • 4 USB2 • 1 Mini Firewire • Windows XP Professional • 1yr C&R warranty

## Verdict

**Pros** Powerful dual-core processor; good range of components
**Cons** Graphics can't match 7800GTX; average battery life

| | |
|---|---|
| **Features** | ★★★★☆ |
| **Performance** | ★★★★★ |
| **Value for money** | ★★★★☆ |

**Overall** A notebook to rival even the fastest dual-core desktop PCs

★★★★★

MEDIA CENTER PC

# Fujitsu Siemens Scaleo E

## A bulky yet versatile home-entertainment system designed to fit under your TV

Built to match other home-entertainment equipment, in terms of both looks and versatility, the Scaleo E from Fujitsu Siemens is a feature-packed Windows Media Center Edition (MCE) PC. In fact, if you don't look around the back or flip down the panel on the front, it could quite easily pass for an oversized DVD player.

Hiding inside this 15kg behemoth is a Pentium 4 630 (3GHz) processor and 1GB of DDR 400 Ram. The basic version ships with 512MB and is £50 cheaper than our review system.

For most sorts of computing work, the Scaleo E will cope with ease, as our Sysmark 2004 SE score of 179 shows. It's not lightning-fast, but will be able to handle MCE applications efficiently. The Intel 915 integrated graphics are pretty weak, though, and will definitely struggle with 3D games at any sort of decent detail settings.

This computer's real talent lies with its entertainment features. As well as running MCE, it has an impressive collection of ports and sockets on the back, catering for both computer and standard AV devices, along with a detailed LED panel on the front.

On the back sit RGB Scart, DVI, VGA and S-video sockets for connecting to all manner of displays. Running Windows through the Scart cable resulted in a lack of definition and was only really suited to live TV or video playback – you're much better off using the DVI or VGA connection. There's a second Scart socket, too, for looping through a VCR, PVR (personal video recorder), satellite, cable TV or games console.

The dual digital/analogue TV tuner can record two channels at once, but only when using the same format – you can't record a digital channel and an analogue one at the same time. The 250GB hard disk is big even by PVR standards and will provide space for plenty of recorded video before any extra gigabytes have to be added. If you do start running out of space, recorded TV can always be archived on the double-layer, dual-format DVD writer.

Quiet operation is imperative when it comes to Media Centers – you're not going to want a noisy PC sitting in your lounge. Thankfully, the Scaleo E is reasonably discreet. However, noise levels increase when a DVD is spinning or the fans need to crank up to cool down the processor. It's not as hushed as the Pentium M Media Centers we've seen, such as the Shuttle M1000 (www.pcw.co.uk/2146311).

The onboard 7.1 soundcard has an eight-channel output for hooking up to speaker systems, and there are S/PDIF optical and digital co-axial outputs for connecting to external digital decoders.

Sticking with A/V connections, there are S-video input and composite inputs behind a flip-down panel on the front. The headphone and microphone ports are also located here.

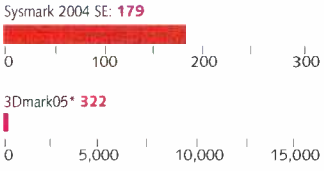
No wireless adapter is supplied as standard (Fujitsu Siemens will include a USB device for an extra £30). In total there are six USB2 and two Firewire sockets, plus a card reader on the front that accepts five types of card.

The Scaleo E comes with an MCE remote control and a keyboard with built-in trackball for surfing the web from the sofa, which is useful. There's no extra software apart from MCE, but the device does have a one-year collect and return warranty.

Priced at £870, this Media Center is good value. It also has plenty of room for expansion and a host of connections.

*Luke Peters*

### Performance




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

### Details

**Price** £870
**Best price** www.pcw.co.uk/bestprices
**Contact** Microanvika 020 7467 6050 www.microanvika.com
**Specifications** Intel Pentium 4 630 (3GHz) • 1GB of Ram • Intel 915 chipset • Integrated graphics • 250GB hard drive • Dual-layer DVD writer • Outputs: 2 Scart, S-video, DVI, VGA outputs • Inputs: S-video, composite • Windows XP Media Center Edition • 430 x 425 x 100mm (w x d x h) • 15kg

### Verdict

**Pros** Huge range of connections; dual TV tuner
**Cons** Poor graphics; bulky, heavy case
**Features** ★★★★
**Performance** ★★★
**Value for money** ★★★★

**Overall** Big and bulky, but powerful enough to act as a competent Media Center
★★★★

NOTEBOOK

# Averatec 1050

## Good battery life and a neat design, but it's no games machine

A veratec might be a relatively unknown computer manufacturer, but its ultra-light notebooks will raise an eyebrow or two. Looking like something straight from the Apple store, the 1050 is a traveller's delight for under a grand.

To give you some idea of its size, the widescreen display is 10.6in. It weighs 1.35kg and, when folded together, sits just 3cm high. Within the white cladding is an Intel Pentium M ULV 733 (1.1GHz) processor, which gives battery life a boost. It managed a Sysmark 2004 SE result of 102 and a PCmark05 score of 1,297 – nothing special in either case. However, for using office and Internet applications on the go, it's perfectly acceptable. The 80GB hard disk will store a good number of applications and files too. Gaming isn't really an option – the laptop scored a pathetic 5fps (frames per second) in Far Cry and wouldn't run 3Dmark05 at all. But this isn't a games machine. More relevant is its battery life, which is very impressive. The Averatec 1050 scored three hours, 46 minutes for productivity in our Mobilemark tests and two hours, 51 minutes when watching a DVD.

The 1,280 x 768 resolution display with Averabrite technology offers a sharp image, but you may have to increase the font size of documents and web pages.

The shallow keyboard and small trackpad can make extended periods of typing awkward, but there are two USB2 ports for adding an external keyboard and mouse. There's also a VGA socket, mini-Firewire, 4-in-1 memory card reader, 802.11g wireless adapter and a built-in DVD combo drive. The only other downside is the heat it generates, which could be uncomfortable with extended periods of use.

Considering the components included we expected the price to be lower, but it's a good choice if you need to work on the move. *Luke Peters*

### Performance

Sysmark 2004 SE: **102**

0 100 200 300

PCmark 2005 **1,297**

0 1,000 2,000 3,000 4,000 5,000

### Details

**Price** £999
**Best price** www.pcw.co.uk/bestprices
**Contact** Averatec 08712 405 060 www.averatec.co.uk
**Specifications** Intel Pentium M ULV 733 • 512MB of Ram • 80GB hard drive • 10.6in display • DVD combo drive • Memory card reader • 802.11g • 2 USB2 • Windows XP Home

### Verdict

**Pros** Small; light; good battery life
**Cons** Cramped keyboard and touchpad; expensive
**Features** ★★★☆☆
**Performance** ★★★☆☆
**Value for money** ★★★☆☆

**Overall** A good budget notebook for work on the move, but slightly overpriced

★★★☆☆

BUSINESS NOTEBOOK

# Toshiba Satellite Pro M70

## Well built, but this is neither a desktop replacement nor a truly mobile PC

Toshiba's latest addition to its business-oriented Satellite Pro range seems an oddity. Here we have a notebook that, at 2.9kg, isn't that mobile, offers just two hours of battery life and hasn't really got enough juice to make it a desktop replacement.

At its heart is an Intel Pentium M processor 740 running at 1.73GHz. Augmented by 512MB of Ram, it managed to gain an overall Sysmark 2004 SE score of 143 and a PCmark05 rating of 2,120 – far from jaw-dropping, but it will be fine running office software and most business-type applications.

Graphics are another matter though, with the ATI Radeon X600SE card achieving just 15fps (frames per second) in Far Cry. Although our tests had all the detail settings switched on to max, it's still going to be pedestrian with most switched off – 3Dmark05 wouldn't even run. However, we can't complain too much as gaming isn't this notebook's forté.

The 128-minute battery life is disappointing, especially considering there's a 4,000mAh battery slotted into the back that we've seen run for five hours elsewhere, but where it does score highly is in design. It's extremely well built, with a hard-wearing, solid chassis and robust keys. Two touchpad buttons are woven into a rubberised strip and a lip beneath houses Harman Kardon speakers which perform well.

It may weigh almost 3kg, but there's no denying Toshiba has made this notebook with some quality parts. The 15.4in Trubrite Widescreen is a good piece of work too, displaying WXGA resolutions very clearly.

A 60GB hard disk seems a little paltry for a notebook of this price, especially when you examine what consumer notebooks offer for the same price.

Despite the excellent build quality, we find it hard to recommend the Satellite Pro M70. It's no desktop replacement and the battery life is poor. *Luke Peters*

### Performance

Sysmark 2004 SE: **143**

0 100 200 300

PCmark 2005 **2,120**

0 1,000 2,000 3,000 4,000 5,000

### Details

**Price** £821.33
**Best price** www.pcw.co.uk/bestprices
**Contact** Toshiba 0870 444 8944 www.toshiba.co.uk
**Specifications** Intel Pentium M 740 (1.73GHz) • 512MB of Ram • 15.4in Trubrite screen • ATI Radeon X600SE • 60GB hard drive • Dual-layer DVD writer • 802.11g wireless • 2.9kg

### Verdict

**Pros** Bright screen; hard-wearing chassis; great design
**Cons** Poor graphics; small hard disk; relatively low battery life
**Features** ★★★☆☆
**Performance** ★★☆☆☆
**Value for money** ★★☆☆☆

**Overall** Apart from the excellent screen and build quality, this notebook failed to inspire us

★★☆☆☆

PORTABLE MEDIA PLAYER

# Creative Zen Vision: M

## Beats the Ipod in terms of features, but not style

The Vision: M may come in an array of colours, but it's more of a follower than a leader in fashion

Hot on the heels of the new video-friendly Ipod is Creative's latest portable media player, the Zen Vision: M and, yes, the Vision part refers to the fact that the device can play video as well as music. What the M stands for, however, we're not quite sure.

Given its design and functions, it's hard not to draw comparisons with Apple's market leader, so we're not going to beat about the bush here. In terms of its technical specs and price, the Vision: M can be most obviously stacked up against the 30GB current generation Ipod. The Zen matches the Ipod on both storage capacity and screen size. Both players come with a 2.5in 320 x 240pixels backlit LCD, although compare the two displays side by side and the Vision: M looks marginally sharper, brighter and more colourful.

Depending on bit rates and file formats, the Zen sounds good, too, although the white earbuds the device is provided with are just begging to be upgraded. Mp3, wav and wma audio formats are supported, but not aac. For video, the manufacturer claims support for a wide range of formats, including mpeg2, mpeg4 Simple Profile formats (such as Xvid), wmv and mjpeg, as well as providing a software tool for converting other types of video to a compatible format.

In practice we were disappointed to find just how many of the video files we tested threw up compatibility issues. We suggest tracking down a good freeware or shareware video format converter to sort out this end of things. The Vision: M can be hooked up to a TV in order to view video on a big screen, although a separate AV cable is required.

On top of music and video playback, the Vision: M can be used to view jpeg photos, display album art, synchronise contacts and calendar databases with a PC and be a portable hard disk, just like another very similar device.

Creative has included a few other useful features that you won't find on the Ipod. A built-in microphone, for example, allows users to record speech and sounds straight to the Zen's hard disk. The device also has an FM radio tuner and the ability to record directly from broadcast. Battery life is good, too. We managed around 12 hours of non-stop music from one charge, although video playback will reduce that time considerably.

It's only really in terms of design that the Vision: M starts to lose ground against the market leader. Creative's player is almost exactly the same width and height as Apple's but is noticeably thicker. It's not that the Zen is necessarily an ugly device, but it just doesn't have the artistry of the Ipod design team behind it. The vertical scroll bar in the middle doesn't compare well to the Ipod's scroll wheel, either in terms of looks or usability. Looks are, of course, a matter of taste, but whether it's blue, green, pink, black or white, the Vision: M can hardly be described as the cutting edge of fashion.

Apple is currently outselling Creative in the portable music player stakes but it's entirely possible that, with all its added extras and neat proportions, the Vision: M could be the device that convinces people to switch allegiance. Of course, it's equally likely that many will wonder why they should pay £250 for a 30GB Ipod clone when £30 less would get them the real thing.

*Jonathan Parkyn*

### Details

**Price** £250
**Best price** www.pcw.co.uk/bestprices
**Contact** Creative http://uk.europe.creative.com
**Specifications** 30GB • 2.5in screen (320 x 240) • 262,144 colours • Microphone • FM radio • Audio: mp3, wma (including DRM), wav • Video: mpeg1/2/4-SP, wmv, mjpeg • Photo: jpeg • USB2 • 62 x 19 x 104mm (w x d x h) • 166g

### Verdict

**Pros** FM radio; good screen; voice recorder
**Cons** Not as attractive as the Ipod
**Features** ★★★★☆
**Performance** ★★★★☆
**Value for money** ★★★☆☆
**Overall** It does everything the Ipod does and more, but lacks the sex appeal of Apple's iconic original
★★★★☆

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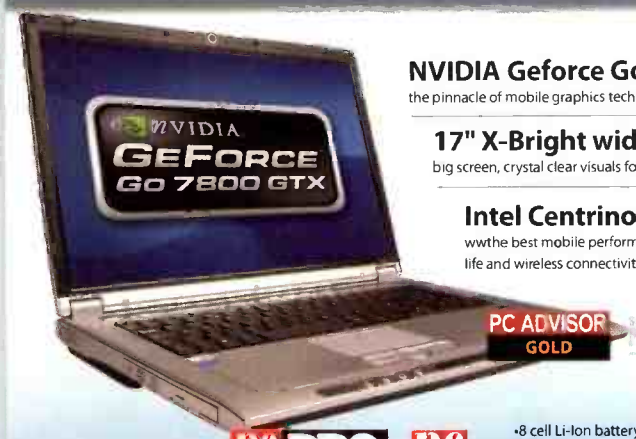
**"The C720 is the fastest notebook we've yet seen... both flexible and fantastic value"** PC Pro, A-List, Dec 2005

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## Voyager C720

e-CODE:AX1185

- Intel Centrino Mobile Technology: Intel Pentium M processor 760 (2GHz, 2MB L2 cache, 533MHz)
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- 256MB NVIDIA GeForce Go 7800 GTX graphics
- 17" WXGA X-Bright wide screen display (1440x900)
- 1GB DDR2 RAM 533MHz (2x512MB)
- 80GB S-ATA 5400rpm hard drive
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**£1399** inc VAT (£1190.64 ex VAT)

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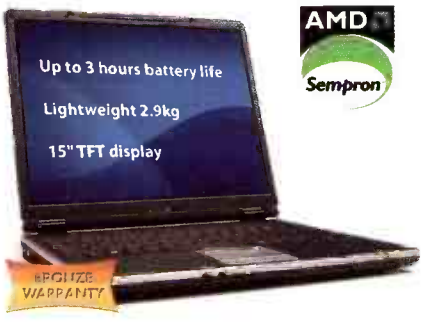
•Weight - 3.8kg, Dimensions - 397x293x44.9mm

•**Gold 3 year warranty** - 1st & 2nd year in-home service (parts & labour). 3rd year return-to-base (parts&labour). National rate telephone support & BigFix pre-emptive support.

GOLD 3YR WARRANTY

PC PRO A LIST

PC PRO RECOMMENDED




AMD Sempron

## Quest A215

e-CODE: QU1091

- Mobile AMD Sempron processor 3000+
- Genuine Windows® XP Home Edition
- 512MB DDR RAM 333MHz
- 60GB 5400rpm hard drive
- 15" XGA display (1024x768)
- Integrated graphics
- DVD/CD-RW drive
- Wireless Mini PCI 802.11bg (54Mbps) LAN
- Built-in audio and speakers

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Upgrade to Silver 3 year warranty £29.99

•6 cell Li-Ion battery (life up to 3hrs) •4xUSB2.0, VGA, PCMCIA, & 10/100 LAN

•Weight - 2.9kg, Dimensions - 326x277x36.7mm

•**Bronze 1 year warranty** - 1 year return-to-base service (parts & labour). National rate telephone support.

AMD Turion 64 MOBILE TECHNOLOGY

Radeon X1600 Graphics

GOLD 3YR WARRANTY

## Quest A420 PLUS

e-CODE: QU1104

GRAPHICS BY ATI MOBILITY RADEON X1600

- AMD Turion 64 Mobile Technology MT-37
- Genuine Windows® XP Media Center Edition 2005
- 1GB DDR RAM 333MHz
- 80GB 5400rpm hard drive
- 15.4" WXGA X-Bright widescreen display (1280x800)
- 256MB ATI Mobility Radeon X1600 graphics
- DVD/CD-RW/Dual Layer DVD-RW drive
- Wireless Mini PCI 802.11bg (54Mbps) LAN
- Bluetooth
- 1.3M Pixel camera with rotation
- Built-in audio and speakers
- 6 in 1 card reader (SD, MMC, MS/Pro, XD, SM)

**£999** inc VAT (£850.21 ex VAT)

•9 cell Li-Ion battery (life up to 3hrs) •4xUSB2.0, Firewire, VGA, DVI, TV-out, PCMCIA & 10/100 LAN

•Weight - 2.9kg, Dimensions - 358x259x33mm

•**Gold 3 year warranty** - 1st & 2nd year in-home service (parts & labour). 3rd year return-to-base (parts&labour). National rate telephone support & BigFix pre-emptive support.

## Latest Intel Technology

intel Centrino Duo

Radeon X1600 Graphics

GOLD 3YR WARRANTY

## Voyager C550

e-CODE: VY1538

GRAPHICS BY ATI MOBILITY RADEON X1600

- Intel Core Duo processor T2400 (1.83GHz, 2MB cache, 667MHz)
- Genuine Windows® XP Media Center Edition 2005
- 1GB DDR II RAM, 667MHz (2x512MB)
- 100GB 5400rpm S-ATA hard drive
- 15.4" WXGA X-Bright wide screen display (1280x800)
- 256MB ATI Mobility Radeon X1600 graphics
- DVD/CD-RW/Dual Layer DVD-RW drive
- Wireless Mini PCI 802.11abg (54Mbps) LAN
- 1.3M Pixel camera
- Built-in audio and speakers
- 4 in 1 card reader (SD, MMC, MS/Pro)

**£1149** inc VAT (£997.87 ex VAT)

•8 cell Li-Ion battery (life up to 3hrs) •4xUSB2.0, Firewire, VGA, DVI, TV-out, PCMCIA & 10/100/1000 LAN

•Weight - 2.9kg, Dimensions - 354x284x35.2mm

•**Gold 3 year warranty** - 1st & 2nd year in-home service (parts & labour). 3rd year return-to-base (parts&labour). National rate telephone support & BigFix pre-emptive support.

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# Evesham Technology recommends Microsoft® Windows® XP Media Center Edition

SOFTWARE INCLUDED

•Roxio Easy Media Creator 7
CD/DVD creation, video editing and DVD playback software

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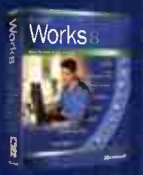
Anti-virus with *FREE* 90 day updates - plus firewall & online backup.

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e-CODE: AX1238

AMD 64 Athlon

- AMD Athlon 64 3200+ processor with HT technology
- Genuine Windows® XP Media Center Edition 2005
- 256MB ATI Radeon X550 graphics with TV-out & DVI
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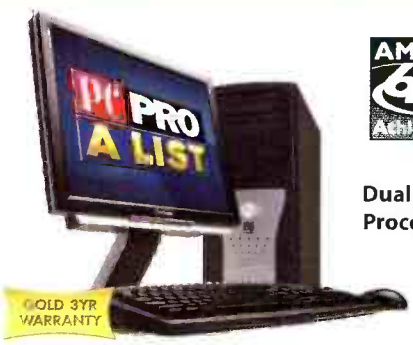
- On-board audio
- Creative Sound Blaster SBS260 speakers
- Canon MP150 AIO Printer

**£799** inc VAT
(£680.00 ex VAT)

Creative SBS260 2.0

AMD 64 Athlon

**17" TFT**



AMD 64 Athlon X2

**Dual Core Processor**

AMD 64 Athlon FX

**X1900 XT Graphics**

BRONZE WARRANTY

GOLD 3YR WARRANTY

GOLD 3YR WARRANTY

## Axis STR PLUS

e-CODE: AX1231

- AMD Athlon 64 processor 3000+ with HT technology
- Genuine Windows® XP Media Center Edition 2005
- ATI Radeon XPRESS 200 series graphics (on-board)
- 17" flat panel TFT display
- ATI Radeon XPRESS 200 chipset motherboard
- 512MB DDR RAM (PC3200) 400MHz (2x256MB)
- 160GB 7200rpm hard drive with 8MB buffer
- Multi Format Dual Layer DVD Writer (16x) / CD-RW (40x) drive
- On-board audio
- Not suitable for TV

**£629** inc VAT
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## Axis RD A-List

e-CODE: AX1241

ATI CROSSFIRE MULTI-GPU READY

- AMD Athlon 64 X2 processor 3800+
- Genuine Windows® XP Media Center Edition 2005
- 256MB ATI Radeon X800 GTO graphics with TV-out & DVI
- 17" Viewsonic VX715 flat panel TFT display (8ms response)
- ATI Radeon XPRESS 200 Crossfire motherboard
- 512MB DDR RAM (PC3200) 400MHz (2x256MB)
- 200GB Serial ATA hard drive with 8MB buffer
- 16x DVD-ROM drive
- Multi Format Dual Layer DVD Writer (16x) / CD-RW (40x) drive
- On-board audio
- Creative I-Trigue 3220 2.1 speakers

**£899** inc VAT
(£765.11 ex VAT)

Creative I-Trigue 3220 2.1

- Midi tower case (453x222x495mm) 6xUSB2.0 & 10/100 LAN
- Logitech Black Internet Pro Cordless Desktop
- **Gold 3 year warranty** - 1st & 2nd year in-home service (parts & labour). 3rd year return-to-base (parts&labour). National rate telephone support & BigFix pre-emptive support.

## Axis Vulcan

e-CODE: AX1242

ATI CROSSFIRE MULTI-GPU READY

- AMD Athlon 64 FX-57 processor 4400+
- Genuine Windows® XP Media Center Edition 2005
- 512MB ATI Radeon X1900 XT graphics
- 19" Viewsonic VX912 flat panel TFT display (12ms response) or 19" Viewsonic VA1912w widescreen flat panel TFT display
- ATI Radeon XPRESS 200 Crossfire motherboard
- 1GB dual channel DDR RAM (PC3200) 400MHz (2x512MB)
- 320GB Serial ATA 7200rpm hard drive with 8MB buffer
- DVD-ROM (16x) drive
- Multi Format Dual Layer DVD Writer (16x) / CD-RW (40x) drive
- Sound Blaster X-Fi XtremeMusic sound card
- Creative Inspire T7900 7.1 speakers or I-Trigue 3300 2.1 speakers

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(£1531.06 ex VAT)

Creative Inspire T7900 7.1

- Brushed aluminium case (510x205x457mm) 6xUSB2.0 & 10/100/1000 LAN
- Logitech Black Internet Pro cordless desktop
- Optional modem
- **Gold 3 year warranty** - 1st & 2nd year in-home service (parts & labour). 3rd year return-to-base (parts&labour). National rate telephone support & BigFix pre-emptive support.

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19IN TFT

# AGM CW-19

**One of the cheapest widescreen 19in monitors currently available**

Personal Computer World GREAT VALUE

The CW-19 is the first monitor to appear under the recently formed AGM brand, the new arm of AG Neovo, dedicated to producing high-quality monitors on a budget.

Despite being a wide-format 19in panel, it takes up remarkably little desk space. At roughly the width of a keyboard, it looks classy without dominating the desk.

Using a smart black casing with a very thin bezel, the CW-19 has an understated appearance with none of the cheap tackiness found on some competing products.

The five control buttons are of the membrane type and easy to operate. There's a separate auto-setup button as well as direct access to brightness and contrast adjustments, while the menu itself is basic but easy to navigate.

As a budget monitor, the CW-19 understandably offers a modest set of features. It sits rather low on the desk and, as is usually the case with low-cost monitors, the stand offers only a tilt adjustment. It only tilts back by up to 5°, which isn't enough for comfortable viewing from low down. This problem is compounded by the restrictive 130° vertical viewing angle of its TN panel.

Once properly adjusted, the CW-19's display is clear and sharp. Although the brightness fell short of the advertised 300cd/m², it's perfectly bright enough for desktop and gaming use – the 8ms response time makes it particularly suited to the latter.

The most remarkable feature of the AGM CW-19 is the price. It's certainly not a luxury item and it won't meet the exacting performance standards of professional graphic artists, nor does it offer the ergonomic flexibility required for prolonged office use. However, with an RRP of just £199.74, it's one of the cheapest 19in widescreen models currently available. For those after a monitor for home use, it's an excellent buy. *Paul Monckton*

## Details

**Price** £199.74
**Best price** www.pcw.co.uk/bestprices
**Contact** AGM www.agm-display.com
**Specifications** 19in screen • 1,440 x 900 • TN panel • 8ms response time • 500:1 contrast ratio • 300cd/m² • 150°/130° horizontal/vertical viewing angles • VGA input • 440 x 207 x 352mm (w x d x h) • 4kg

## Verdict

**Pros** Low cost; fast response time; neat design
**Cons** No DVI input; poor stand adjustments
**Features** ★★☆☆☆
**Performance** ★★★☆☆
**Value for money** ★★★★★

**Overall** A basic, no frills monitor with a smart, compact design; solid performance and an incredible price

★★★★☆

20IN WIDESCREEN MONITOR

# Fujitsu Siemens S20-1W

**A fast response time and stylish case makes this one of the best in its class**

The S20-1W from Fujitsu Siemens starts to impress from the moment you open the box. We've looked at quite a few monitors in this class recently and only Apple's 20in Cinema Display has come close in terms of design and build quality. Like Apple's product, the S20-1W eschews the usual plastic casing in favour of stylish brushed aluminium. This not only looks great, but also serves to dissipate heat from the panel without the need for air vents, thereby protecting the internals from dust.

The stand is a sturdy and well-engineered piece of equipment with a designer feel to it. Unlike Apple's monitor, it is tilt- and height-adjustable and fitted with a carrying handle; there's also a hole to help keep your cables tidy. The supplied analogue and digital video cables are fitted with right-angle connectors to allow them to fit between the panel and the stand.

A set of built-in speakers is mounted below the screen and provide crisp audio with plenty of volume. Pressing two rear-mounted buttons allows the speaker module to be detached – useful if you're looking for a smarter appearance and don't require built-in audio. Five control buttons provide easy access to automatic setup as well as the on-screen menus.

In operation, the S20-1W produces a sharp image with excellent contrast. Colour gradations are smooth and lifelike, and gamers will certainly appreciate the fast, 8ms response time. The 300cd/m² brightness is almost certainly too much for normal desktop use but ideal for viewing widescreen movies at a distance.

It's a shame there's no USB hub, as they're found on most higher-specification monitors in this class. However, the S20-1W is great value for money. Nothing in its price range offers this level of build quality and design or will look as good on your desktop. *Paul Monckton*

## Details

**Price** £399.50
**Best price** www.pcw.co.uk/bestprices
**Contact** Fujitsu Siemens www.fujitsu-siemens.co.uk
**Specifications** 20.1in • 1,680 x 1,050 • 8ms response time • 176° horizontal/vertical viewing angles • 300 cd/m² brightness • 800:1 contrast ratio • Integral speakers • Aluminium casing • VGA and DVI inputs • 480 x 207 x 400mm (w x d x h) • 6.8kg

## Verdict

**Pros** Attractive design; image quality
**Cons** No USB; stand can't swivel or pivot
**Features** ★★★★☆
**Performance** ★★★★☆
**Value for money** ★★★★★

**Overall** Superb build and image quality combine to make one of the most attractive monitors in its class

★★★★☆

20IN WIDESCREEN MONITOR

# Viewsonic VA2012w

**Great for watching DVDs and playing games, and it's reasonably priced, too**

Viewsonic's VA2012w joins an ever-growing breed of widescreen TFT monitors. This 20in model combines elegant design with modest features at a competitive price.

Finished in silver or black, the casing is basic, though reasonably attractive. It features dual video connections (analogue and digital) and a stereo audio input.

A speaker grille runs the width of the unit and sits just below eight control buttons. These provide direct access to common features such as volume, brightness and contrast control without the need to enter the on-screen menu, although no auto setup button is included.

The menu system isn't particularly pretty but it is easy to navigate with large fonts and easy-to-follow instructions. Auto image adjust is provided as the first option on the menu – further down, you'll find full manual controls and colour modes, including sRGB.

The stand is lightweight plastic and offers only a tilt adjustment, which isn't great for prolonged work use – the standard Vesa mount allows you to fit a more flexible stand of your choice. A rear compartment door helps keep your cables tidy.

The VA2012w uses a TN panel and as such suffers slightly in terms of viewing angles, although less than other TN panels we've seen (see www.pcw.co.uk/2149165 for an explanation). The screen image is clear and sharp with smooth greyscale gradations. It's better, by some way, than many TN panels we've looked at.

The fast response time will be of interest to gamers. Viewsonic's Clearmotiv technologies provide an 8ms response time over the entire range of colour transitions. With a maximum 300 cd/m² brightness and 600:1 contrast ratio, DVDs and games look great.

While not as flexibile as more expensive monitors, the VA2012w is worth considering. *Paul Monckton*

## Details

**Price** £375
**Best price** www.pcw.co.uk/bestprices
**Contact** Viewsonic 01293 643 900 www.viewsonic.co.uk
**Specifications** 20.1in • 1,680 x 1,050 • Clearmotiv 8ms response time • 160° horizontal x 145° vertical viewing angles • 300 cd/m² brightness • 600:1 contrast ratio • Integral speakers • VGA and DVI inputs • 479 x 216 x 423mm (w x d x h) • 5.5kg

## Verdict

**Pros** Low cost; fast response time
**Cons** No USB; viewing angles
**Features** ★★★½☆
**Performance** ★★★½☆
**Value for money** ★★★★☆

**Overall** A competent monitor at a good price, but it has some limitations

★★★½☆

MONITOR COLOUR CALIBRATION

# Pantone Huey

**Low-cost monitor adjustment tool with ambient light sensor**

Personal Computer World RECOMMENDED

Pantone's Huey makes it easy to get consistent colour results time after time. If you've ever tried to match how your digital photos look on screen to how they emerge when printed, you will need to make sure your display is calibrated correctly.

Many software tools are available, but most require a keen eye and plenty of manual tweaking. There's also no reliable way of verifying the results. Huey performs all the necessary measurements and adjustments for you in only a few seconds, and then creates a colour profile that can be understood by Windows and all colour management-aware applications, such as Adobe Photoshop.

The software is simple to operate with a friendly user interface and easy-to-follow instructions. Just fix the device to your screen using the suction cups and wait for calibration to complete. At the end of the operation you can choose from a short menu of colour options according to your intended use or personal preference.

When not in use, Huey sits in a small USB cradle but is far from idle. At configurable intervals it will measure the ambient light in your room and adjust the display accordingly.

Huey shields you from the technical complexities of colour calibration. It won't tell you what colour temperature or gamma you have selected. Instead, it leaves it to your eyes and preference, by providing presets for photo editing or gaming as well as options such as Warm and Cool, with various levels of contrast.

Notably absent is any help in adjusting your monitor's controls prior to calibration, which is a vital, if irksome, step in getting the most from your display. Nor will you find multi-monitor support. Despite this, Huey is a useful and very reasonably priced tool for getting you on the road to a consistent colour workflow. *Paul Monckton*

## Details

**Price** £69.33
**Best price** www.pcw.co.uk/bestprices
**Contact** Pantone 0800 0735 845 www.colourconfidence.com
**Specifications** Three-sensor hardware calibration • Ambient light sensor • Monitor cleaning kit • USB extension cable • Desktop cradle • Windows 2000/XP • Mac OSX 10.3 or later

## Verdict

**Pros** Size; ambient light sensor; easy and quick
**Cons** Lack of advanced controls; no multi-monitor support
**Features** ★★★½☆
**Performance** ★★★★½
**Value for money** ★★★★★

**Overall** Quick and easy to use, the Huey is perfect for hassle-free colour calibration

★★★★½

DIGITAL SLR

# Olympus E-500

## The popular E-300 camera finally gets an update

Personal Computer World RECOMMENDED

This camera is easy to operate and packed with useful features

A worthy successor to the E-300, the E-500 Digital SLR from Olympus brings with it a welcome selection of new features, while maintaining compatibility with the existing range of Four Thirds lenses and accessories (see www.four-thirds.org for more information).

In our last round-up of digital SLR cameras (*PCW* December 2005), Olympus' E-300 was considerably older than the competition and starting to show its age. The E-500 is lighter and has a larger, higher-resolution LCD panel.

The E-300's unusual sideways viewfinder gave the camera body a rather strange low-rise appearance, but the E-500 makes a return to a more conventional and yet still highly compact body shape. At 435g (without the lens), it's 145g lighter than the E-300 and is comfortable to hold.

It also has a larger 2.5in LCD panel with an increase in resolution from 134,000 to 215,250 pixels. This is a welcome upgrade, not only for the increased clarity in image playback, but also because it's home to a vastly improved status display. The E-500 doesn't have a separate, top-mounted LCD status panel, so all shooting parameter information must be displayed on the main LCD. Although this uses more battery power, it saves a great deal of space on the body.

The status shows a large amount of information in a clear, illuminated format. More impressive is that, by pressing the OK button and cursor keys, you can use this display to edit the camera settings directly – much faster than using the camera's menu system. All the major shooting options are laid out before you, making adjustments almost as fast as having dedicated control buttons.

A new manual focus bracketing feature allows you to use manual focus with confidence; the camera will automatically take up to seven extra shots with slight adjustments in focus either side of your selected focus point. Exposure, white balance and flash power bracketing are provided too.

Also new is the ability to process raw images directly in the camera. By selecting the edit mode, you can convert raw files to tiff or jpeg using the currently selected camera settings (the settings can be different from those selected at the time of shooting). You can also post-process jpeg or tiff files into black and white or sepia, reduce red-eye effects and perform colour and size adjustments, all without the use of a computer.

Like the E-300 model, the E-500 has a built-in dust-control system, and Olympus is very keen to make sure you notice it. An ultrasonic filter is activated every time the camera is turned on, and accompanied by a short animated display on the LCD panel and a flashing blue LED on the top of the camera. Although the inclusion of a dust control system on an SLR is laudable, it does cause a noticeable delay during the start-up process.

The E-500 retains the same 8megapixel resolution as its predecessor, and achieves image quality that's similar or, in many cases, better. The added control and bracketing functions also serve to improve your results, which stand up very well when compared to other budget SLRs.

At the time of writing, you can buy the E-500 with a 17.5-45mm lens at Dixons for only £499, which is an excellent price for a quality digital SLR kit. Olympus is currently quoting an estimated retail price of £600 for the same lens kit.

*Paul Monckton*

## Details

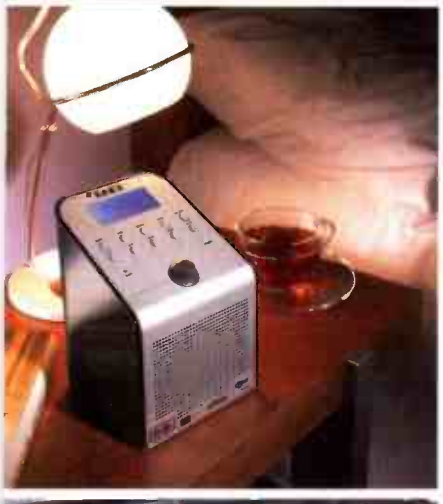
**Price** £600
**Best price** www.pcw.co.uk/bestprices
**Contact** Olympus 0800 072 0070 www.olympus.co.uk
**Specifications** 8megapixel • 3,624 x 2,448 • Four Thirds lens system • 2.5in LCD • 2.5 frames per second maximum • CF and XD memory card • In-camera raw processing • Li-ion rechargeable battery • 130 x 95 x 66mm (w x d x h) • 435g

## Verdict

**Pros** Good-quality photos; excellent user control; built-in dust remover
**Cons** No separate LCD status panel
**Features** ★★★★★
**Performance** ★★★★☆
**Value for money** ★★★★☆

**Overall** A decent upgrade of the E-300 that's easy to operate, has plenty of features and produces good-quality images
★★★★☆

# "Some day all radios will be made this way" The Sunday Times



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SMARTPHONE

# Motorola A780

**Feature-rich, Linux-based and it comes with GPS migration too**

Personal Computer World RECOMMENDED

The great thing about mobile phones built around a Linux-based OS is that they can run a number of extremely useful applications. The Motorola A780, for example, comes complete with a bunch of useful tools pre-installed, including a viewer for files such as Microsoft Word and pdf documents, a voice recorder and a mobile version of Realplayer.

In addition, the A780 features a built-in GPS receiver and comes with Copilot Live satellite navigation software on a 256MB memory card. Copilot is a fine navigation program that includes detailed roadmaps of the UK and Ireland, as well as mainland Europe.

The A780 uses a stylus and touchscreen-based input system, which makes it extremely easy to operate. All applications, particularly the sat nav system, benefit from a very bright, colourful 2.5in TFT display. The Linux-based software that runs the phone helps make operation fast and smooth.

There's no 3G or Imode here – just standard GPRS. The A780 is quad-band, so it should pick up a network however far it roams from home. It's also compatible with Edge networks, which, claims the manufacturer, can increase download speeds up to three times that of standard GPRS. Chuck in Bluetooth, a 1.3megapixel camera and Java for 3D gaming, wrap it up in a neat clamshell and you've got a pretty smart smartphone.

The downside is that all the A780's exciting applications take a heavy toll on the handset's battery life. Using the dashboard mount and cigarette lighter power adapter means it's not a problem in-car but, when it comes to extra-vehicular activity, the battery runs out fairly quickly. Our test unit needed a recharge after just two or three days of fairly standard usage.

Despite the poor battery performance, the A780 is a decent phone with a heap of features. *Jonathan Parkyn*

## Details

**Price** From free (depends on contract)
**Best price** www.pcw.co.uk/bestprices
**Contact** Dialaphone 0800 0928 244 www.dialaphone.co.uk
**Specifications** Linux-based OS • Java • Quad-band • GPRS • GPS receiver • Copilot sat nav software • 240 x 320 colour touchscreen • 1.3megapixel camera • Bluetooth • 130g • 53 x 24 x 107mm (w x d x h)

## Verdict

**Pros** Fast; easy to operate; useful applications
**Cons** Battery life
**Features** ★★★★☆
**Performance** ★★★★☆
**Value for money** ★★★★☆
**Overall** Combines a mobile phone, PDA and satellite navigation in one easy-to-use smartphone
★★★★☆

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GRAPHICS CARD

# ATI Radeon X1900

**Supremely fast – ATI's latest Radeon is now king of the graphics card hill**

It seems like only yesterday that the dust settled on the latest skirmish between the two big 3D graphics card manufacturers, ATI and Nvidia, when the former released the X1800 series of cards. Now we have the latest high-end cards from the guys in Canada – the X1900 series.

The X1900 cards are based on ATI's latest 90nm R580 core, which is a significant step up from the R520 core of the X1800 series. The number of vertex shaders remains eight, but the pixel pipeline count rises from 16 to an impressive 48 in the R580. Support for the next generation of Shader Model 3 is also included. All of this, and more, raises the transistor count from the already massive 321 million to a staggering 384 million.

ATI has gone all out on image quality with the R580. Not only does it support 6x adaptive anti-aliasing and HDR (high dynamic range), but it can also enable both together. It supports parallax occlusion mapping (POM), a technology that adds three-dimensional detail to flat surfaces, for example realistic-looking cobbled streets or brickwork.

The R580 uses the same ring bus memory controller for the 512MB of GDDR3 memory as the previous core, with 512bit internal and 256bit external memory. This allows for reduced latency and more flexibility with the memory clock rate.

Four models are available so far: the top-of-range X1900 XTX, the X1900 XT, the X1900 Crossfire Edition and the All-in-Wonder X1900. The X1900 XTX has clock speeds of 650MHz for the core, while the memory runs at 775MHz (1.55GHz effective). The other three models have 625MHz core and 725MHz (1.45GHz effective) memory speeds.

It's not cheap, but neither is it as pricey as we'd anticipated, with the X1900 XTX sitting at £363.

For full performance results, check out www.reportlabs.com, but in the meantime we can tell you that this card is fast – very fast indeed. *Simon Crisp*

Personal Computer World RECOMMENDED

## Details

**Price** X1900 XTX: £363
X1900 XT: £307
X1900 Crossfire Edition: £335
All-in-Wonder X1900: £279
**Best price** www.pcw.co.uk/bestprices
**Contact** ATI www.ati.co.uk
**Specifications** R580 core • 512MB GDDR3 Ram • X1900XTX: 650MHz core, 775MHz memory • X1900XT/ Crossfire Edition: 625MHz core, 725MHz memory • 8 vertex shaders • 48 pixel pipelines • Shader Model 3 support • 6x adaptive anti-aliasing • Parallax occlusion mapping

## Verdict

**Pros** Very fast
**Cons** Expensive
**Features** ★★★★½
**Performance** ★★★★★
**Value for money** ★★★★½
**Overall** The fastest graphics card money can buy
★★★★★

INKJET MULTIFUNCTION DEVICE

# Dell Photo All in One Printer 944

**Slow colour printing, but a quality product for home or office**

The Photo All in One Printer 944 is one of Dell's latest inkjet multifunction devices (MFDs) and is being sold from £121 for the most basic setup.

This MFD is a twin-cartridge photo printer that can print at a maximum resolution of 4,800 x 1,200dpi. During testing, it took six minutes and 25 seconds to print an A4 borderless photo at best quality, which isn't exactly nippy. The resulting image was good in terms of colour but, up close, lacked the precise detail of photo printers we've seen with multiple colour cartridges.

Replacing the 944 with high-capacity colour and mono cartridges costs £44.50 and will prove more economical over standard size cartridges.

The integrated A4 flatbed scanner can scan up to 1,200 x 2,400dpi (19,200dpi interpolated) and has a 48bit colour depth. Scan quality was as expected for an MFD of this price; detailed enough for home scanning, but lacking the depth required for professional use.

The 944 reminds us of Dell's compact 540 photo printer (read a review at www.pcw.co.uk/2135437), albeit three times as big. There's a 2.4in flip-up LCD screen on the front for viewing images from a memory card and printing photos without a PC. The inbuilt software can enhance, crop, rotate, resize and re-brighten images, and does this all within a straightforward menu system. Using the buttons on top of the printer, you can also copy, print, scan and fax documents with ease. However, you'll need an Internet-connected PC for the latter.

The All in One Printer 944 is large and clunky, but ultimately good at what it does, and the supplied printer software is clear and simple to navigate. It's a little slow printing large colour photos and the image quality won't please those looking for perfect photo prints, but on the whole it's a decent MFD at a good price. *Luke Peters*

## Details

**Price** £121
**Best price** www.pcw.co.uk/bestprices
**Contact** Dell 0870 907 5818 www.dell.co.uk
**Specifications** 4,800 x 2,400dpi prints • 1,200 x 2,400ppi scanning • 100-sheet input • 25-sheet output • 2.4in screen • Multiformat memory card reader • USB2 • Pictbridge • 435 x 307 x 194mm (w x d x h) • 5.9kg

## Verdict

**Pros** Good value; reasonable quality
**Cons** Large; slow photo printing
**Features** ★★★½☆
**Performance** ★★★½☆
**Value for money** ★★★★½
**Overall** A bulky but good-quality MFD that would suit both home and small office use
★★★½☆

PORTABLE HARD DRIVE

# Buffalo Ministation HD-PHS40U2/UC

**Shock-resistant to keep your data safe and secure**

Personal Computer World RECOMMENDED

Portable hard drives are growing in popularity, but there is always a concern that you will lose data due to the notoriously fragile nature of hard disks. Although some great progress has been made in the past few years to improve them, many users still think twice about carrying around 40GB of important data in a jacket pocket.

Buffalo's shock-resistant portable hard drive, the Ministation HD-PHS40U2/UC, is designed to withstand the occasional knock. Like most such drives, it is based on a 2.5in notebook design. Due to the shock-protection element, the chassis is obviously a little larger than most of its competitors. The plastic case doesn't look or feel particularly sturdy, but it's what's inside that counts.

The protection is in the form of a layer of what Buffalo coyly describes as 'shock-absorbent materials', without going into further detail. However, the company does make it clear that it's not rubber, which would simply reflect the shock, but a material that evenly dissipates the impact. The drive floats on this layer, inside the plastic case. Buffalo points out that the protection will not shield the drive against severe physical shocks, such as dropping it from a great height, nor does it make the device waterproof.

With the limited claims from Buffalo, we obviously weren't able to perform a full destruction test on the drive, but the shock proofing does work. We bumped and jostled the drive while it was in use, and it kept going throughout with little noticeable impact on performance. The 5,400rpm disk is also reasonably fast, writing at around 25Mbits/sec using a USB2 connection. A second USB cable is supplied to provide the necessary power and an optional external power supply can also be purchased.

Don't expect it to withstand anything more than minor bumps and knocks, but it's more sturdy than the average portable hard drive. *Anthony Dhanendran*

## Details

**Price** £70
**Best price** www.pcw.co.uk/bestprices
**Contact** Buffalo 01753 555 000 www.buffalo-technology.com
**Specifications** 40GB • 5,400rpm • USB2 • Secure Lock Ware encryption utility • 83 x 127 x 21mm (w x d x h) • 208g

## Verdict

**Pros** Shock protection; fast
**Cons** Large casing; only protects from minor knocks
**Features** ★★★★☆
**Performance** ★★★★★
**Value for money** ★★★★☆

**Overall** The shock protection only works for minor bumps, but it's a decent drive nevertheless

★★★★☆

TV COLOUR CALIBRATION

# Datacolor Spyder TV

**Take the guesswork out of setting up a home-cinema display**

Setting up a home-theatre system involves a lot more than just plugging everything in and turning it on. The Spyder TV is an easy way for enthusiasts to set up their televisions correctly.

TVs sold on the high street usually have the picture settings pre-set to attract the eye in the typical brightly lit showroom. They'll be over-bright and have the colour ramped up, all of which means that, in a normal domestic setting, they'll look awful. Most people will play around with the settings, or even use a test pattern such as those found on THX-certified DVD videos, but for professional, consistent results you need a colorimeter that measures the signal coming out of the screen.

This is exactly what the Spyder TV does. In the box you get the distinctive three-footed USB1.1 colorimeter with a suction cup and a 2m lead, the calibration software and two DVDs with appropriate test patterns for Pal/Secam and NTSC TVs. There's also an adapter for the colorimeter to allow it to sit flat on curved CRT TV screens, plus a tripod adapter. It can be used with any type of TV, even rear-projection models.

The software is wizard-driven and very easy to use – just follow the steps and in about 30 minutes you'll have your TV optimised. The clear printed manual explains how to cope with different styles of on-screen display controls; manual test patterns are also provided. Settings and results for multiple TVs are recorded in a database for reference. The only major annoyances are that the interface isn't resizable and requires a minimum 1,024 x 768 display. The 2m USB lead is also a bit short if you don't have a laptop or your PC's not near the TV. Apart from that, it's a great product if you're serious about home entertainment. *Kelvyn Taylor*

## Details

**Price** £199.99
**Best price** www.pcw.co.uk/bestprices
**Contact** Colour Confidence www.colourconfidence.com 08000 735 845
**Specifications** Spyder TV colorimeter • Suction cup/tripod attachment • Test pattern DVD • Spyder TV software • 2m USB cable • 2yr warranty

## Verdict

**Pros** Simple to use; great results
**Cons** Short USB lead; interface not resizable; expensive
**Features** ★★★★★
**Performance** ★★★★★
**Value for money** ★★★☆☆

**Overall** An easy-to-use professional product that takes the guesswork out of setting up home-cinema displays

★★★★☆

DLP PROJECTOR

# Toshiba TDP-TW90

**Perform wireless presentations from your PC**

One of the benefits of DLP (digital light processing) projectors is that they aren't as bulky as traditional LCD models. But in this instance, DLP doesn't seem to have much impact on the Toshiba TDP-TW90's size and weight. At 2.9kg, this business projector is heavier than many comparable LCD projectors, which could make it a drag to lug to and from presentations. It also generates a fair amount of heat.

On the positive side, the projector is well served in terms of connections. On the rear sit two VGA inputs and one output. With the appropriate adapter (not supplied), a VGA input can be converted to a component input for high-definition video. While the TDP-TW90 isn't primarily a video projector, there are inputs for both composite and S-video as well as corresponding audio. The unit's speaker is mono only and doesn't provide a particularly inspiring aural experience.

More notable is the sharp, bright image with good contrast levels. The projector can switch between 4:3 and 16:9 aspect ratios, which is particularly useful when watching movies. It isn't intended for home cinema use, but when connected to a DVD player it looks pretty impressive, apart from the slight rainbow effect common to DLP projectors.

By far the most remarkable aspect of the TDP-TW90, however, is that it comes with a PC Card slot and 802.11b Wifi card. In conjunction with a small software utility, the projector can display either the entire desktop of a notebook PC or specific application windows, such as Microsoft Powerpoint, without the need for cables. It also allows for remote control of the projector from the PC. The wireless system works well, although we did notice some lag in the response time between our test computer and the network display, as well as some minor blockiness in the image.

Overall, it's an expensive projector that includes some useful business features. *Jonathan Parkyn*

## Details

**Price** £1,499
**Best price** www.pcw.co.uk/bestprices
**Contact** Toshiba 08704 424 424 www.toshiba.co.uk
**Specifications** DLP • 1,024 x 768 native resolution • 2,200lumens • 200w lamp power • 4:3/16:9 aspect ratio • Composite, S-video inputs • 2 RGB VGA inputs • RGB VGA output • Wifi card • USB port • Remote control • 2.8kg • 298 x 275 x 101mm (w x d x h)

## Verdict

**Pros** Wireless feature; picture quality
**Cons** Heavy and hot; takes a while to cool down

| | |
|---|---|
| **Features** | ★★★★☆ |
| **Performance** | ★★★☆☆ |
| **Value for money** | ★★★☆☆ |

**Overall** It's expensive but it creates a high-quality display and the wireless aspect is much more than a gimmick

★★★☆☆

## Jabra JX10

**Price** £99 **Contact** www.jabra.com **Overall** ★★★☆☆

Bluetooth headsets have been getting smaller and smaller, and now we have the JX10 from Jabra. Weighing 10g and measuring just 3.9cm high and 2cm deep, you'll get strange looks from people thinking you're nattering away to yourself as you stroll down the street.

Despite its size, the microphone still manages to pick up your voice clearly without amplifying nearby noise. The ear hook can be swapped round for use on either left or right ears and the unit comes with a neat-looking recharging stand and a USB charger.

At just under £100, it's not the cheapest of headsets, but it's definitely one for high-flying executives who want to look the part. *Will Stapley*

**Overall** A small and stylish headset, but overpriced

## Philips SPC 610NC

**Price** £40 **Contact** www.philips.co.uk **Overall** ★★★☆☆

The SPC 610NC from Philips is a webcam specifically designed for notebooks. Thanks to the flexible stand, it can be positioned at just about any angle. The 640 x 480 camera (digital stills can be taken at 800 x 600) sits behind a slide-back cover. Pull this cover further back and a bright LED is revealed – useful when taking photos and partaking in videoconferences. Video is recorded at 30fps (frames per second), although what you achieve during online video chats will depend on the speed of your Internet connection. At £40, it costs a little more than we expected, but if you're after a webcam for your notebook this is a versatile model, and the built-in LED is a bonus. *Will Stapley*

**Overall** Great for video chats via your notebook

## Trust Mobile Laptop Alarm

**Price** £14.99 **Contact** www.trust.com **Overall** ★★☆☆☆

This system consists of two small units, one of which is attached to your laptop and you hold on to the other. An alarm will sound when the two units are a certain distance apart – two sensitivity levels are available. Of course, the distance the two can travel before the alarm is activated depends on how deep you have the devices buried.

The alarm isn't particularly loud and if you're in a noisy airport or coffee shop, there's a chance you wouldn't hear it. A vibration option would have been useful. The low price of Trust's Mobile Laptop Alarm indicates its quality and we wouldn't recommend relying on it to stop your laptop being pinched. *Will Stapley*

**Overall** More of a gimmick than a security system

## Sandisk 1GB Cruzer Titanium

**Price** £59 **Contact** www.sandisk.com **Overall** ★★★★☆

A rugged USB key, the Sandisk 1GB Cruzer Titanium has a tough casing for protection from high-impact damage to a claimed 2,000lb of force.

We loaded it with files and put it through a wash cycle inside a pocket, followed by 90 minutes in a drier on the hottest setting. We then drove over it, threw it down the stairs, trod on it and dropped it from a second-storey window, which caused sparks as it hit the concrete below. It survived with nothing worse than a few scuffs, and all files could be accessed.

Preloaded software includes Cruzer Lock 2.1 for encrypting sensitive data, Cruzer Pocket cache for backing up files and Cruzer Synch to securely access files. *Rob Jones*

**Overall** It looks smart and survived the abuse we put it through

# G1-Turbo

Series Motherboards

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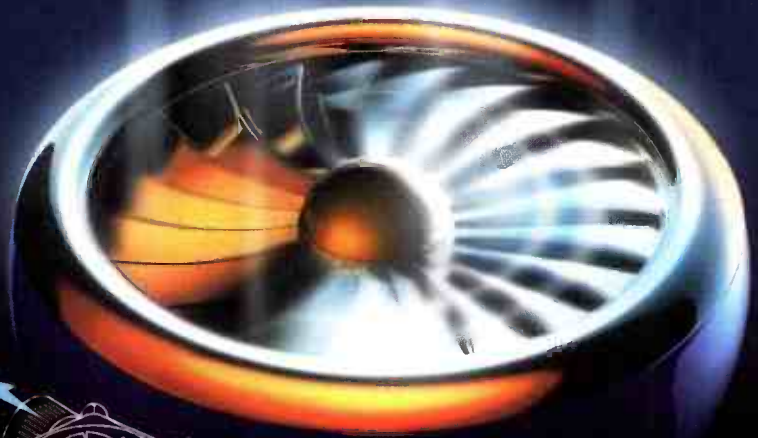

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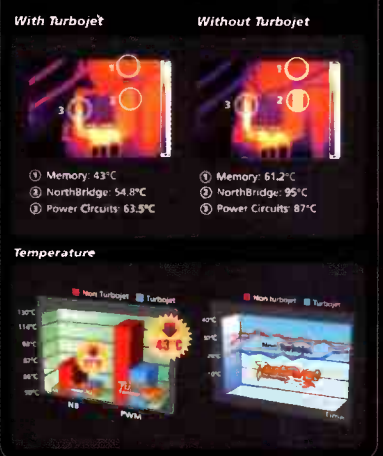



### Dual PCI-e Graphics Slots

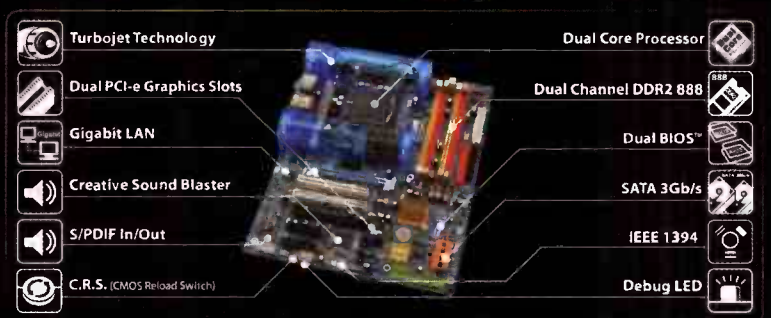
Powered by the Intel® 975X Express Chipset, the GA-G1975X supports two 8-lane (X8) PCI Express links offering twice the performance of single 16-lane (X16) graphic card solutions.

### Creative Sound Blaster

Creative Sound Blaster Live 24-bit with DTS support delivers heart pounding 7.1 channel surround effects.

### C.R.S. (CMOS Reload Switch)

C.R.S. provides convenient default settings retrieval and jumper-free CMOS reload.




★This product does not include CPU cooler fan

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TECHNOLOGY

## Asus EN7800GT Top Silent

**Price** £269.36 **Contact** www.scan.co.uk **Overall** ★★★★☆

In the past, if you wanted to build a silent PC, you usually had to compromise on the graphics card. Passively cooled cards tended to be based on lower performance models. Asus has broken the mould with the EN7800GT Top Silent, which is not only quiet, but also has core and memory clock speeds faster than the standard 7800GT.

The core is clocked at 420MHz (20MHz faster than standard and only 10MHz slower than a GTX), while the 1.6ns memory runs at 600MHz (1.2GHz effective) – a significant improvement over the standard 7800GT's 500MHz (1GHz effective). However, the card still takes up a lot of space, so if you have a cramped case you might struggle to fit it in.

**Overall** **Asus has created a fanless 7800GT and overclocked it**

## Coolermaster Stacker 830

**Price** £175.65 **Contact** www.overclock.co.uk **Overall** ★★★★☆

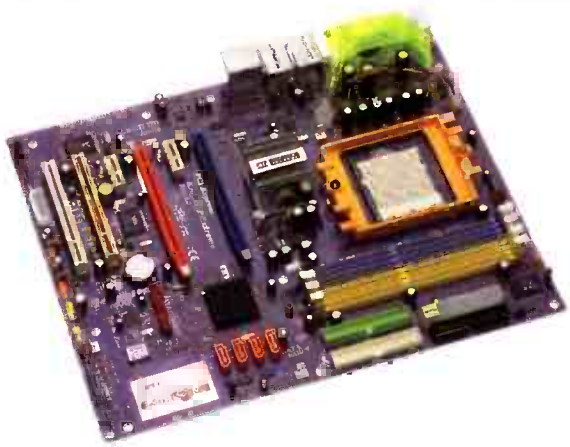
Yes, that's right, nearly £200 for a computer case – but high-quality cases from Coolermaster have never been cheap. The Stacker 830 is clearly aimed at the enthusiast, or anybody else with very deep pockets.

It's a huge case and measures 25cm wide, 53.6cm deep and 63.8cm high. With the exception of the steel 3.5in drive cage, the entire case is constructed from good-quality aluminium.

The Stacker 830 comes with a multitude of drive bays. There are nine 5.25in bays, all with external access, and four 3.5in drives in the internal drive cage. It can also support up to nine 12cm case fans.

It accepts E-ATX, ATX, m-ATX and all the major BTX formats.

**Overall** **Expensive for a case, but you get a lot for your money**



## ECS KA1 MVP Extreme

**Price** £68 **Contact** www.pcnextday.co.uk **Overall** ★★★☆☆

One of the latest motherboards to support Crossfire is ECS' KA1 MVP Extreme. Built around AMD's Socket 939, the KA1 MVP uses ATI's RD480 Northbridge and SB450 Southbridge combination. While both bridges are passively cooled, there is a cooling fan and duct keeping the voltage regulation circuitry cool.

It's well laid out but there are a couple of niggles. The Northbridge is very close to the CPU socket, so you may struggle fitting a third-party cooler. Meanwhile, the positioning of the main Sata ports could cause conflict with larger graphics cards. And the locking latches for the two x16 PCI graphic card slots are so small they cause a problem when removing any cards.

**Overall** **A well-featured board, but there are some design flaws**

## EVGA Geforce 7800GTX Black Pearl

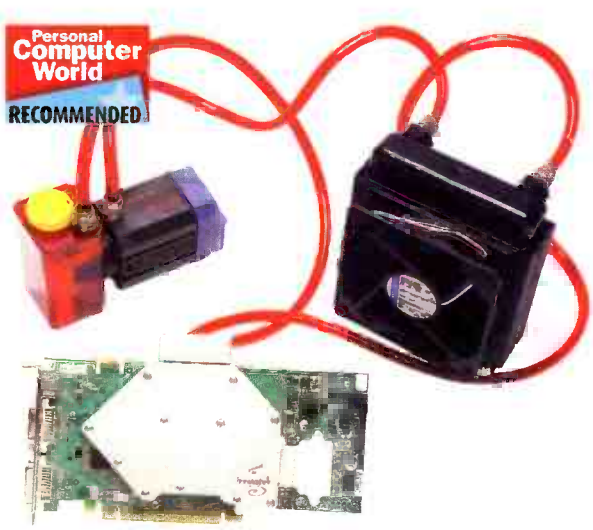
**Price** TBC **Contact** www.scan.co.uk **Overall** ★★★★★

Housing the fastest single-core Geforce currently available, EVGA's 7800GTX Black Pearl is water-cooled, but don't panic at the thought – EVGA has made the installation and maintenance of the Black Pearl as easy as possible.

The core is clocked at 600MHz and sits under the flat heatsink (our sample was plain aluminium, but retail versions will be finished in black). The memory runs at 750MHz (that's 1,500MHz effective), a huge increase over the standard 7800GTX's 430MHz and 1,200MHz core and memory speeds.

All this is done as quietly as possible with the Eheim pump running whisper quiet and the large 120mm cooling fan on the radiator only producing 37.7dBA when running at the highest clock speeds.

**Overall** **A fast, quiet card that pushes the 7800GTX chipset to the limit**



## Samsung SH-W163

**Price** £49.99 **Contact** www.samsung.co.uk **Overall** ★★★★☆

Optical drives with a Sata (Serial ATA) interface are rare. In addition to the Sata interface, Samsung's SH-W163 offers fast burn times, both with standard and dual-layer discs, and is one of Samsung's lead-free products. It burns DVD +/-R discs at up to 16-speed, dual-layer DVD+R at eight-speed and DVD-R dual-layer at four-speed.

The SH-W163 comes with a host of technologies for error-free burning. Writemaster intelligently detects the type of media in the drive tray; you also get Buffer Under Run protection, Tilt Actuator Compensation to improve recording across the entire media surface, and Firmware Live update that automatically adds the latest firmware via the web.

**Overall** **One of few Sata optical drives available and at a good price**

## Silentmaxx ST11-Pro

**Price** £110.45 **Contact** www.quietpc.com/uk **Overall** ★★★☆☆

Silentmaxx is well known for producing a range of products aimed at making your PC quieter, such as case fans and large fanless power supplies. Its latest product range is the ST11, a selection of quiet PC cases.

Once inside, the first thing that catches the eye is the acoustic material on virtually every panel of the case, which reduces case vibration noise to an absolute minimum.

Another interesting feature is that there are two collections of 5.25in drive bays – four sit at the top of case as normal, with a further three at the bottom. The latter have been designed to hold the larger hard drive enclosures, which are able to reduce the din made by noisy hard drives.

**Overall** **Well designed but expensive, and you still need to buy a PSU**

## Toshiba SD-R6572M

**Price** £37.52 **Contact** www.span.com **Overall** ★★★☆☆

Toshiba's latest slimline optical drive, the SD-R6572M, is the world's first notebook drive with Lightscribe technology, which allows you to burn an image onto the surface of compatible discs.

The SD-R6572M supports dual-layer disc burning, but only in DVD+R format. Its burn speeds may not be as fast as the latest desktop drives (eight-speed read, four-speed write and 2.4-speed dual-layer writing), but if you're looking for a replacement for the ageing drive in your notebook or are building an ultra-slim desktop PC, it's ideal. Our only real gripe is that it doesn't support both dual-layer formats. Hopefully Toshiba will release a firmware update to allow for dual-layer DVD-R support.

**Overall** **Good replacement, but lacks DVD-R dual-layer support**

## Zalman CNPS9500-LED

**Price** £45.83 **Contact** www.quietpc.com/uk **Overall** ★★★★☆

The new pure copper CNPS9500-LED turns the familiar Zalman flower design on its side, so although it's the same diameter as the 7000 series, it's a lot deeper. At the heart of the cooler lie three heat pipes, each of which is formed into a figure of eight for increased cooling capacity. In turn, these are cooled by a 92mm dual ball bearing fan, which spins from 1,350rpm up to 2,600rpm. Noise levels range from 18dBA up to 27.5dBA. The fan is lit by blue LEDs.

The CNPS9500-LED is compatible with all Socket 775, 748, 939, 940 and 754 processors regardless of clock speed. This is not a cooler for the smaller case, nor for cases with cooling ducts attached to the case side panel.

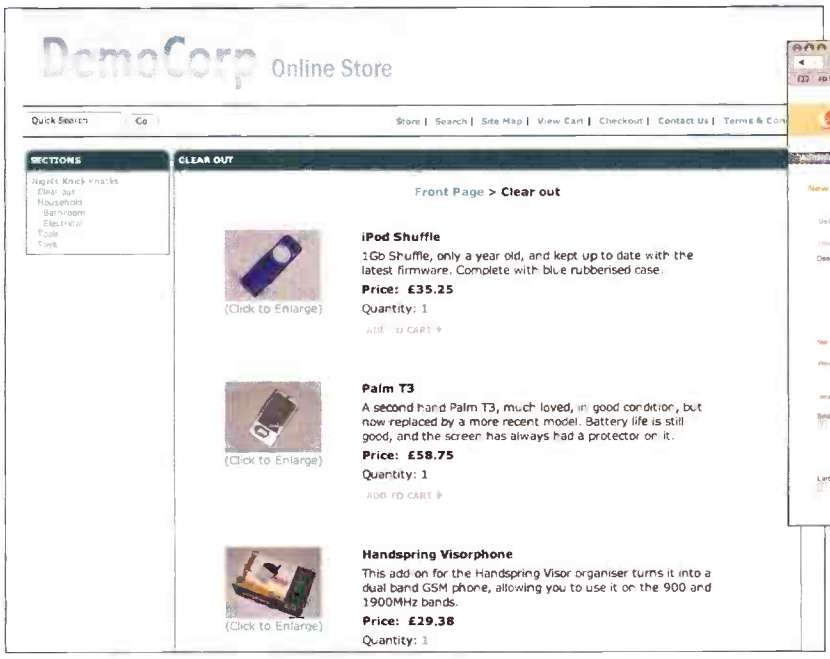
**Overall** **For a big enough case, this fan is quiet and efficient at cooling**

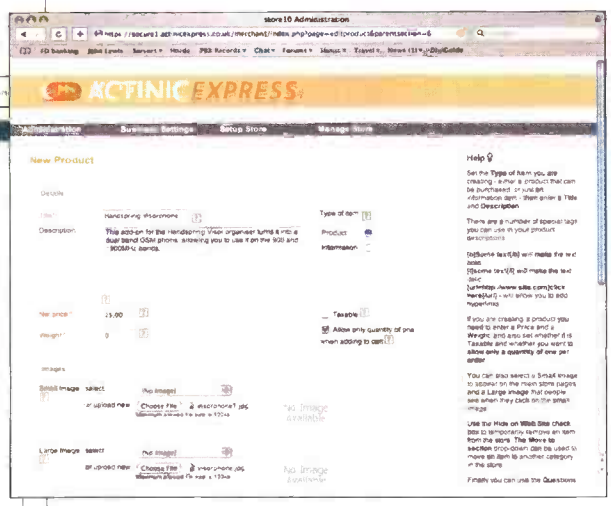
ECOMMERCE

# Actinic Express

## Create an online store without spending a fortune

Personal Computer World BUSINESS RECOMMENDED




Above: Build your online store from one of Actinic's templates

Left: The package offers a straightforward way to sell your products

Actinic's Catalog ecommerce software has long been a popular choice. It's easy to set up and fairly simple to manage, but at around £400 it's also a bit pricey to take a punt on if you're starting up in business. So step forward Actinic Express, an online shopping solution that includes an ecommerce system and the necessary web hosting for only £19.99 per month, plus VAT.

Unlike Catalog, which runs the management side of things on your PC, Actinic Express is a completely online service. You sign in to the website to view orders that have been placed, print them out, mark them as paid and so on. You also create your store by filling in the details of products online, adding photographs and purchase options.

Setting up your store is pretty straightforward thanks to a wizard-based approach and plenty of standard text for terms and conditions to save you having to start from scratch. It's good to see terms in there to help protect you should you make a mistake entering the price of an item – for customers there's a reminder of their rights under the Distance Selling Directive.

There's a good range of choices, so you can cater for products that might need customisation or come in different sizes and colours, and options can be copied from one product to another, saving time. You can even price in two currencies, though not with realtime rate conversion.

For payments, Worldpay, Protx, Paypal and Secpay are supported, which should be enough for the smaller businesses at which Express is aimed. Since the price is so low and there's no limit to the number of products you can sell, it may well appeal to some larger ones too.

You can choose whether or not you require customers to create an account, if you want them to confirm acceptance of your T&Cs, and the obligatory 'can we share your email' opt-in. Processing orders is a matter of signing in to the site where you'll see how many are pending. You can then view details, mark them as paid, despatched or delete them.

There are also tools to manage customers, including the ability to select by postcode. However, there's no option to download the details, which will be a pain should you wish to create a promotional email or use third-party tools to analyse how customers use your site.

There are some other niggles. Your store is built from templates, and at the moment there's only a fairly limited range; though you can change the colour scheme. And while there's an upgrade path to Catalog, and the ability to export your product list in Excel or Catalog formats, as yet there's no facility to batch-import.

On the positive side, you can register a domain for £9.99 ex VAT for your shop when you set it up, (.com domains for one year, all others for two years) or configure your own DNS so that the store appears within an existing domain, for example, shop.nigelwhitfield.com. Actinic also says it can arrange a customised site design for a fee, if you want a completely different look.

Despite a few minor irritations, Actinic Express is a straightforward way to get a shop online. It compares well with similar offerings from competitors such as 1&1 and, for many, having a clear upgrade path will provide extra peace of mind. *Nigel Whitfield*

### Details

**Price** £58.74 setup, £23.49 per month
**Best price** www.pcw.co.uk/bestprices
**Contact** Actinic 0845 129 4800 www.actinicexpress.co.uk
**System requirements** All major operating systems • Internet Explorer 5.5, Mozilla Firefox 1.0x+, Opera8+, Netscape Navigator 8+ • Requires browser with Javascript for admin

### Verdict

**Pros** Simple to manage; clear upgrade path
**Cons** No batch import; small range of templates
**Features** ★★★☆☆
**Ease of use** ★★★★☆
**Value for money** ★★★★☆
**Overall** A cost-effective way for a small business to create a good-looking store, without the risk of being locked in
★★★★☆

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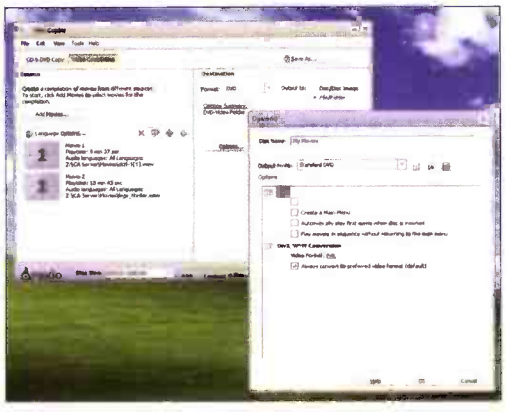
DVD COPYING/ENCODING

# Roxio Easy DVD Copy 2

**Convert your unprotected movies into DivX and wmv files**



Titles such as Easy DVD Copy, now on version 2, are always going to raise eyebrows, and we must state from the outset that duplicating copyrighted DVDs is illegal. Roxio also makes it perfectly clear, both on the packaging and throughout the application, that it does not condone piracy and you should not copy commercial DVDs unless you have the appropriate licence. Indeed, if Easy DVD Copy 2 comes across any copyrighted material, it will refuse to deal with it.

Copyright infringement issues aside, Easy DVD Copy 2 is loaded with useful tools such as the ability to encode your DVDs using the ultra-efficient DivX codec. You can also encode directly to the wmv format. Alternatively, it's possible to burn either DivX or wmv to a DVD, ready for viewing in a standard player.

Novices might take a while to learn the ropes, but in terms of usability we have no complaints with the interface and various controls. Just place your DVD in the drive or point Easy DVD Copy 2 to a video on your hard drive, decide what size you want the finished product to be, then choose whether to burn it to DVD or store it on your PC.

You can also opt to remove extras such as multiple angle views, foreign subtitle tracks and trailers, although we don't envisage too many unprotected movies having these features.

Other applications include Cineplayer, a basic viewer for watching your movies, and a label creator for your burned discs. The Disc Image Loader tool lets you run games without having the CD or DVD in the drive by creating a virtual drive, although some games have copy protection to prevent this.

Considering the price sits at under £20, you get a lot for your money with Easy DVD Copy 2. *Will Stapley*

Personal Computer World RECOMMENDED

## Details

**Price** £19.99
**Best price** www.pcw.co.uk/bestprices
**Contact** Roxio www.roxio.co.uk
**System requirements** 500MHz PIII • 100MB hard disk • CD or DVD drive • Windows 2000/XP

## Verdict

**Pros** Relatively easy to use; cheap
**Cons** Cineplayer DVD viewer is very basic
**Features** ★★★★☆
**Ease of use** ★★★★☆
**Value for money** ★★★★★

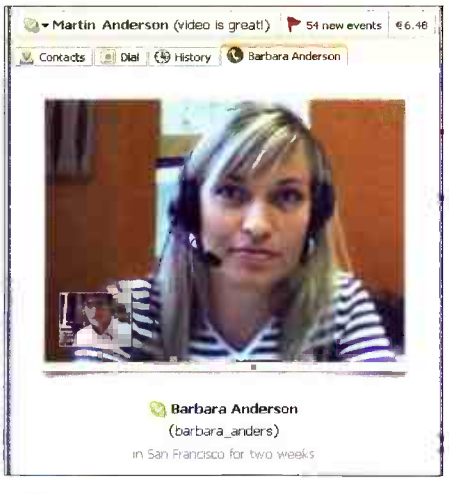
**Overall** Useful if you have a variety of unprotected material to copy or convert to DivX

★★★★☆

VIDEO VOIP

# Skype 2

**Yet another compelling reason to sign up to this free service**




Skype is a well-established Voice over IP (VoIP) service that offers free and very low-cost phone calls around the world but, until now, has lacked video calling.

We looked at previous releases last year (see www.pcw.co.uk/2140773) when Skype added Skype In (an individual phone number to receive calls from landline and mobile phones), Skype Out (to make calls to landline and mobile phones), Voice Mail and call forwarding to a designated number.

But until Skype 2, it was unable to offer video – a feature long available in rival MSN Messenger's service.

It's obvious a lot of thought has gone into the feature. When making a call, you can either start the webcam automatically or when you decide. During a call, you can alter the size of the video window or stop the video mid-conversation without ending the call.

The video can be slow to get going. We tried it from several locations and found that, although you could begin a conversation immediately, it took about 40 seconds for the video to snap in.

Image quality is down to your webcam and doesn't tend to impact voice quality. On a couple of occasions when it did during testing, simply switching off the video immediately improved the voice quality akin to that of a landline.

This version lets you group your contacts (for example, into business and friends), and display mood messages and the time local to your location. But video is the main benefit. Compared to the video capabilities offered by MSN Messenger, Skype's is far superior.

For anyone who needs video calling, it is an excellent addition to a good Internet telephony service. *Rob Jones*

Personal Computer World RECOMMENDED

## Details

**Price** Free
**Best price** www.pcw.co.uk/bestprices
**Contact** Skype www.skype.com
**System requirements** Internet connection • Speakers/microphone or USB headset • Webcam for video • 400MHz processor minimum • 128MB Ram • 15MB hard disk • Windows 2000/XP

## Verdict

**Pros** Free; easy to install and use; video calling
**Cons** Delay before video starts
**Features** ★★★★★
**Ease of use** ★★★★☆
**Value for money** ★★★★★

**Overall** A great addition to an already excellent service, and it's free so the decision to upgrade should be an easy one

★★★★★

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ARCADE ADVENTURE

# Prince of Persia: The Two Thrones

## Two heads are better than one in this Middle Eastern epic

The final instalment in Ubisoft's Sands of Time trilogy, the Two Thrones, sees the Prince of Persia back for another adventure. Following on from Warrior Within, our royal has arrived home to find things aren't exactly as they should be. Babylon has been invaded, an old enemy has returned and, to cap it all, his new girlfriend has just been kidnapped by the locals.

Just when you think things couldn't get any worse, the prince himself has developed a split personality. Early events in the game conspire to release his dark side, and from here you get to play as both the hero and his arrogant alter-ego. Each character has unique abilities and different ways of getting the job done.

Other than this intriguing new twist in the storyline, the basic gameplay is pretty much the same as the rest of the series. That said, many will be pleased to hear that this latest episode plays more like the original than its all-action sequel. For the uninitiated, it's an updated version of the classic PC platform game with ledges to leap from, puzzles to solve and pitfalls to avoid. Add a fair amount of swordplay and a good helping of villainous henchmen, and you've got a proven recipe full of Eastern promise.

To help even the odds a little, the Prince can gather the Sands of Time, allowing you to slow down or even rewind the action at certain points. Should you end up on the wrong end of an arrow or misjudge the distance during a jump, you can cheat death by taking time back to before it happened. Things are further enhanced this time by the introduction of 'speed kills', which allow you to quickly dispatch an unsuspecting enemy from behind. Meanwhile, the dark prince has a powerful whip-like weapon that can also be used to explore parts other peers cannot reach.

During your progress you will earn points that can be used to unlock artwork and videos on the DVD. There's nothing outstanding, but it's a good little extra.

Graphically, The Two Thrones makes excellent use of the latest hardware to deliver detailed characters and lavish surroundings. Shadow and fog effects are particularly good, animation is smooth and textures finely detailed. However, nothing is ever perfect – viewed close up, models can be a trifle angular, there's no option to continuously centre the camera behind the player or lock on to enemies, and poor collision detection means it's easy to end up with your foe embedded halfway though a wall.

Sound effects and the musical score are as detailed as the visuals. For once, even the voice-acting is spot on, the Prince's conversations with himself being particularly noteworthy.

Unfortunately, the PC version does fall short when it comes to keyboard control. This game was clearly designed with consoles, or at least a gamepad, in mind. Many of the on-screen tips suggest moving or clicking an analogue stick, while trying to perform some of the more complex fighting moves with the keys will likely tie your fingers in knots. It's difficult to see how Ubisoft could have worked around this, but that doesn't make it any less frustrating.

Minor niggles aside, the Two Thrones is quite possibly the best action adventure on the PC at the moment and comes highly recommended to those who own a console-style game controller.

In fact, if you don't already have one, it's worth nipping to the shops.

*Chris Cain*

### Details

**Price** £34.99
**Best price** www.pcw.co.uk/bestprices
**Contact** Ubisoft
www.princeofpersiagame.com
**System requirements** 1GHz processor • 256MB of Ram • DVD-Rom drive • Windows 2000/XP

### Verdict

**Overall** An engrossing storyline and quality graphics combine to create a thoroughly enjoyable game – just make sure you have a decent gamepad

★★★★★

3D SIMULATION

# The Movies

## It's hooray for Hollywood with Lionhead's cinematic sim game

Personal Computer World RECOMMENDED

Games such as The Sims and Rollercoaster Tycoon have proved that the simulation genre can produce some phenomenally popular titles. Hoping to continue the tradition is Lionhead's simulation of building and operating a Hollywood-style film studio.

Players start with an empty lot at the dawn of the cinema era and have to achieve and maintain both critical and financial success as the industry progresses from silent films to talkies, then colour and beyond.

The fact that time is marching on provides constant variations on the theme. As technology progresses in the game world, your studio will have to adapt and spend some of its hard-earned dollars on new sound stages, better equipment and more staff. You'll soon learn to keep one eye on the timeline at the top of the screen as it scrolls from right to left. Keeping up to date with current affairs (the outbreak of war, scientific discoveries and so forth) can, for example, help you to produce films that are more in tune with popular tastes.

Part of The Movies experience is putting together the films themselves. Players who prefer not to spend time on this can automate the movie-making process to a large degree, but it is possible to get fairly hands-on, creating your very own starlets, editing scenes and even recording your own dialogue, sound effects and music. An online community has quickly grown up around the game, with players from all over the world uploading, viewing and rating each other's mini-masterpieces.

The Movies is packed with detail, full of wit and bags of fun to play. But the subject material won't necessarily appeal to everybody, and it is unlikely to attain the blockbuster status of more immediate, universal games such as The Sims. *Jonathan Parkyn*

### Details

**Price** £44.99
**Best price** www.pcw.co.uk/bestprices
**Contact** Activision
www.activision.co.uk
**System requirements** 800MHz processor • 256MB of Ram • 32MB video card with T&L (transform and lighting) • Windows 98SE/ME/2000/XP

### Verdict

**Overall** Not everyone's cup of tea, but a great sim with plenty of humour and detail that's a must for film fans

★★★★☆

GOLF SIMULATOR

# Real World Golf

## Become king of the swingers with this motion-capture golfing game

Along with the humble joystick or gamepad, there are a number of specialised game controllers that are meant to simulate real-world controls, such as steering wheels for driving games or light guns for shooters. When a new type of controller works, it's usually because it's either incredibly realistic or because it provides an element of arcade novelty to an otherwise straightforward game.

Real World Golf (RWG) comes with one of the more unusual controllers we've handled. It's not quite up there with Sega's virtual fishing rod, but RWG's mini golf club and motion-capture accessory is still a pretty silly prospect. And it's fairly convoluted too. A large black box sits on the floor directly in front of your PC screen and, once you don the special golfing gloves provided, you must attach your hands to the unit via the spring-loaded cables that poke out of the box's surface. A further foot button device needs to be attached to the main unit and the whole caboodle is then plugged into a USB port. The otherwise complicated setup's one saving grace is that Windows seems happy to recognise the device and install it automatically.

Once you get out on the Links, you can't help feeling that the game itself is a bit of an anticlimax. It's a long way from the polished graphics and well-honed

gameplay that players of more recent golf games will be used to. The courses and player models are also relatively limited.

The mechanics of physically taking a swing are certainly rewarding but, as a single-player experience, Real World Golf does feel faintly ludicrous. The game becomes a lot more fun in multiplayer mode with a bunch of mates and a fridge full of beer, but be prepared to get in a bit of a tangle when it comes to handing over the controls to the next player. *Jonathan Parkyn*

### Details

**Price** £39.99
**Best price** www.pcw.co.uk/bestprices
**Contact** Gametrak
www.realworldgolf.com
**System requirements** 800MHz processor • 128MB of Ram • 32MB video card • Windows 98SE/ME/200/XP

### Verdict

**Overall** Real World Golf scores high on novelty but low on practicality. The real handicap is the game itself, which is well below par

★★★☆☆

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## ON TEST


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Editor's Choice


**'You might not get state-of-the-art components, but these PCs still provide enough power to satisfy the needs of most home users'**

# Get more for your money

**Don't despair if you've only got £699 to spend on a PC – you can pick up a powerful package with plenty of features for that price. Cliff Joseph tests seven systems to help you make a choice**

There was a time when a £699 PC would have been very much at the budget end of the spectrum.

In recent years, however, PC prices have fallen to such an extent that £699 will now buy you a pretty decent mid-range PC, complete with a flat-screen monitor, DVD burner and quite a few other bells and whistles.

Admittedly, you probably won't get the latest state-of-the-art processors or graphics cards – there's only one dual-core processor among the seven PCs submitted for this group test, and the graphics cards are at best mid-range. Yet these PCs still provide more than enough power to satisfy the needs of most home users.

They're all perfectly capable of running business software, as well as performing more demanding graphics, video and audio work. Most of them can even handle games pretty well, with several of these PCs easily producing playable frame rates in demanding 3D games such as Far Cry.

Even so, configuring a PC to what is still a relatively tight price point does mean that there are occasional difficult choices to be made.

Spend a lot of money on one component – such as the main processor or a compact 'cube' chassis – and you'll have to compromise somewhere else.

Different manufacturers choose to compromise in different ways, and that means there are some quite significant differences between these £699 systems submitted for review this month. So read on to find out which of these price-conscious PCs is the right one for you and see exactly what you can get for your money.

# Ambros Direct Shuttle SK21G Sempron 754

**Price** £699 **Contact** www.ambros.co.uk

Most of the PCs submitted for this group test were conventional tower units – fairly large and bulky, and not necessarily what you'd want to have in a home office or bedroom if you're a bit tight on space.

Ambros is the exception to that rule, as it has opted for a neat and compact 'cube' system, built around a Shuttle small form factor chassis (model SK21G to be precise). The unit measures about 20cm in width and height and 30cm in depth, so it's small enough to sit on a desk or shelf without taking up too much space. It's also quiet when running, so is a good choice for people who want something that's not too large or obtrusive.

The disadvantage of using the Shuttle chassis is that it's a little more expensive than the cheap and cheerful tower boxes used by rival manufacturers. And that, of course, means there's a bit less money to spend on the other components of the system.

Ambros has therefore opted for an AMD Sempron processor running at 1.8GHz, backed up with 512MB of Ram and a 160GB hard disk. That's slower than most of its rivals, which all have systems running at 2GHz or more, as well as features such as dual-core or Hyperthreading in some of the top performing systems.

As a result, the Shuttle SK21G can't match the all-round performance of rivals such as Panrix or PC Nextday. To be fair, though, its performance is perfectly adequate for most home users who want to surf the Internet, run office software or maybe do a bit of video editing from time to time.

If performance is your top priority then you should look elsewhere, but if you want a compact and quiet PC for your home office, the Shuttle SK21G is well worth considering.

## Verdict

**Pros** Compact and quiet PC for home users who don't have too much room to spare

**Cons** Unremarkable performance; uses speakers built into monitor

**Features** ★★★☆☆

**Performance** ★★★☆☆

**Value for money** ★★★☆☆

**Overall** Not a top performer, but the compact design will appeal to many home users

★★★☆☆

# Cube 247 Atlas ST3

**Price** £699 **Contact** www.cube247.co.uk

Calling this system 'Atlas' is perhaps optimistic. In fact this PC's greatest strength lies not in its sheer power but in its expandability.

The Atlas is equipped with a 3.2GHz Pentium 4, and in terms of processor speed alone that makes it one of the fastest machines in this group. However, it's let down somewhat by the poor performance of its motherboard's integrated ATI Radeon Xpress 200 graphics. The 3D performance was particularly disappointing, with the Atlas failing to complete our Far Cry test as it simply wouldn't run that benchmark.

The integrated graphics also use some of the system's own memory, although it has 1GB of Ram so there's still almost 900MB left over for running Windows and other applications. And, as long as you're not a games fan, you'll find that the Atlas is more than powerful enough for running productivity software or demanding audio and video applications. Audio and video are particular areas where the Atlas will excel, thanks to its extensive range of expansion and connectivity options. It's got a totally over-the-top set of 12 USB ports, along with Firewire for connecting a camcorder and both composite and S-video outputs.

Audio support is good too, with both analogue and digital connectors for its 5.1 surround-sound output. The 250GB hard disk provides plenty of room for storing video and audio files and there's room inside to add more storage if required. It's a shame the graphics performance lets it down as that is the only weakness in an otherwise impressive system – although it would be possible to upgrade the graphics via the free x16 PCI Express slot. In its review configuration it's not the best choice for games, but it should provide the performance required by most home users, along with features that will appeal to people who want to experiment with home recording or video editing.

## Verdict

**Pros** Powerful Pentium 4 processor, with wide range of audio and video features

**Cons** Poor performance for 3D graphics and games

**Features** ★★★★☆

**Performance** ★★★☆☆

**Value for money** ★★★★☆

**Overall** The Atlas' 3D performance may be disappointing, but it's an excellent choice for home audio and video work

★★★★☆

# Evesham Axis SB

**Price** £699 **Contact** www.evesham.com

The Axis SB was the only PC in this group supplied with Windows XP Media Center Edition 2005, and that gives you a good idea where Evesham's emphasis is with this system.

In keeping with the MCE operating system, the Axis is equipped with an analogue Hauppauge WinTV TV tuner card, which will allow you watch and record television programmes and to use it as part of your home entertainment system (although the rather bland mini-tower design won't look particularly attractive sitting in your front room).

The tuner card also includes composite and S-video inputs, and there's a Firewire port on the back of the system as well, so you can grab video from most types of camcorder or VCR equipment for video-editing work. There's a video output connector so you can record your edited video onto VCR, output it to a camcorder or burn it onto DVD using the Sony multiformat DVD burner. Audio work is also well catered for, with both digital and analogue connectors for the Axis' 5.1 surround-sound output. Finally, rounding out the multimedia features is an FM radio receiver on the TV tuner card.

However, the inclusion of all these features does mean that there has had to be a slight trade-off in terms of performance. The 2GHz Athlon 64 CPU and Radeon X550 graphics card are both solid enough, but they're also both outshone by faster rivals such as Panrix and PC Nextday, particularly when it comes to 3D graphics performance. Performance certainly can't be described as poor, but it definitely sacrifices a bit in exchange for its multimedia capabilities.

Of course, for many people that will seem like a fair exchange. If you're more interested in video editing than in playing games, the Axis has both the power and the multimedia capabilities that you need.

## Verdict

**Pros** Windows Media Center system with versatile audio and video features
**Cons** Average performance; documentation could be improved
**Features** ★★★★☆
**Performance** ★★★☆☆
**Value for money** ★★★★☆
**Overall** A solid but unremarkable performer, that also boasts a good range of audio and video features
★★★★☆

# Intellect Prodesk A64/3500s

**Price** £699 **Contact** www.intellect.uk.com

Intellect's Prodesk A64/3500s is a good performer in most areas, even if it doesn't have any particularly outstanding features that immediately catch the eye.

Like the Zoostorm from PC Nextday, it uses an Athlon 64 3500+ running at 2.21GHz. However, it only has 512MB of Ram, compared to a full gigabyte for the Zoostorm. And its Radeon X800GT graphics card doesn't fare quite as well as the Nvidia graphics cards used by the Zoostorm and the even more consistent Panrix Magnum. As a result, it tends to fall into the mid-range on most of our performance tests. Even so, it's more than powerful enough for most business applications, as well as more demanding music or video-editing work. Its games performance isn't bad either, taking third place in our Far Cry test.

One minor disappointment is the lack of a good set of speakers. The system includes a Sharp 17in TFT monitor, which provides very good image quality and has a set of built-in stereo speakers. These produce a reasonable sound but they don't make up for the lack of a proper set of external speakers – especially since most of its rivals provide 2.1 speaker systems with a sub-woofer to give their sound a bit of a boost.

There are no fewer than six USB ports scattered around the front and back of the PC. A memory card reader on the front of the unit allows you to quickly import digital photos and other files, and there's a single Firewire port at the back for connecting a camcorder or external hard drive.

It may not be the fastest PC in this group, but its performance is still strong enough to cope with most tasks that home users are likely to throw at it. Only the lack of a good set of speakers is likely to deter some potential owners.

## Verdict

**Pros** Good performance; handy media card reader
**Cons** Lacks proper external speakers; no digital audio output
**Features** ★★★☆☆
**Performance** ★★★★☆
**Value for money** ★★★☆☆
**Overall** A solid performing PC, marred only by its lack of a decent set of speakers
★★★☆☆

# Mesh Matrix Vector PCW

**Price** £699 **Contact** www.meshcomputers.com

As you might expect, the dual-core Athlon64 X2 3800+ used by Mesh in this Matrix Vector PCW (flatteringly named after us, it seems) provides more raw processing power than the single-core processors used by all its rivals. It quite comfortably takes top spot in a number of our benchmarking tests.

It's noticeable, though, that it doesn't perform quite so well when it comes to 3D graphics performance. Spending a large chunk of its £699 budget on the dual-core processor means that Mesh has had to compromise here by using a Radeon X800GTO graphics card. This is certainly no slouch when it comes to graphics performance, but it doesn't quite keep up with the faster graphics cards used by some of its rivals.

This is only a minor weakness, though, and is forgivable given the Vector's strong all-round performance. However, there are other signs of cost-cutting. The most obvious is the inclusion of a relatively small 15in flat-screen monitor, whereas most of the other PCs here include 17in displays – or even 19in in the case of Panrix. The speaker system is also quite modest, as is the 160GB hard disk.

Mesh does provide a good selection of bundled software, though, including Microsoft Works and a number of programs for video editing and DVD creation. It's noticeable, though, that this is the only PC in this group that doesn't have a Firewire interface, so anyone who wants to connect their camcorder to the Matrix will need to pay extra for a separate Firewire upgrade card.

So while the Matrix Vector's dual-core processor does provide plenty of raw horsepower, putting all its eggs into that one basket means it doesn't have the same range of features as some of this group.

## Verdict

**Pros** Dual-core processor provides strong all-round performance
**Cons** Only includes 15in monitor; no sub-woofer for speakers and no Firewire interface
**Features** ★★★☆☆
**Performance** ★★★★☆
**Value for money** ★★★☆☆
**Overall** A powerful PC system that is let down by its limited range of additional features
★★★☆☆

# Panrix Magnum IQ 3700

**Price** £699 **Contact** www.panrix.co.uk

Personal Computer World EDITOR'S CHOICE

One of the hardest things to do when you're buying a PC on a fixed budget is to strike a balance between performance and features. However, the Magnum IQ 3700 from Panrix manages to get the balance just about right.

It is equipped with a 2.21GHz Athlon64 3700+ processor, backed up with a healthy 1GB of Ram and an Nvidia Geforce 6600GT graphics card. That combination produces very consistent all-round performance, with the Magnum IQ finishing in the top three of every single one of our labs tests. This makes it a good choice for just about any application you care to name – running business software, video editing, graphics and even the latest 3D games. Hardcore gamers might also want to note that the motherboard has twin x16 PCI Express slots, so you've even got the option of upgrading by adding a second graphics card in the future.

Just as important, though, is the fact that Panrix has managed to provide a good selection of additional features as well. The Magnum was the only PC in this group to include a 19in flat-screen monitor. It was also the only one that came with a complete set of 5.1 surround-sound speakers. This means that it's equally suited to use as a home entertainment PC or as a workstation for digital photography or video editing. There are Firewire ports for connecting a camcorder, and a digital audio output for budding musicians. The 250GB hard disk provides plenty of room for storing files and there's lots of space inside the case for adding extra hard disks if required.

One or two of the Magnum's rivals do include extra features such as a TV tuner or media card reader. These are very minor omissions though, and it's hard to fault a machine that provides such a good combination of features and performance at this price.

## Verdict

**Pros** Good all-round performance; large monitor; surround-sound speakers
**Cons** Not much missing, apart from the possible exception of a media card reader or TV tuner
**Features** ★★★★☆
**Performance** ★★★★★
**Value for money** ★★★★★
**Overall** Strong performance and impressive range of features make this excellent value for money
★★★★★

# ASUS Motherboards Deliver True SLI Graphics Performance

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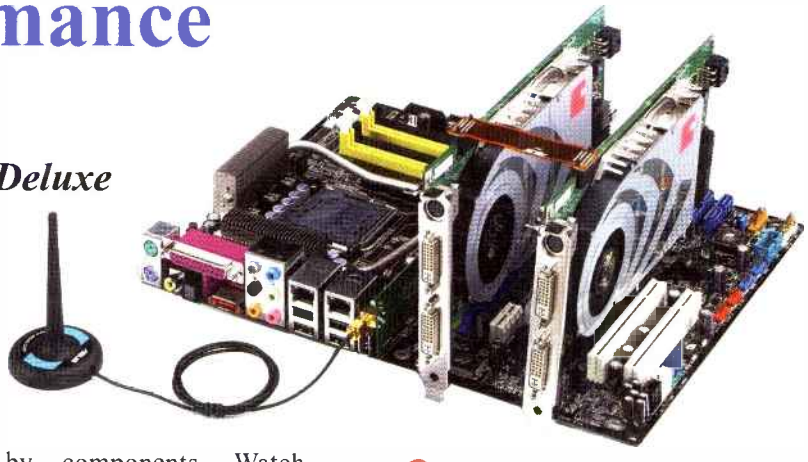

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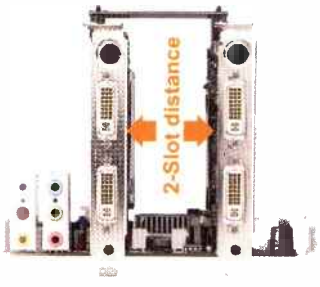


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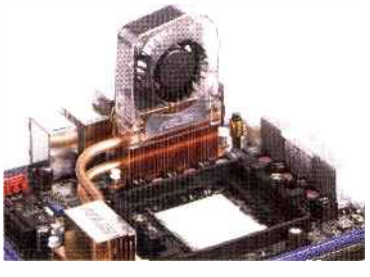
## 8-Phase Power design

With the 8-Phase Power design, power modules operate at 15°C lower than conventional power solutions to provide a cool computing environment. Lower temperature also results in lower fan speed for quiet operation and better stability during overclocking.

8-phase design operate at 15°C lower than conventional power solution

The 8-Phase Power design reduces input ripple current and output ripple voltage, keeping the CPU and power modules from high power stress to lengthen component lifespan. Furthermore, it has the advantage of quick transient response. It acts faster than 4-phase power designs to stabilize output current and voltage. This is especially critical when the CPU requires immediate current support when under heavy workload.

## Optional fan bundle for water-cooling systems



The optional fan is designed to provide sufficient airflow over the CPU power modules and chipset area when water-cooling and passive cooling solutions are utilized, ensuring effective heat dissipation for the entire system.

# PC Nextday Zoostorm 9-5401

**Price** £699 **Contact** www.pcnextday.co.uk

With its bulky tower design and slightly plasticky front panelling, the Zoostorm 9-5401 isn't the most elegant of PCs. However, it performs well and is good value for money.

Its basic specification is very similar to that of the Panrix Magnum. Like the Magnum it has an Athlon64 processor running at 2.21GHz, along with 1GB Ram and an Nvidia Geforce 6600GT graphics card. Not surprisingly, it performs consistently in all our performance tests, mirroring very closely the performance of its Panrix counterpart. It doesn't quite match the performance of the Panrix Magnum, though, as the Magnum benefits from an Athlon64 3700+, which has a larger L2 cache than the Zoostorm's 3500+ processor. However, the difference between the two PCs really is minimal and you'll have no trouble using the Zoostorm for playing games, editing video or surfing the web. It's also got a healthy 250GB hard disk and room inside that big tower case for additional upgrades if required.

The Zoostorm is supplied with a 17in flat-panel monitor and a set of its own-brand stereo speakers and a sub-woofer. There are two USB ports and a Firewire port on the front panel, with a further four USB ports and three more Firewire ports tucked around the back (the additional Firewire ports could be used for connecting high-speed hard disks for video or audio recording work as well as ordinary camcorders). There are digital audio and S-video outputs as well, so you've got a good set of options for recording onto external audio and video devices. We also like the inclusion of a media card reader on the front.

Its consistent performance results and versatile audio and video features mean that the Zoostorm is good value for money and will make a good, reliable workhorse PC for a wide variety of applications.

Personal Computer World RECOMMENDED

## Verdict

**Pros** Consistent all-round performance; media card reader and useful audio and video outputs

**Cons** Bulky tower design and slightly tacky plastic finish

**Features** ★★★★☆

**Performance** ★★★★☆

**Value for money** ★★★★☆

**Overall** A conventional enough PC, but one which performs solidly and has all the features most users will need

★★★★☆

# DIY option: the cost of building your own PC

There was a time when people on a tight budget could save themselves money by building their own PC from scratch. However, the cut-throat competition between manufacturers, along with their ability to buy components at wholesale prices, means this is no longer the case.

Buying the processor is the tricky part. You obviously want a fairly powerful chip, but if you spend too much here you may not have much money left for the rest of the system. It's tempting to opt for a dual-core processor, but our Editor's Choice system from Panrix managed very well with a single-core Athlon64 3700+. Check out www.dabs.com or www.overclockers.co.uk and you should be able to pick this up for about £160. Motherboards can vary in price enormously, so you could pay anything from £50-£150 or more. However, £70 is a reasonable average, which takes us to about £230 just for the basic processor and motherboard.

Another component that can vary in price a lot is the case. A cheap and cheerful mini-tower may only cost about £20 but, again, a good average price is around the £50 mark (including a 400w power supply and system fan). Next on the shopping list are memory and storage, which are pretty cheap. We'd like a full 1GB of PC3200 Ram, which shouldn't cost more than £65, and a 160GB hard disk should be about the same again. Even a dual-layer DVD burner should set you back no more than £30. But this still brings us to £450 and we haven't even got a graphics card or monitor.

Games aren't the only programs that benefit from a good graphics card. Even low-cost video-editing programs can make use of graphics card features, so it still can be worth spending £80-£100 on something like an Nvidia Geforce 6600GT.

We've now spent £550 and we still have to get a monitor. A 17in flat screen will cost you about £150-£200, but you can save money if you get a monitor with its own built-in speakers. That brings us to somewhere in the region of £750 without any operating system, keyboard/mouse or speakers – which will add another £110 (unless you use Linux) – a total of £860, which is well over the cost of any of the PCs reviewed here. And you won't even have the comfort of a manufacturer's warranty in case anything goes wrong – although the individual components should be covered by each manufacturer.

Building your own custom PC can be very rewarding for enthusiasts or games fans, but most ordinary home users can save time, money and hassle by buying a complete system from a reliable vendor.

| COMPONENT | TYPICAL STREET PRICES |
|---|---|
| Athlon64 3700+ processor | £160 |
| AMD Socket 939 motherboard | £70 |
| ATX case (with 400w PSU and fan) | £50 |
| 1GB PC3200 memory | £65 |
| 160GB hard disk | £70 |
| Dual-layer DVD burner | £30 |
| 128MB PCI Express graphics card | £100 |
| 17in flat-panel monitor (with speakers) | £200 |
| Keyboard/mouse | £15 |
| Windows XP Home Edition | £60 |
| 2.1 speakers | £35 |
| TOTAL | £855 |

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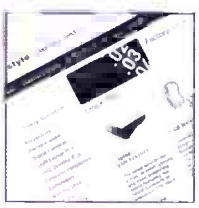

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**£1743.83** Ex.Vat
offer code: SZ1-EXCLB2B.CEK

**Also available in the all NEW SZ range - see online for full details.**

**VGNSZ1XP/C**
100GB Carbon fibre
**£1360.85** Ex.Vat
order code: VGNSZ1XP/C.CEK

**VGNSZ1HP/B**
80GB Magnesium finish
**£1105.53** Ex.Vat
order code: VGNSZ1HP/B.CEK

**VGNSZ1M/B**
XP Home Version
**£1020.43** Ex.Vat
order code: VGNSZ1M/B.CEK

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# TX2 NEW! EXCLUSIVE

**Sony recommends Windows® XP Professional**

**PRE-ORDER YOURS NOW!**

## TX2XP blue limited edition

- High tech carbon fibre for a lightweight and durable chassis – an incredible 1.25kg!
- No compromise on power: 80GB hard drive and 1GB RAM
- Maximum mobile performance with up to 7.5 hours battery life
- 11.1" NEW X-black™ with LED technology

**Weight** : 1.25kg
**Dimensions (w x h x d)** : 272 x 23 - 29 x 195mm

Microsoft Windows xp

## Slim down!

The TX2 Series is our slimmest and lightest notebook. Do business wherever you choose to go without compromising on power. Beat the crowds and pre-order your TX2 Series notebook at **www.sonystylebusiness.co.uk**

**Strictly limited edition**

**£1445.96** Ex.Vat
order code: VGNTX2XP/L.CEK (Blue Exclusive)
VGNTX2XP/B.CEK (Black)

### TX2HP/W Striking White

**£1275.74** Ex.Vat
order code: VGNTX2XP/W.CEK

**See online for full details.**

## EXCLUSIVE TX2 XP Blue VIP Launch Bundle

### STYLE

Protect its looks and stand out from the crowd, with this exclusive slip case.

### + PEACE OF MIND

The VIP launch bundle includes a professional 3 year On-site warranty too.

Save over **£150** on individual prices

**£1616.17** Ex.Vat
order code: TX2-EXCLB2B.CEK

# A Series

## Big screen power and entertainment

**Sony recommends Windows® XP Home Edition**

### A617B

With its huge, vivid 17" X-black™ screen, fast graphics and Centrino™ processor, you have the power of a desktop with the freedom of a notebook.

**£1020.43** Ex.Vat
order code: VGNA617B.CEK

### A617S

Add on a powerful multimedia docking station with TV tuner, premium Sony speakers and much more for the ultimate all-in-one entertainment notebook.

**£1445.96** Ex.Vat
order code: VGNA617S.CEK

**£25 Voucher:** Register for our new business only website - see back page

sony style | business direct call 020 7365 2797

# FE NEW! Series

intel Centrino Duo

# Strong communicator, great entertainer

**Sony recommends Windows® XP Media Center Edition**

Designed with mobile communications in mind, you can get online, use Internet telephony and hold video conferences straight out of the box - and with Microsoft® MCE* you can have all of your photos, music and multimedia at your command.

**FREE SKYPE® handset and airtime voucher**

Microsoft Windows xp Media Center Edition 2005

## FE11S

- Run multiple programmes, without draining your battery with the NEW Intel® Centrino™ Duo processor
- Total mobile communication: Built-in Videoconferencing camera and microphone. FREE SKYPE® handset
- Easy to use entertainment interface for recording, organising, editing and viewing all of your multimedia files
- Next generation giant 15.4" X-black™ Widescreen, 1280 x 800. Delivers ultra bright and rich colour images
- Huge 160GB hard drive and 1GB memory

**Weight :** 2.8kg
**Dimensions (w x h x d) :** 366 x 26 - 35.3 x 275mm

**£1105.53** Ex.Vat
order code: VGNFE11S.CEK

### FE11H also available - see online for full details.

The FE11H shares all of the powerful features of its big brother, but without the built-in camera and Bluetooth® and has a 100GB hard drive.

**£935.32** Ex.Vat
order code: VGNFE11H.CEK

*See page 2 for more information on Microsoft® Media Center Edition 2005.

# FS Series

## Slim and smart for work and play

**Sony recommends Windows® XP Home Edition**

### FS415E

Superb value based around Intel's Celeron® processor. It packs an impressive 15.4" X-black™ widescreen into a sleek, light body and has wireless networking built-in.

**£594.89** Ex.Vat
order code: VGNFS415E.CEK

### FS415B

Step up to Intel's Centrino™ processor for extended battery life and wireless flexibility. Like the 415E, it has a hefty 80GB hard drive and 512MB RAM.

**£680.00** Ex.Vat
order code: VGNFS415B.CEK

### FS415S

This top of the range model boasts Intel® Centrino™ technology, 100GB HDD storage and 1024MB memory. Features a dedicated graphics card.

**£850.21** Ex.Vat
order code: VGNFS415S.CEK

55

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to buy for home go to
**www.sonystyle.co.uk**

# BX Series

Microsoft Windows xp

## Sony recommends Windows® XP Professional

# For every business: from only £624

For professional business users, who never compromise on quality. The BX Series combines the style, performance and build quality that you expect from Sony.

### Fingerprint scanner

- A built-in fingerprint sensor makes passwords a thing of the past.
- Simply slide your finger across the sensor for secure access to your notebook.
- Activate the built-in Trusted Platform chip, which creates an encrypted area of your hard drive.

### Videoconferencing Camera

The built-in Motion Eye camera makes for a powerful mobile videoconferencing solution when combined with a Bluetooth® headset (sold separately). Now you can talk face to face even when you can't be there in person.

Traditional LCD | X-black™

### X-black™ LCD

X-black™ screens are the latest cutting-edge screen technology.

Benefits:

- Vibrant colours
- Sharp contrast
- Wider viewing angles
- Reduced eye fatigue
- Enhanced brightness without consuming more power

### Easy Swap Drive Bay and Optional docking station

- The swappable drive bay in your BX notebook accommodates either a double layer DVD+-RW or a second hard drive.
- Docking station also has the Easy Swap bay and even charges your battery.

## BX range at a glance

Prices start from only **£624.00** Ex.Vat

| Model | Processor | Operating System Microsoft® Windows® XP | Processor Speed | Bluetooth® | Wireless LAN | Standard RAM | Hard Disk Drive | X-Black™ LCD Screen | Videoconferencing Camera | Weight with Battery | 1/2 Price Warranty Offer* | Price Ex.Vat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BX197XP 17" **Big screen powerhouse** | Intel® Pentium® M 760 | Professional | 2.0GHz | ✔ Headset supplied | ✔ | 1GB | 160GB | WUXGA 17" (1920x1200) | ✔ | 4.0kg | ● | £1499.00 |
| BX196SP **High performance widescreen** | Intel® Pentium® M 750 | Professional | 1.86GHz | ✔ | ✔ | 512MB | 100GB | WXGA 15.4" (1280x800) | ✔ | 3.0kg | ● | £949.00 |
| BX196VP **Widescreen all-rounder** | Intel® Pentium® M 740 | Professional | 1.73GHz | | ✔ | 512MB | 80GB | WXGA 15.4" (1280x800) | | 3.0kg | ● | £799.00 SAVE £50 |
| BX194VP **Exclusive compact Centrino™** | Intel® Pentium® M 740 | Professional | 1.73GHz | ✔ See Offer | ✔ | 512MB | 80GB | XGA 14.1" (1024x768) | ✔ | 2.5kg | ● | £799.00 SEE OFFERS |
| BX195VP **15" 4:3 Centrino™** | Intel® Pentium® M 740 | Professional | 1.73GHz | | ✔ | 512MB | 80GB | XGA 15" (1024x768) | | 2.8kg | ● | £749.00 SAVE £50 |
| BX195EP **Superb value Celeron™ model** | Intel® Celeron™ 380 | Professional | 1.6GHz | | ✔ | 256MB | 60GB | XGA 15" (1024x768) | | 2.8kg | ● | £624.00 SAVE £25 |

S6

**£25 Voucher:** Register for our new business only website - see back page

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# Professional performance – no compromise

**Sony recommends Windows® XP Professional**

## BX197XP

A no-compromise powerhouse of a machine with a jaw-dropping 1920 x 1200 17" X-black™ display, the fastest Intel® Centrino™ processor and dedicated graphics together with a huge 160GB hard disk. Includes Bluetooth® headset.

**Weight :** 4.0kg
**Dimensions (w x h x d) :** 402 x 40.2 - 42.5 x 297mm

**£1499.00** Ex.Vat
order code: VGNBX197XP.CEK

**Only Sony builds this phenomenal 17" WUXGA screen into an off-the-shelf model - truly a screen like no other**

BX197XP

## BX194VP EXCLUSIVE†

We've packaged up all the essentials for business at a superb price. With Microsoft® Windows® XP Professional, Centrino™ technology, built-in videoconferencing and Sony design it's a notebook you'll be proud to do business with.

**Weight :** 2.5kg
**Dimensions (w x h x d) :** 317 x 31.8 - 33 x 264mm

**£799.00** Ex.Vat
order code: VGNBX194VP.CEK

BX194VP

**EXCLUSIVE† with webcam and Bluetooth®**

## Fulfil your BX194VP's potential with one of these exclusive offers

**FREE Bluetooth® Headset**
Talk without wires

**FREE** offer code: BX194VP-BT.CEK — Bundle price £799.00 Ex.Vat

**OR**

**HALF PRICE Docking Station**
Unclutter your desk and work more flexibly

**£54.90*** Ex.Vat offer code: BX194VP-PRBX1.CEK — Bundle price £853.90 Ex.Vat

**OR**

**HALF PRICE 3 year On-site Warranty**
Relax and let us look after you

**£100.00*** Ex.Vat offer code: BX194VP-VPPS.CEK — Bundle price £899.00 Ex.Vat

Microsoft Windows xp

Sony has chosen Microsoft® Windows® XP Professional for all our business notebooks - a powerful and reliable foundation for your working life. You can be as productive on the road as you are in the office using its advanced mobility features and rest assured your confidential data is protected by the latest security technology. It's for people who demand the most from their computer.

*Normal ex VAT prices : docking station £109.79, warranty £203.40

† Also available from selected Sony Centres

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www.sonystyle.co.uk

# HOT DEALS

Sony recommends Windows® XP Professional for business

## S5VP EXCLUSIVE

The S5VP is a seriously powerful executive notebook. It has a massive hard drive and 1GB RAM in a compact 13.3" form factor weighing only 1.95kg.

**FREE 3 year On-site Warranty CALL NOW**
**Save £203.40**

**£1531.06** Ex.Vat

order code: S5VPB-VPPS.CEK

## TX1HP/W

- Ultra small
- Ultra light
- White carbon fibre

**FREE 3 year On-site Warranty CALL NOW**
**Save £203.40**

## BX SAVINGS

Great prices on all our BX VAIO Professionals

**XP PRO models up to £50 Off**

**From only**

**£624.00** Ex.Vat

See pages 6/7

**There are always great bargains in our factory outlet**

Check online or call now

**STRICTLY LIMITED STOCKS**

## BX194VP

**3 EXCLUSIVE offers**

See page 7

**FREE** **Half Price**

## FJ1 COLOURS

**EXCLUSIVE**

~~£8~~

**£765.11** Ex.Vat

order code: VGNFJ1S/L Blue VGNFJ1S/R Red

## SAVE £700*

Huge saving on our Top of the Range LCD TV

24 months 0% Credit available**

**KDLW40A12**

*Saving includes VAT

## WIN your favourite colour VAIO

when you register to buy without VAT from our new business website

**HOW TO ENTER** (VAT registered customers only)

1. Go to **www.sonycompetition.co.uk** and complete the registration process.
2. We will set you up with a zero VAT business account on our website.
3. We will notify you of your login information and send you your £25 e-Voucher.

You can then buy Ex.Vat whenever you like, either online or through our call centre.

**Every Entrant** gets a **£25** e-Voucher to spend on your next business order

Competition closes 28th February 2006 No purchase necessary. See website for full terms & conditions of competition and e-Voucher.

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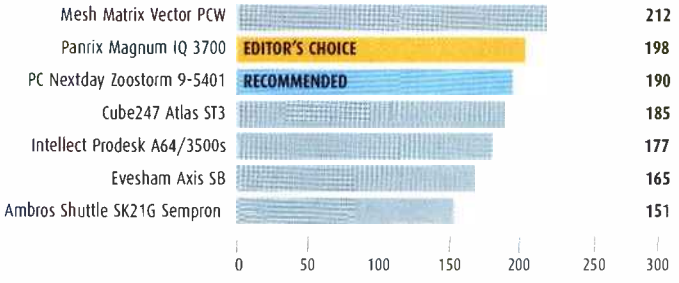
# Lab results

**Only two of the systems (Mesh and Cube 247) in this group test come with dual-core processors, but the benefits aren't really evident in our benchmark tests**

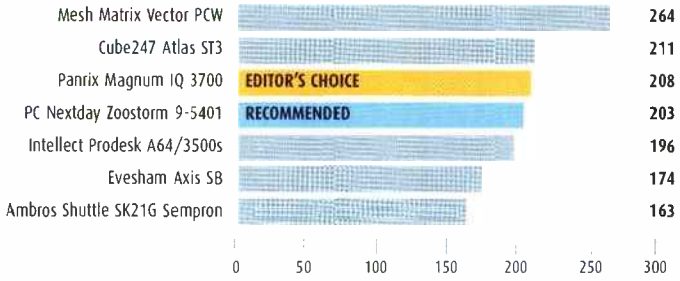
## Sysmark 2004 SE overall

Bigger is better



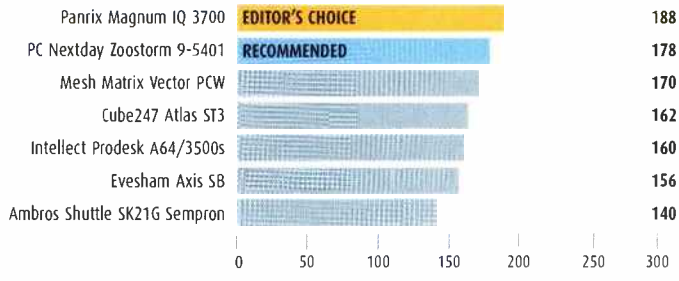

## Sysmark 2004 SE Internet content creation

Bigger is better



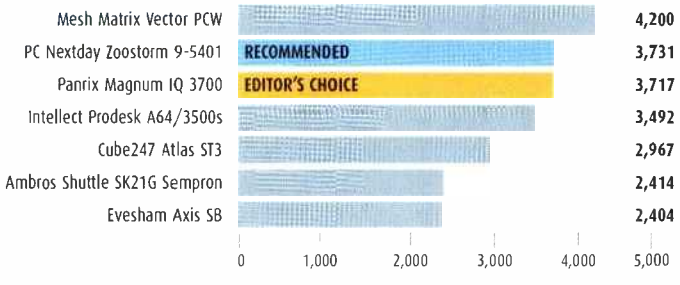

## Sysmark 2004 SE office productivity

Bigger is better



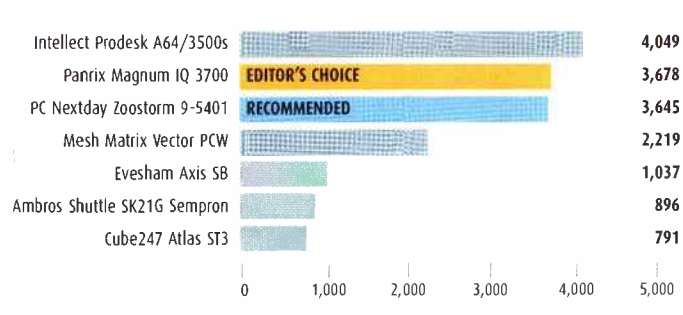

## PCmark05 overall

Bigger is better



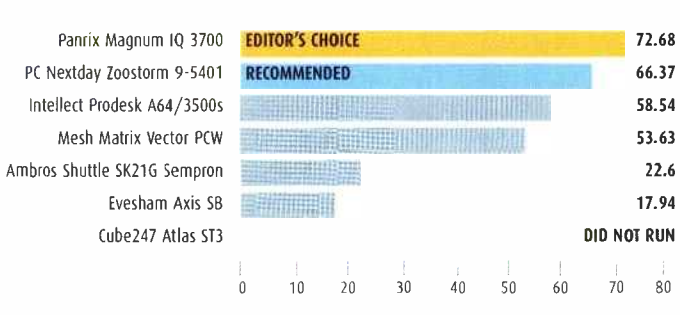

## 3Dmark05 (1,024 x 768 in 32bit colour)

Bigger is better



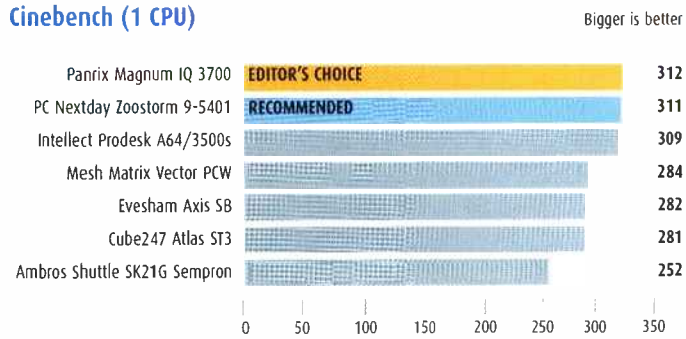

## Far Cry (1,024 x 768 in 32bit colour) fps

Bigger is better



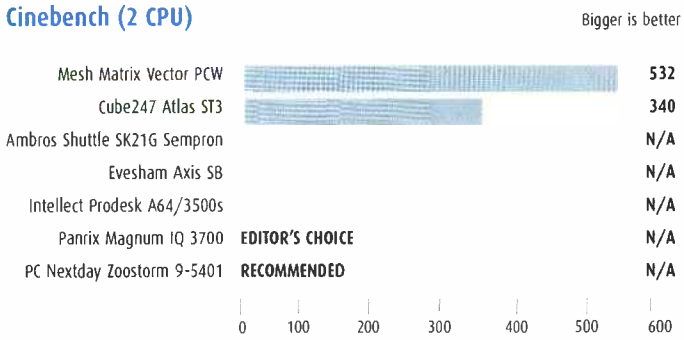

## Cinebench (1 CPU)

Bigger is better




## Cinebench (2 CPU)

Bigger is better




Please see page 102 for an explanation of how we tested the PCs

FOR THE BEST PC PRICES go to www.pcw.co.uk/bestprices

## £699 PCs

| MANUFACTURER | AMBROS DIRECT | CUBE 247 | EVESHAM |
|---|---|---|---|
| Product name | Shuttle SK21G Sempron 754 | Atlas ST3 | Axis SB |
| Price inc VAT (ex VAT) | £699 (£594.89) | £699 (£594.89) | £699 (£594.89) |
| Sales telephone | 020 8998 1010 | 0870 242 1179 | 0870 160 9500 |
| URL | www.ambros.co.uk | www.cube247.co.uk | www.evesham.com |
| **HARDWARE** | | | |
| Processor | AMD Athlon Sempron 3000+ 1.8GHz | Intel Pentium 4 3.2GHz (640) | AMD Athlon64 3200+ 2GHz |
| Motherboard | Shuttle SK21G | PC Partner RS400MS7-A55S | MSI RS480M2-IL |
| Chipset | Via K8M800/VT8237R Plus | ATI Radeon Xpress 200/IX400 | ATI Radeon Xpress 200/SB400 |
| Available memory/type | 512MB PC3200 DDR400 | 896MB PC3200 DDR400 | 512MB PC3200 DDR400 |
| Occupied/spare memory slots | 1/0 | 2/2 | 2/2 |
| Max memory in this configuration | 2GB | 3GB | 2GB |
| Max memory supported by motherboard | 2GB | 4GB | 4GB |
| Hard disk manufacturer and model | Maxtor 6L160M0 | Seagate ST325082 | Western Digital WD2000JB |
| Secondary hard drive | ✘ | ✘ | ✘ |
| Total storage space | 160GB | 250GB | 200GB |
| **EXPANSION AND I/O** | | | |
| No of 3.5/5.25in bays | 2/1 | 6/4 | 2/2 |
| No of free 3.5/5.25in bays | 1/0 | 4/3 | 1/1 |
| No of PCI/PCI-x16/PCI-x4/PCI-x1/AGP ports | 1/0/0/0/1 | 2/1/0/1/0 | 3/1/0/0/0 |
| No of free PCI/PCI-x16/PCI-x4/PCI-x1/AGP ports | 1/0/0/0/0 | 1/1/0/1/0 | 2/0/0/0/0 |
| No of USB2/Firewire ports | 6/2 | 12/1 | 6/2 |
| No of serial/parallel/PS/2 ports | 1/0/2 | 1/1/2 | 1/1/2 |
| **MULTIMEDIA** | | | |
| Primary optical drive | NEC ND-4550A | NEC ND-4550A | Sony DW-Q30A |
| Optical drive formats and DVD write speed (max) | 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD+R DL, 6x DVD-R DL, 5x DVD-Ram, 16x DVD | 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD+R DL, 6x DVD-R DL, 5x DVD-Ram,16x DVD | 16X DVD+/-R, 8X DVD+RW, 6X DVD-RW, 8X DVD+R DL, 4X DVD-R DL, 16x DVD |
| Secondary optical drive | ✘ | ✘ | ✘ |
| Optical drive formats & DVD write speed (max) | N/A | N/A | N/A |
| Soundcard/channels | Integrated /5.1 | Integrated Realtek ALC655/5.1 | Integrated Realtek ALC658/5.1 |
| Speakers/type | Integrated in monitor | Logitech S100/2.0 | Creative MF0055/2.0 |
| Graphics type/memory | ATI Radeon 9550/256MB | Integrated ATI Xpress 200 (X300)/128MB | ATI Radeon X550/256MB |
| Screen type, size and (max resolution) | GNR TS700/17in TFT/ 1,280 x 1,024 | AMW M179D/17in TFT/ 1,280 x 1,024 | Viewsonic VE710b/17in TFT/ 1,280 x 1,024 |
| **OTHER INFORMATION** | | | |
| Modem/other hardware | Logitech Internet keybord | Floppy drive, Logitech Internet Pro keyboard and mouse | Hauppauge WinTV 88 TV-card, Microsoft keyboard and mouse |
| Network controller/speed(s) | Via Rhine II | Realtek RTL8139/10/100/1,000 | Realtek RTL8100C/10/100 |
| Operating system | Windows XP Home SP2 | Windows XP Home SP2 | Windows XP Media Center Edition 2005 SP2 |
| Bundled software | Open Office, Nero, Power DVD | Nero 6 Suite - Power DVD 6 | Microsoft Works 8, Roxio Easy Media Creator 7, Bullguard Internet Security |
| Standard warranty* | 1yr RTB; for 2yrs add £69 inc VAT | 1yr RTB | 1yr onsite, 2yrs RTB |
| **SCORES** | | | |
| Features | ★★★☆☆ | ★★★★☆ | ★★★★☆ |
| Performance | ★★★☆☆ | ★★★☆☆ | ★★★☆☆ |
| Value for money | ★★★☆☆ | ★★★★☆ | ★★★★☆ |
| **OVERALL** | ★★★☆☆ | ★★★★☆ | ★★★★☆ |

*RTB = return to base C&R = collect and return

| INTELLECT | MESH | PANRIX | PC NEXTDAY |
|---|---|---|---|
| Prodesk A64/3500s | Matrix Vector PCW | Magnum IQ 3700 | Zoostorm 9-5401 |
| £699 (£594.89) | £699 (£594.89) | £699 (£594.89) | £699 (£594.89) |
| 08701 225 590 | 08700 464 747 | 0870 027 1981 | Online only |
| www.intellect.uk.com | www.meshcomputers.com | www.panrix.co.uk | www.pcnextday.co.uk |
| | | | |
| AMD Athlon64 3500+ 2.21GHz | AMD Athlon64 X2 3800+ 2.01GHz | AMD Athlon64 3700+ 2.21GHz | AMD Athlon64 3500+ 2.21GHz |
| Gigabyte GA-K8N51GMF-9 | Asus A8N-E | Asus A8N-SLI | ECS Nforce4-939 |
| Nvidia Geforce 6100/Nforce 430 | Nvidia Nforce4 Ultra | Nvidia Nforce4 SLI | Nvidia Nforce4 |
| 512MB PC3200 DDR400 | 512MB PC3200 DDR400 | 1GB PC3200 DDR400 | 1GB PC3200 DDR400 |
| 2/2 | 2/2 | 2/2 | 2/2 |
| 2GB | 2GB | 2GB | 2GB |
| 4GB | 4GB | 4GB | 4GB |
| Western Digital WD2500JS | Maxtor 6L160M0 | Samsung SP2504C | Hitachi HDS722525VLSA80 |
| ✘ | ✘ | ✘ | ✘ |
| 250GB | 160GB | 250GB | 250GB |
| | | | |
| 3/2 | 4/3 | 4/4 | 4/3 |
| 1/1 | 2/2 | 2/3 | 1/2 |
| 2/1/0/1/0 | 3/1/2/2/0 | 3/2/0/1/0 | 3/1/0/2/0 |
| 2/0/0/1/0 | 2/0/2/2/0 | 3/1/0/1/0 | 2/0/0/2/0 |
| 6/1 | 8/0 | 8/2 | 6/4 |
| 1/1/2 | 0/1/2 | 1/1/2 | 1/1/2 |
| | | | |
| Pioneer DVR-110D | Sony DW-Q30A | Samsung SH-W162C | Philips DVR 1628P1 |
| 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD+R DL, 8x DVD-R DL, 16x DVD | 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD+R DL, 4x DVD-R DL, 16x DVD | 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 5x DVD+R DL, 4x DVD-R DL, 16x DVD | 16x DVD+/-R, 8x DVD+RW, 6x DVD-RW, 8x DVD+R DL, 4x DVD-R DL, 16x DVD |
| ✘ | ✘ | ✘ | ✘ |
| N/A | N/A | N/A | N/A |
| Integrated Realtek ALC880/7.1 | Integrated Realtek ALC850/7.1 | Integrated Realtek ALC850/7.1 | Integrated Realtek ALC655/5.1 |
| Integrated in monitor | Creative SBS/2.0 | Aopen MS-917/5.1 | Zoostorm 2176/2.1 |
| ATI Radeon X800GT/256MB | ATI Radeon X800GTO/128MB | Nvidia Geforce 6600GT/128MB | Nvidia Geforce 6600GT/128MB |
| Sharp LL173-GB/17in TFT/ 1,280 x 1,024 | Relisys TL565/15in TFT/ 1,024 x 768 | LG L1950SQ 8ms/19in/ 1,280 x 1,024 | AOC LM725/17.1in TFT/ 1,280 x 1,024 |
| | | | |
| 12-in-1 card reader, Microsoft Digital Media keyboard and mouse | V.92 modem, floppy drive | Logitech Cordless Internet Pro keyboard/mouse, floppy drive | 12-in-1 card reader |
| VSC 9201/10/100/1,000 | Nvidia Nforce/10/100/1,000 | Nvidia Nforce4/10/100/1,000 | Marvell 88E1111/10/100/1,000 |
| Windows XP Home SP2 | Windows XP Home SP2 | Windows XP Home SP2 | Windows XP Home SP2 |
| Open Office, AVG Antivirus | Microsoft Works 8.5, Cyberlink PowerDVD 5, Power2go 4, Power Producer 3, Power Director 3, Mediashow SE, Power DVD Copy, Power Cinema 4 | Ability Office Pro | Nero 6 |
| 1yr RTB; on site: £30 extra; 3yrs on-site £120 extra | 1yr on site (UK mainland only), 2yrs RTB | 1yr on site, 1yr C&R | 1yr RTB |
| | | | |
| ★★★½☆ | ★★★☆☆ | ★★★★½ | ★★★★☆ |
| ★★★★½ | ★★★★½ | ★★★★★ | ★★★★½ |
| ★★★½☆ | ★★★☆☆ | ★★★★★ | ★★★★☆ |
| ★★★½☆ | ★★★☆☆ | ★★★★★ | ★★★★½ |

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.

# Is Intel still inside?

The battle between AMD and Intel recently took another turn – this time in AMD's favour. Intel's shares took a tumble in January when it revealed that its financial results for the Christmas quarter had fallen below expectations. In contrast, AMD's shares leapt following a massive 45 per cent increase in revenue for the same period.

It's interesting to note that Intel specifically put the blame on disappointing sales of desktop processors, and if you look at the PCs in this group test you'll see that all but one of them was built around an AMD processor.

To be fair, AMD has long had a reputation for producing processors that provide good performance at relatively low prices, so when you're looking at a tight £699 price point you would expect AMD to dominate. Even so, AMD's virtual clean sweep – with six out of seven PCs that have 'AMD inside' – suggests that AMD is on a bit of a roll at the moment.

But let's not start writing the obituaries for Intel just yet. Its recent sales figures may have been disappointing, but they still came in at over $10b for the quarter, whereas AMD's sales were less than $2b.

So AMD may be doing well, but it's a long way from toppling Intel from the dominant position it has held for the past two decades.

Besides, in recent months Intel has very much been focusing on its new Core Duo chips, which are primarily designed for use in laptop PCs. But don't be surprised if the Core Duo starts to appear in desktop systems pretty soon.

Apple's already used it in the latest version of its consumer-oriented Imac, and the Core Duo is likely to feature strongly in Intel's Viiv platform ('Viiv' rhymes with 'alive').

This is yet another attempt to convince people to buy computers and use them in their front room as part of their home entertainment system. Like the Centrino brand that Intel developed for laptops, Viiv is a 'platform' rather than just a single processor.

A Viiv PC will contain an Intel processor – probably a Core Duo or the single-core version, the Core Solo – along with other features such as wireless networking and software designed to handle tasks such as beaming audio and video around your home.

So Intel is going through one of those tricky transitional phases at the moment, shifting the emphasis from its well-established Pentium processors to the new Core Duo and Solo and pushing new ideas such as Viiv.

It may have dropped its well-known 'Intel Inside' tagline, but you can be sure that Intel will be fighting back in 2006.

# Editor's Choice

**Editor's Choice** Panrix Magnum IQ 3700
**Recommended** PC Nextday Zoostorm 9-5401

Panrix Magnum IQ 3700

PC Nextday Zoostorm 9-5401

We were quite impressed by the sheer value for money offered by these £699 systems. A couple of years ago you could have paid that much just for the flat-screen monitor alone.

Now, though, you can take it for granted that £699 will get you a flat-screen monitor, along with a PC that – with one exception – will run at 2GHz or more, and include a DVD burner, surround-sound output, built-in Ethernet networking, Firewire connectivity and, in many cases, a full gigabyte of Ram and a 250GB hard disk that will take quite a while to fill up.

Even so, producing a complete PC system for £699 doesn't give you too much room to manoeuvre. There were signs of compromise in most of these machines, where the manufacturers had clearly cut back on performance or features in order to save money.

Mesh, for instance, had the most up-to-date processor in the form of the dual-core Athlon64 X2 3800+ that it used in its Matrix Vector system. That processor certainly had plenty of raw horsepower to draw on. However, Mesh had to cut back elsewhere – leaving the Matrix Vector with a mere 15in monitor and relatively skimpy Ram and hard disk sizes.

Ambros Direct chose to use a compact 'cube' chassis for its Shuttle SK21G. The compact design will appeal to many people who don't want a great big tower system sitting in their office or cluttering up their bedroom. But you'll have to accept lower performance levels and do without add-ons such as a proper set of external speakers.

Another slightly specialised system is Evesham's Axis SB, a PC that consciously puts its emphasis on multimedia features rather than on raw power. It may not have been the fastest PC in this group, but it was the only one to include both Windows Media Center software and a TV tuner card, so it's a very good choice if you want to use the PC as part of your home entertainment system.

However, two PCs in particular managed to strike a very good balance between price, performance and added features. The Zoostorm 9-5401 from PC Nextday deserves our Recommended award, thanks to a consistent set of performance results, plenty of Ram and hard disk space, and good audio and video connectivity. However, Panrix went one step further. Its Magnum IQ 3700 was the most consistent all-round performer, and was the only PC that also included a 19in monitor and a complete set of surround-sound speakers as well. In fact, it was the only system that didn't seem to show any obvious signs of compromise or cost-cutting, and therefore soon emerged as the obvious Editor's Choice. **PCW**

**'A couple of years ago you could have paid £699 just for the flat screen alone'**

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**Available Models :**
Blue Eye Pro
Blue Eye 2

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## ON TEST


**82** **01 Communique I'm In Touch Desktop Edition 5.10**
**83** **3am Labs Log Me In Pro 2.30.523**
**84** **Anyplace Control 2.12**
**85** **Citrix GotomyPC 5.0**
**88** **Laplink Everywhere 4**
**89** **Symantec PC Anywhere 11.5**

**90** Table of features
Connect for free
**93** Don't forget security issues
Editor's Choice


# Access your PC from anywhere

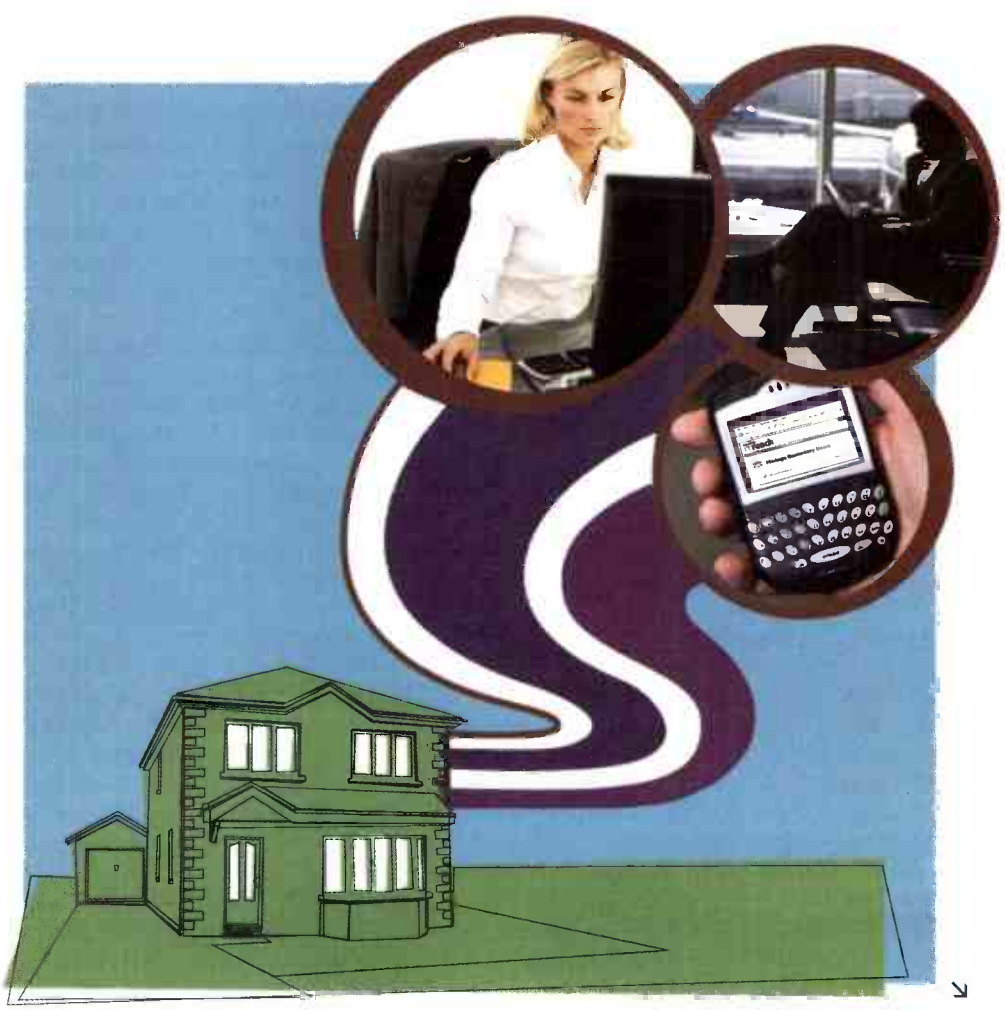
**You don't have to be in front of your PC to use it or work on your files. Paul Monckton tests six remote access software and services options that can give you more freedom**

**'These products are aimed at users who want to take the pain out of being in front of the wrong PC at the wrong time'**

Have you ever left a vital document at home and had to beg a family member to email it to you at the office? Or have you stayed late at work in order to wait for an important email to arrive, or use a piece of software you don't have installed at home? How much would you pay to have back the two hours you spent talking your partner through that obscure dialogue box on your home PC?

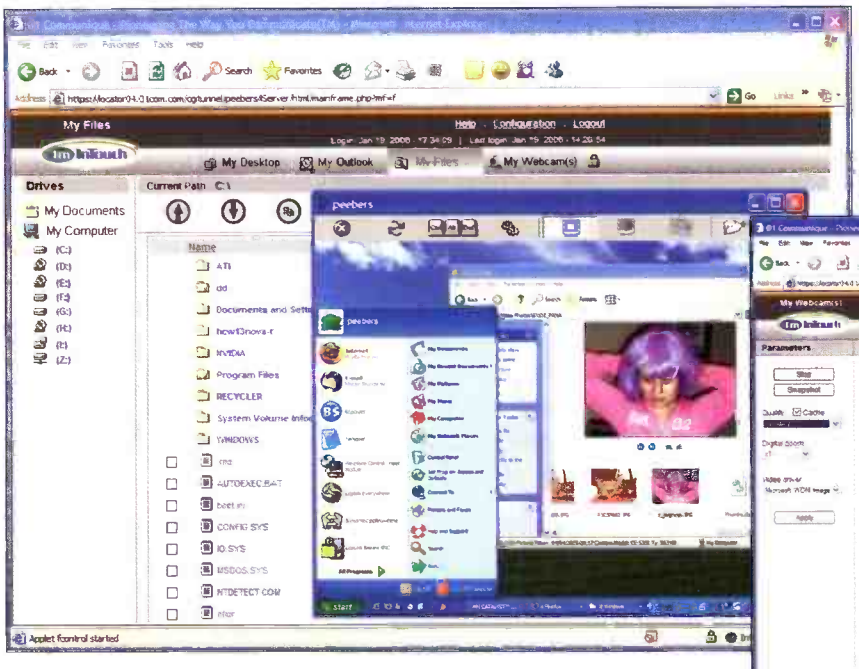
If these questions strike a chord with you, then you could be in the market for either a personal teleportation device, or failing that some remote access software. The six products we've reviewed in this group test all allow you to connect to a remote PC and use it almost as though you were sitting in front of it. Prices for remote access solutions range from nothing to several hundred pounds, depending on how serious you want to get. We're focusing on products aimed at individual users who want to take the pain out of being in front of the wrong PC at the wrong time.

The simplest package here offers a basic remote control function, albeit with secure encryption, while the most advanced provides tools for remote technical support, such as direct access to Windows system files and running process data. Between the two extremes are services giving you access from mobile devices, file sharing, and advanced file transfers with built-in data compression. If you're not sure which one is for you, that's just what we're here for, so read on.



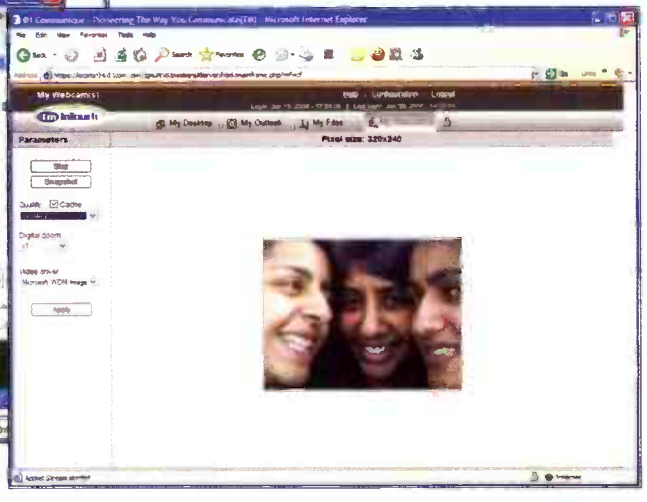
# 01 Communique I'm In Touch 5.10

**Price** From £5.65 per month (single PC) **Contact** www.01com.com



Left: I'm In Touch uses a web-based interface supporting remote control, file transfer, email and remote webcam viewing

Below: The remote webcam lets you view cameras connected to your remote PC



I'm In Touch Desktop Edition from 01 Communique is a browser-based remote access and control solution with support for remote email and wireless devices. In addition to standard PC remote control functions, I'm In Touch provides dedicated support for Outlook and Outlook Express on full-size PCs as well as PDAs and mobile phones with Internet connections.

By selecting My Outlook you can maintain full access to your host's email system, including Outlook's calendar and contact details. You also have the ability to compose emails remotely, but with attachments sent directly from your host PC. Most importantly, these functions are also available via a fast, compact user interface tailored for use on small mobile screens and they do not use a full remote control desktop. Attachments are processed on the host into a format that can be viewed remotely without the need for the application that created the files to be installed, so you can view documents such as Excel spreadsheets and pdfs on a mobile phone using just your browser.

Since you're interacting with your host PC in real time, all edits take place immediately without the need to sync up later. I'm In Touch can also send notifications to your mobile while you're disconnected from your host PC to let you know when new email has arrived.

Taking you one step further towards that 'being there' experience, I'm In Touch allows you to connect remotely to your host PC's webcam from a browser. You could use this for security or to add video communication to a user at your host PC without them having to perform any setup. Up to four cameras can be connected simultaneously.

Like Log Me In Pro, I'm In Touch can send invitations to guests to access your PC for online demos or for technical help. With I'm In Touch up to 10 guests can access your PC at a time, enabling you to give virtual online presentations and demonstrations.

I'm In Touch allows you to connect either directly or via 01 Communique's central communication server. The central server method is the easier of the two to set up, requiring no firewall or router configuration, but the direct connection method allows Lan connections to run at full Lan speeds. This is a distinct advantage when you want to access PCs on your local network and is therefore a very useful feature, but other products such as Log Me In Pro offer similar flexibility and can additionally manage direct connections automatically without the need for additional configuration by the user. By contrast it takes considerable effort to get I'm In Touch to run with direct connections.

The remote control function has a built-in file-transfer utility that runs on your local PC and is quite fast in operation, although it lacks any advanced replication and synchronisation facilities. You can also initiate file transfers without starting a remote control session, although this method doesn't support uploading. True remote printing is also available with support provided at the driver level.

Connecting from a PDA or mobile phone presents you with a slimmed-down version of the web interface which is tailored to small-screen, low-bandwidth connections. From here you can access all the functions of I'm In Touch except remote control, enabling you to get at your email, contacts and files while on the move. If you're sending email from your mobile phone, you can send attachments directly from your home PC.

## Verdict

**Pros** Integrated email, PDA and mobile compatibility; easy setup; remote webcam support

**Cons** No multi-monitor support; remote file access not quite as comprehensive as other products

**Features** ★★★★☆

**Ease of use** ★★★★☆

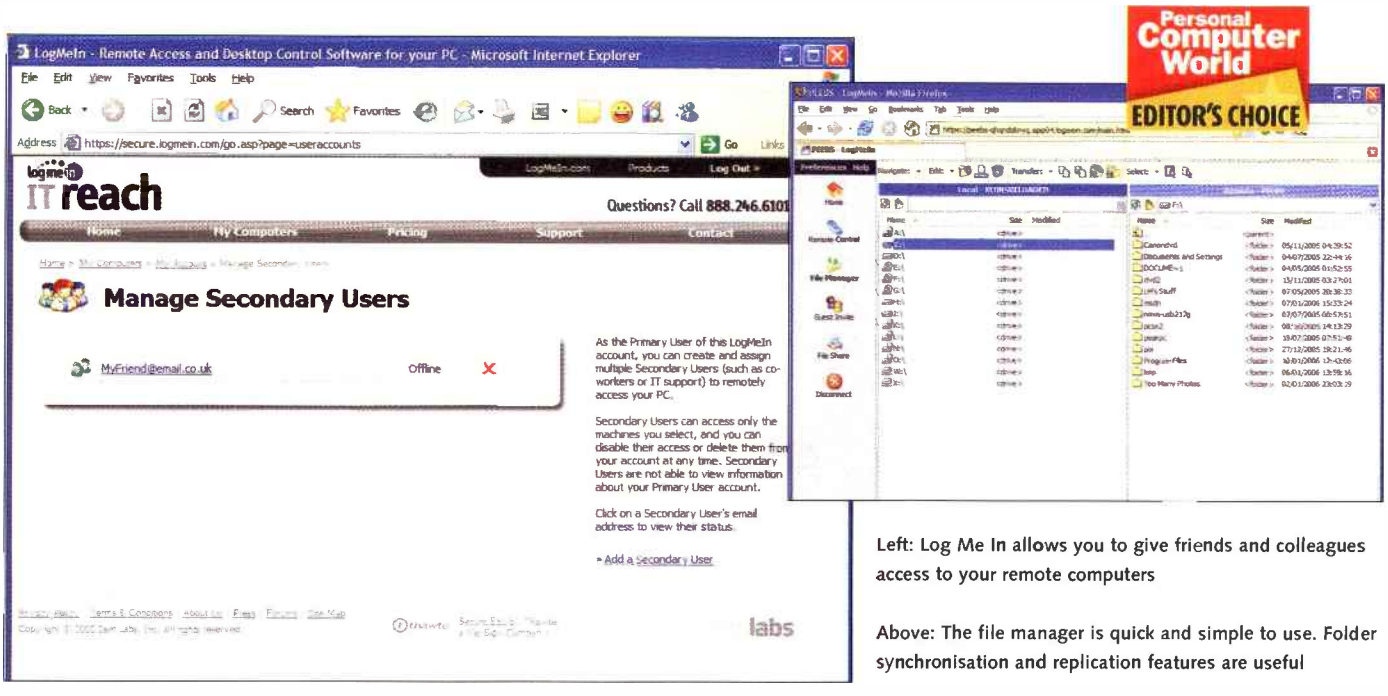
**Value for money** ★★★★☆

**Overall** I'm In Touch is easy to set up and offers solid remote control functionality and file transfers with PDA, mobile and dedicated Blackberry support. Remote webcam viewing provides a simple security feature

★★★★☆

# 3am Labs Log Me In Pro 2.30.523

**Price** From $12.95 per month (approx £7.37, single PC) **Contact** www.logmein.com




Left: Log Me In allows you to give friends and colleagues access to your remote computers

Above: The file manager is quick and simple to use. Folder synchronisation and replication features are useful

This Internet-based remote access service is incredibly easy to use. Log Me In Pro from 3am Labs takes next to no time to set up and you can start immediately using just your web browser.

Like GotomyPC and Laplink Everywhere, you use Log Me In Pro by connecting to an Internet-based server with your preferred browser. Simply set up an account and click on 'Add computer' to make your current PC available for remote access. At this point you can choose from Log Me In Pro, the version reviewed here; Log Me In IT Reach, which offers additional remote IT support functions; and Log Me In Free, which is a no-cost version with a reduced feature set.

Unlike other trial versions of remote control software, Log Me In Free does not expire and can be used as much as you like – nor are you required to provide your credit card details to sign up (Citrix/GotomyPC should take note!) The free version includes fully functional remote control and is one of those rare software packages that really does just work.

All the important functions are there: it can scale the remote desktop smoothly to fit your local viewing window. It's fast and, if your remote machine is on the same Lan as your client, it will communicate at the full speed of your Lan rather than the speed of your Internet connection.

If the remote machine has multiple monitors, Log Me In will cope with that too, allowing you to either swap between displays or view them as one large, contiguous desktop. Some other remote control applications simply ignore your second monitor, leaving you unable to access anything displayed on it – if you open a window and it opens on the second display you will simply 'lose' it.

Given that it's free, why would you want to upgrade? Though useful, the free version offers no easy way of transferring files, which is where Log Me In Pro comes in with a selection of useful additions.

An Explorer-style dual-pane file manager can be run independently of the remote control session. From here you can drag and drop files in both directions, as well as synchronise or replicate folders in a single action.

By enabling remote printing you can redirect remote print jobs to your current default printer on the local PC. There's nothing to configure and there are no drivers to install. Everything happens seamlessly and automatically. The file-sharing function allows you to create a secure link to any file on your PC which you can then send to a friend or colleague. They can then open the link in their browser and download the file directly from you.

If you want to use your PC to run a demo for a remote user, you can invite a guest to view or remotely control your system using a one-time, time-limited session. This can be sent in the form of an HTTPS link via email or an instant messaging application. Once they click on the link they gain supervised access to your system complete with whiteboard functions.

You can also set up secondary users for your Log Me In account, giving them access to any or all the computers you have set up without them having to purchase Log Me In Pro themselves.

Log Me In comes in versions to suit everyone from casual beginners to corporate IT professionals. And with such a good free version also available, there's no reason not to try it – and every reason for it to be our Editor's Choice.

## Verdict

**Pros** Very easy setup; works well over a Lan; allows guest users; wide range of versions

**Cons** No integrated email access; no dedicated login for handheld devices

**Features** ★★★★½

**Ease of use** ★★★★★

**Value for money** ★★★★½

**Overall** Log Me In Pro offers a good selection of features with a very simple and efficient browser-based interface. The free version is excellent too

★★★★★

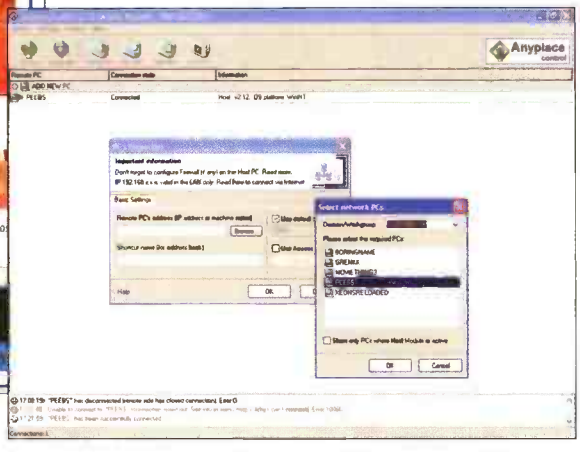
NETWORK ACCESS PROBLEMS SOLVED
Overcome Nat protection issues – page 147

# Anyplace Control 2.12

**Price** £10.50 for 2 PCs (one-off fee) **Contact** www.anyplace-control.com

Left: Anyplace Control offers simple and efficient remote control from a pre-installed admin module

Below: When operating over a Lan, Anyplace Control can browse the network for available hosts



Anyplace Control is a straightforward no-frills remote access solution. Best suited to users who will always connect from the same PC, its clean and simple interface is dedicated to remote control and offers no file transfers or extras such as email integration or PDA support.

It uses a similar remote access approach as Symantec's PC Anywhere. Software must be installed at both host and remote ends. This gives you the advantage of being able to connect directly between workstations on a Lan without having to go via Internet-based servers but has the drawback of a much more complicated setup procedure if you need to locate and access remote computers via the Internet.

To initiate a remote session you must install the client software on your local machine and set up a connection to the host. If you're connecting over a Lan, connection is very simple – just select the desired machines on your network using the built-in network browser. However, if you're connecting over the Internet and your host doesn't have a static IP address or domain name, you'll need to locate it using some sort of Dynamic Domain Name Service (DDNS).

Furthermore, if your PC is behind a router protected with network address translation (Nat), such as a home network router, you will have to configure port forwarding manually to enable remote connections from the Internet. Full instructions are provided, but this is not the kind of configuration we would expect home users to want to perform.

Once connected to your host PC, you have the option to connect in either full control or view-only modes, transfer clipboard data or turn off the remote PC. Even for a remote control-only solution, the features available with Anyplace Control seem rather thin: a remote file transfer utility would improve its usefulness by an order of magnitude, especially when you consider that file transfer is one of the main distinguishing features between the free and paid-for versions of competitor Log Me In, which offers remote control at no cost.

Strong encryption is included for all traffic, and IP filtering is provided at the host to grant access only from particular IP addresses or subnets, although there's no way to deny IP addresses on a similar basis. Full logging of connections is available too.

One major advantage of Anyplace Control is its price. Being based on a traditional licensing model, rather than an annual subscription, you can continue to use the software year after year for a low one-off fee. The disadvantage is that both client and server applications are tied to the PCs on which they are first installed, although you can migrate the application to a new PC.

This affords you none of the flexibility of a web-based solution, where you can connect from any convenient browser, but conversely it means Internet access is not required when accessing hosts across a Lan connection. This is both a more secure and autonomous solution. You'll still be able to use the software over the Lan if your Internet connection goes down and you're guaranteed not to be transmitting any sensitive information out of your home or office.

If you have well-defined requirements that involve static, point-to-point remote control connections, Anyplace Control will do the job admirably, but if that's all you want, you would do well to take a look at Log Me In Free before spending any money.

## Verdict

**Pros** Works over a Lan; not subscription-based; fast; low cost
**Cons** Short on features; no file transfer; tied to specific PCs

| | |
|---|---|
| **Features** | ★★☆☆☆ |
| **Ease of use** | ★★★☆☆ |
| **Value for money** | ★★★★★ |

**Overall** Simple, inexpensive and efficient but light on features. No file transfer and requires installation of client software

★★★☆☆

# Citrix GotomyPC 5.0

**Price** From £11.99 per month (single PC) **Contact** www.gotomypc.com

Left: All file transfer windows are displayed at the remote PC, making using them as slow as a remote control session

Above: Draw mode lets you annotate the remote screen to aid collaboration with the remote user

Recently updated to version 5.0, Citrix's popular, web-based remote access solution, GotomyPC, now boasts many new features, including faster performance, drag-and-drop file transfer and multi-monitor support.

Of the products reviewed here, GotomyPC is most similar in functionality to Log Me In Pro. Connection is via a central web-based server, where having logged in, you are presented with a list of your configured host computers. From this point on, the products start to differ – with GotomyPC you are plunged immediately into a remote control session. From here you can also initiate a realtime chat function, annotate the screen with virtual marker pens or attach a local printer to the remote session. You can choose from various screen modes including full-screen, scaled and windowed displays. If you select these screen modes while holding down the Shift key, various multi-monitor modes can be selected to take advantage of multiple displays on the host, the remote PC or both. This is an important feature if your host has multiple displays, as without it there is no way of accessing any menus that appear on the remote secondary monitor.

With a remote control session there's always a trade-off between image quality, speed and responsiveness. GotomyPC takes the guesswork out of managing these parameters by providing a slider than can be moved to any of six positions ranging from 'better speed' to 'better appearance'. As you move the slider, various cosmetic enhancements are turned on or off, with an explanation of what's happening beneath. This is much simpler to operate than individual checkboxes to toggle remote desktop wallpaper or font smoothing and so on.

One key area in which GotomyPC differs from other products is in the way file transfers and session settings are administered. All its interactive features, including the configuration menus and file transfer windows, are displayed at the host PC and operated via remote control. This means these functions run with the reduced speed and quality of a remote connection. Products such as Laplink Everywhere and Log Me In Pro provide local interfaces to file transfer and configuration, almost leaving remote control as a last resort. If all you want to do is transfer files to or from your home PC, you really shouldn't have to use an interactive remote control session. In its defence, GotomyPC's drag-and-drop file transfer is very easy to use and avoids having to navigate separate Explorer windows to transfer files when you're logged in.

You can print from a remote PC to your local printer, which is vital if the required applications aren't installed locally. Unfortunately, unlike Log Me In Pro, GotomyPC requires you to install the correct printer driver on the host machine before you can use it.

GotomyPC is very easy to set up. It's installed and configured directly from your web browser, giving you the flexibility to connect to your host PC from anywhere you have access to the Internet. If you're connecting from a Pocket PC or Windows Mobile device, a dedicated Pocketview client, designed for handheld devices, will install and run automatically.

If your main requirement is remote control and you want to be able to connect to your host from a number of locations, GotomyPC may be well suited to your needs. But if you want frequent access to email and file transfer, take a look at Log Me In Pro, Laplink Everywhere or I'm In Touch.

## Verdict

**Pros** Easy setup; works well through firewalls; can run from any browser
**Cons** Expensive; remote control file transfers

| | |
|---|---|
| **Features** | ★★★★☆ |
| **Ease of use** | ★★★★☆ |
| **Value for money** | ★★★☆☆ |

**Overall** Easy to set up and use, but file transfer and configuration not as good as some of its competitors. It's also pricey

★★★★☆

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| Home Max | upto 8Mbps | 50 : 1 | £24.95 inc VAT | £39.95 inc VAT |
| Office 500 | upto 512Kbps | 20 : 1 | £22.95 ex VAT | £31.99 ex VAT |
| Office 1000 | upto 1Mbps | 20 : 1 | £26.95 ex VAT | £49.99 ex VAT |
| Office 2000 | upto 2Mbps | 20 : 1 | £29.95 ex VAT | £69.99 ex VAT |
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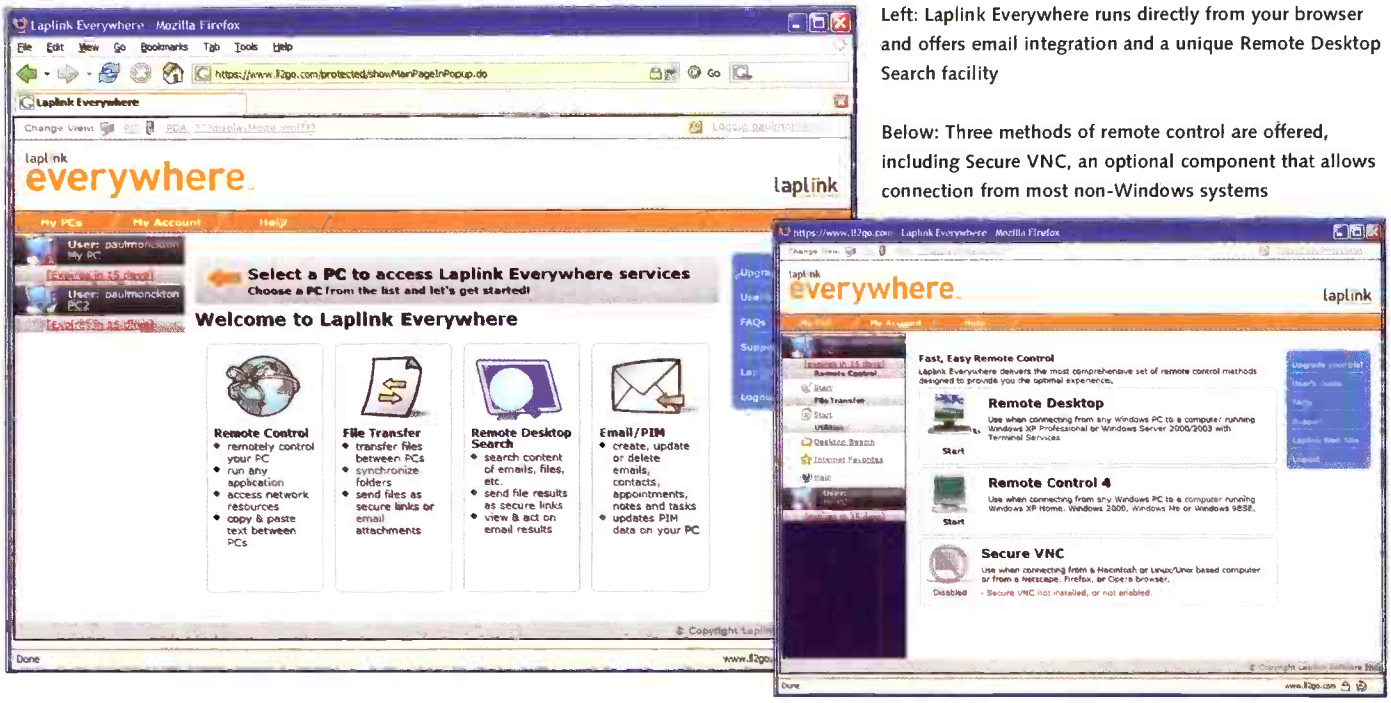
# Laplink Everywhere 4

Personal Computer World RECOMMENDED

**Price** From £5.82 per month (single PC, restricted remote control) **Contact** www.laplink.co.uk




Left: Laplink Everywhere runs directly from your browser and offers email integration and a unique Remote Desktop Search facility

Below: Three methods of remote control are offered, including Secure VNC, an optional component that allows connection from most non-Windows systems

Laplink Everywhere is a web-based remote access service with a difference. Although remote control is fully supported, its true power lies in the many ways you can access data on your remote PC quickly and efficiently.

Where Laplink Everywhere comes into its own is in providing very quick access to remote data, whether it's your Internet favourites, email or any other sort of data you have saved remotely. The opening menu contains several functions designed to help you get at the information you want without having to log in using remote control.

Internet favourites gives you direct access to remote Internet Explorer bookmarks on your local PC, while the Remote Desktop Search feature lets you run Google Desktop Search functions on the remote PC to find remote content almost instantaneously. You must have installed Google Desktop Search on the remote computer for this powerful feature to work. It lets you search for data using a simple, Google-like interface. Once Google has found your files you can click on them to have them sent to you via the built-in file transfer function. You can search within files, emails, web history and chat logs or all at the same time. This is much faster than using remote control to navigate your desktop and search for files using Windows Explorer.

Multiple file-transfer systems are provided: the familiar dual-pane, Explorer-like file manager which runs locally, plus web-based file transfer options. The dual-pane file manager is fast but lacks some of the more advanced features found in other packages, such as folder synchronisation and replication.

Web-based file transfers include the ability to send a secure file link to a friend, which will allow them to download an individual file of any size directly from your computer. You also get integrated support for Outlook and Outlook Express, which gives you access to the email, contacts and so on, on your remote PC via a high-speed, local interface.

The remote control service, though adequate, is possibly the weakest part of Laplink Everywhere. Three methods are provided and your choice depends on your operating system. If you're connecting from a Windows XP Professional or Windows Server 2000/2003 system with Terminal Services installed, select Microsoft's RDP protocol. For systems running Windows XP Home, 2000, ME or 98SE, the Remote Control 4 (RC4) protocol should be used.

It's a shame you're forced to make such decisions, especially as you must be able to differentiate between Professional and Home Editions of Windows XP.

If you're connecting from a Mac or Linux/Unix-based system or your browser isn't Internet Explorer, you must select the Secure VNC option.

None of these protocols support dual monitors, so if you're trying to control a system with more than one monitor installed, you won't be able to access anything displayed on the second screen.

The web interface has versions for both PC and PDA browsing. In PDA mode, remote control options are not available but all other remote services are, and in a more compact form. Remote Google Desktop Search is particularly useful on a PDA, allowing fast access to information that would be tricky to retrieve via remote control.

Two pricing schemes are available, the cheaper of which is limited to one hour of remote control use per month.

## Verdict

**Pros** Integrated email; Google Desktop Search and Internet favourites support

**Cons** Confusing remote control protocols; no dual-monitor support

**Features** ★★★★☆

**Ease of use** ★★★★☆

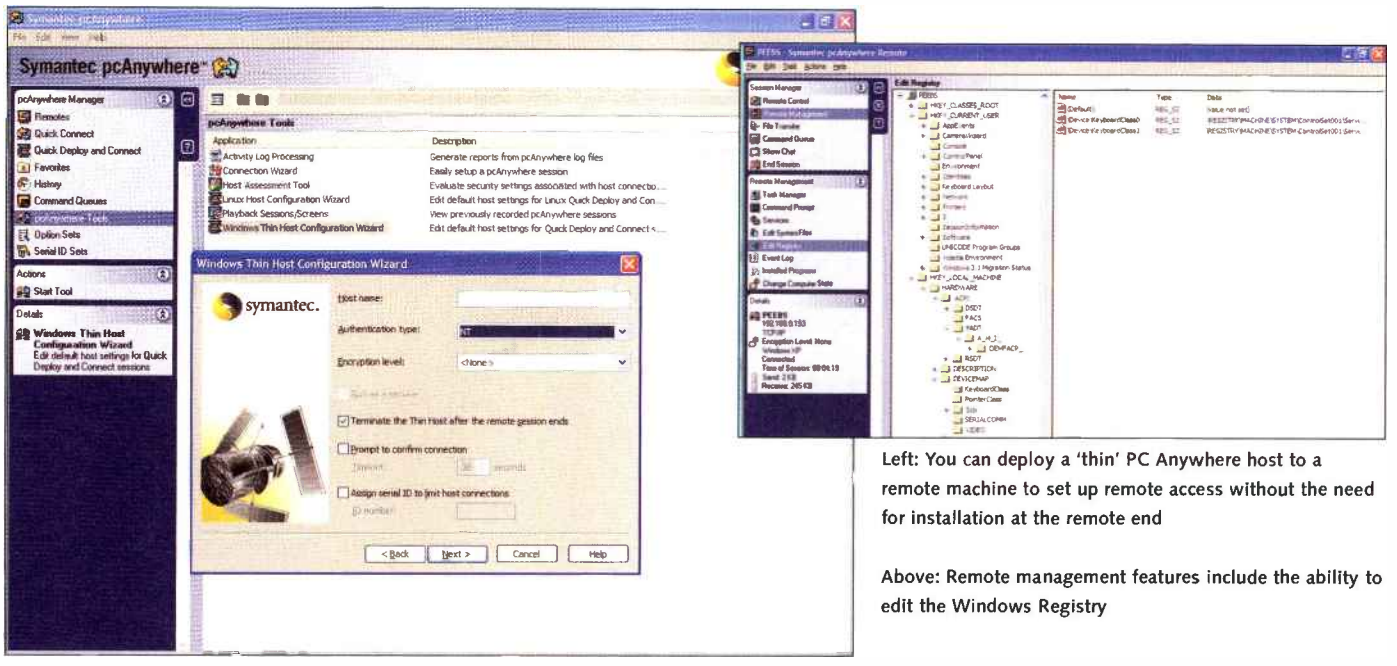
**Value for money** ★★★★☆

**Overall** An excellent tool for accessing all manner of data from a remote PC with minimum effort, although remote control functionality could be improved

★★★★☆

# Symantec PC Anywhere 11.5

**Price** £169.99 inc host & remote PC (£149.99 download), one-off fee **Contact** www.symantec.co.uk




Left: You can deploy a 'thin' PC Anywhere host to a remote machine to set up remote access without the need for installation at the remote end

Above: Remote management features include the ability to edit the Windows Registry

In many ways a radically different product from the others in this group test, PC Anywhere 11.5 is aimed squarely at business users. With a long heritage in direct PC-to-PC remote control, PC Anywhere is based on a host/client model that uses direct connection rather than a web-based intermediary.

Products such as GotomyPC and Log Me In Pro are designed for quick and easy access to the host from anywhere on the Internet, but PC Anywhere, like Anyplace Control, requires you to install a full software package from a CD at each end of the connection. You won't be nipping into an Internet café and phoning home with PC Anywhere, but if you connect regularly between the same PCs or want to provide online support to a number of regular clients, PC Anywhere is full of useful features.

Perfect for IT managers and helpdesk personnel, PC Anywhere provides many support functions not found in other products. A remote management menu provides direct local access to functions on the remote machine without having to use the remote control interface. These include the contents of the Windows Task Manager, direct editing of the remote Registry, system files and event log, as well as the ability to view the list of installed programs and run a remote command prompt. The remote control facility is very fast and automatically connects to multiple monitors at the remote end.

Both Windows and Linux are supported on host and remote systems, and you can connect from Pocket PC devices. The Java-based Web Remote facility allows you to connect from any Java-enabled browser, although its connection setup is functionally the same as the Windows client, using direct connections rather than via an Internet service.

A total of 13 authentication types provide flexible and rigorous security in a variety of environments, including 256bit AES encryption, NT Domain and Active Directory Services. It will also support the Windows Preinstallation Environment and can deploy the host agent program remotely to Linux or Windows systems that don't have PC Anywhere installed. Using the packager application, you can bundle preconfigured connection settings with the client, enabling users to connect to their required systems with no need for setup.

For a standard Internet connection you need to know the IP address or host name of the PC to which you're trying to connect. Included in the package is a 90-day free trial for DynIP's DDNS service, which will allow users with dynamic IP addresses to connect to their PCs using their own domain name instead. Free alternatives to this service are also available. You'll need to configure any firewalls to allow incoming connections at the remote end and possibly configure more advanced options such as port forwarding.

If you're connecting to a system on a local network, clicking the 'New remote' icon will cause PC Anywhere to search automatically for available systems, making discovery and connection simple. PC Anywhere isn't restricted to TCP/IP connections; you can use a modem, direct cable, CAPI 2.0 ISDN, Netbios and SPX.

PC Anywhere 11.5 is not for novices, nor is it appropriate if you simply want to connect between home and office. It's an advanced solution that comes into its own in a support or admin environment where you will be supporting multiple client PCs. It will save time and effort with its integrated remote deployment and management features.

## Verdict

**Pros** Excellent remote control and remote support facilities; remote deployment

**Cons** Requires host and client installation; tricky for novices to configure

**Features** ★★★★★

**Ease of use** ★★★½☆

**Value for money** ★★½☆☆

**Overall** A very powerful product that's great for managing multiple PCs remotely, but it's not for novices

★★★½☆

## Remote access software

| MANUFACTURER | 01 COMMUNIQUE | 3AM LABS | ANYPLACE CONTROL SOFTWARE |
|---|---|---|---|
| | | Personal Computer World EDITOR'S CHOICE | |
| Product | I'm In Touch Desktop Edition 5.10 | Log Me In Pro 2.30.523 | Anyplace Control 2.12 |
| One-off price per PC | N/A | N/A | £10.50 (min 2 PCs) (1) |
| Single PC licence per month | £5.65 | $12.95 (approx £7.37) | N/A |
| Single PC licence per year | £56.76 | $69.95 (approx £39.83) | N/A |
| Two-PC licence per month | £10.80 | $19.90 (approx £11.33) | N/A |
| Two-PC licence per year | £107.90 | $119.90 (approx £68.28) | N/A |
| Three-PC licence per month | £16.20 | $29.85 (approx £17) | N/A |
| Three-PC licence per year | £161.85 | $179.85 (approx £102.41) | N/A |
| URL | www.01com.com | www.logmein.com | www.anyplace-control.com |
| Free version available | ✘ | ✔ | ✘ |
| Free trial available | ✔ | ✔ | ✔ |
| **REMOTE CONTROL** | | | |
| Full-screen view | ✔ | ✔ | ✔ |
| Screen size scaling | ✔ | ✔ | ✔ |
| Turn on/off remote wallpaper | ✘ | ✔ | ✘ |
| Disable host keyboard and mouse | ✔ | ✔ | ✘ |
| Blank host monitor | ✔ | ✔ | ✘ |
| Text-based chat | ✘ | ✔ | ✘ |
| Remote-to-local printing | ✔ | ✔ | ✘ |
| Whiteboard mode | ✘ | ✔ | ✘ |
| Quality settings for remote control | ✔ | ✔ | ✔ |
| Copy and paste between remote and local PCs | ✔ | ✔ | ✔ |
| Send Ctrl & Alt & Del to remote PC | ✔ | ✔ | ✔ |
| Multiple monitor support | ✘ | ✔ | ✘ |
| Remote hardware and software inventory | ✘ | ✘ | ✘ |
| **FILE TRANSFER** | | | |
| File transfer | ✔ | ✔ | ✘ |
| Local file transfer and configuration windows | ✔ | ✔ | ✘ |
| File transfer compression | ✔ | ✔ | N/A |
| Explorer-style file manager | ✔ | ✔ | ✘ |
| Folder synchronisation | ✘ | ✔ | ✘ |
| Folder replication | ✘ | ✔ | ✘ |
| Folder compare | ✘ | ✘ | ✘ |
| **OTHER FEATURES** | | | |
| Remote webcam support | ✔ | ✘ | ✘ |
| Email integration | ✔ | ✘ | ✘ |
| Lan support | ✔ | ✔ | ✔ |
| Can connect without Internet connection | ✘ | ✘ | ✔ |
| Invite guests via email to control your computer | ✔ (up to 10) | ✔ | ✘ |
| Share individual files via email invitation | ✘ | ✔ | ✘ |
| **SECURITY** | | | |
| User-specific permissions | ✘ | ✔ | ✘ |
| IP filtering | ✘ | ✔ | ✔ |
| View access logs | ✔ | ✔ | ✔ |
| User installable SSL certificates | ✘ | ✔ | ✘ |
| Data encryption type | 128bit SSL | RSA, 2,048bits, AES256-SHA 256bits | RC4-like |
| **BROWSER SUPPORT** | | | |
| Internet Explorer | ✔ | ✔ | ✔ |
| Firefox | N/S | ✔ | N/S |
| Opera | N/S | N/S | N/S |
| Netscape | ✔ | ✔ | N/S |
| **PLATFORM SUPPORT** | | | |
| Windows 98/ME/NT/2000/XP/2003 Server support | ✔/✔/✔/✔/✔/✔/✔ | ✔/✘/✔/✔/✔/✔/✔ | ✔/✔/✔/✔/✔/✔/✔ |
| PDA client support | ✔ | ✔ | ✘ |
| Blackberry support | ✔ | ✘ | ✘ |
| Macintosh host support | ✘ | ✘ | ✘ |
| Linux host support | ✘ | ✘ | ✘ |
| **SCORES** | | | |
| Features | ★★★★☆ | ★★★★☆ | ★★☆☆☆ |
| Ease of use | ★★★★☆ | ★★★★★ | ★★★☆☆ |
| Value for money | ★★★★☆ | ★★★★☆ | ★★★★★ |
| **OVERALL** | ★★★★☆ | ★★★★★ | ★★★☆☆ |

NOTES: (1) Price reduces with increasing number of PCs (2) Prices for restricted/unlimited remote control

| CITRIX | LAPLINK | SYMANTEC |
|---|---|---|
| | Personal Computer World RECOMMENDED | |
| GotomyPC 5.0 | Laplink Everywhere 4 | PC Anywhere 11.5 |
| N/A | N/A | £169.99 (£149.99 online) host and remote |
| £11.99 | £5.82/£8.17 (2) | N/A |
| £107.99 | £29.32/£64.51 (2) | N/A |
| £17.99 | £11.63/£16.33 (2) | N/A |
| £159.99 | £58.63/£93.94 (2) | N/A |
| £19.99 | £11.63/£16.33 (2) | N/A |
| £239.97 | £58.63/£93.94 (2) | N/A |
| www.gotomypc.com | www.laplink.co.uk | www.symantec.co.uk |
| ✘ | ✘ | ✘ |
| ✔ | ✔ | ✘ |
| ✔ | ✔ | ✔ |
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| ✔ | ✘ | ✘ |
| ✔ | ✔ | ✔ |
| ✘ | ✘ | ✔ |
| 128bit AES | 128bit SSL | RC4, 256bit AES |
| | | |
| ✔ | ✔ | ✔ |
| N/S | N/S | N/S |
| N/S | N/S | N/S |
| ✔ | N/S | N/S |
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| ✔/✔/✔/✔/✔/✔ | ✔/✔/✔/✔ ✔/✔ | ✔/✔/✔/ /✔/✔ |
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| ✘ | ✘ | ✘ |
| ✘ | ✘ | ✔ |
| | | |
| ★★★★½ | ★★★★☆ | ★★★★★ |
| ★★★★½ | ★★★★½ | ★★★½☆ |
| ★★★½☆ | ★★★★½ | ★★½☆☆ |
| ★★★★ | ★★★★☆ | ★★★½☆ |

# Connect for free

For every piece of software you pay for, there's usually a way of achieving the same thing for free, and remote access is no exception. If you're prepared to put up with the lack of phone support and put in a little effort, there are many ways you can control your PC from afar and keep your money in your pocket.

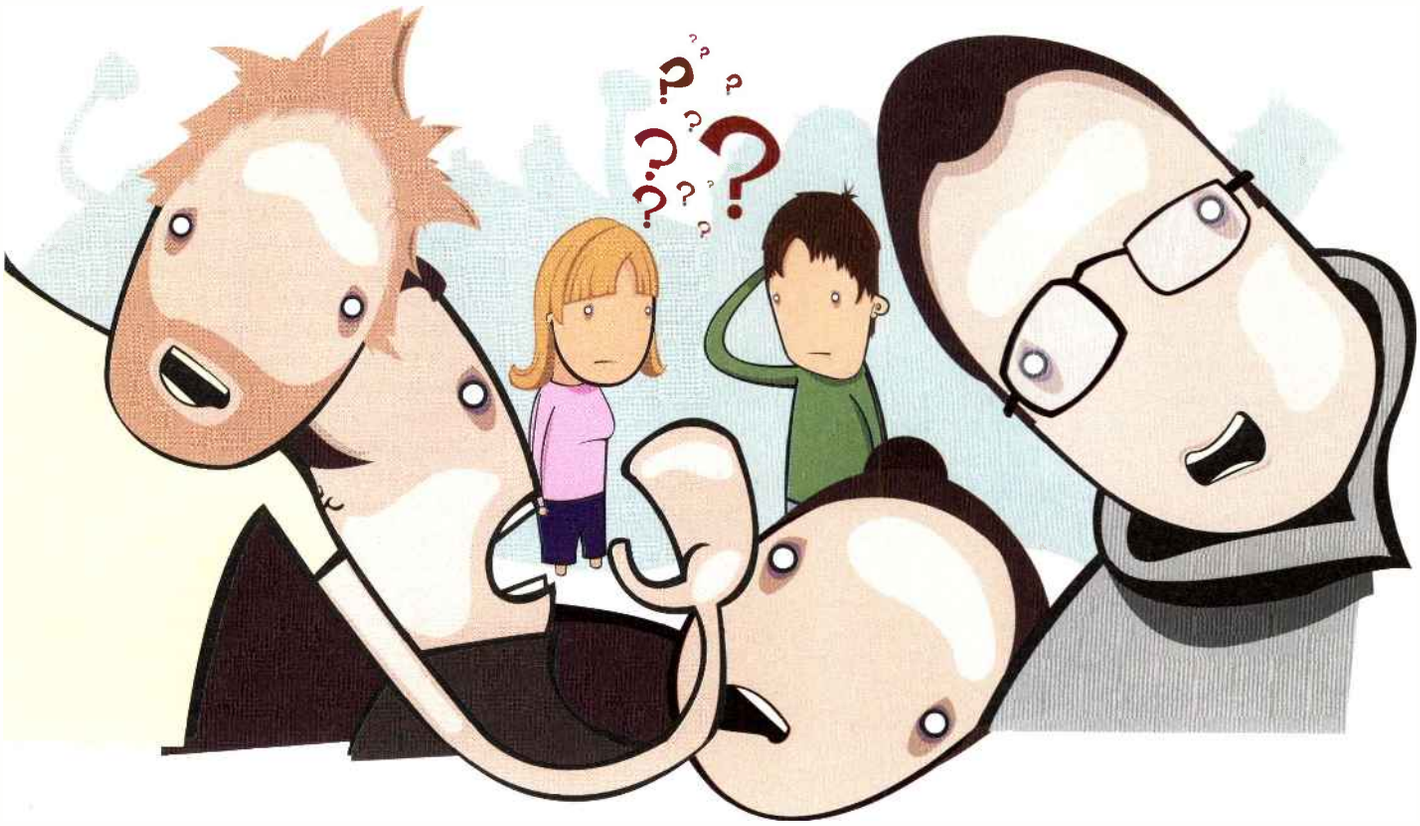
If you run Windows XP Professional, you already have Microsoft's Remote Desktop software. The Remote Desktop Protocol (RDP) allows remote control connections to a suitably equipped computer and has clients available for most versions of Windows, plus browser-based versions and variants that run on Linux. Windows Server OSs can allow multiple simultaneous remote connections but XP Pro will allow only a single connection, and with the session at the host PC disconnected. This means you can't interact with a user at the remote end by sharing their desktop.

The Remote Desktop version shipped with XP Pro supports, among other features, audio redirection, remote printing and the ability to use your local disks as though they were connected at the remote end. Laplink Everywhere uses RDP as its main way of providing remote control, augmenting it with firewall navigation and easy setup as well as its other convenient remote access features.

If you don't have Windows XP Pro, there are still other free options available. One of the most popular is Virtual Network Computing (VNC), which has been around as open-source software since 1998 and runs on a wide range of platforms including various versions of Windows, Mac OSX, Linux, MS-Dos and even older ones such as the Commodore Amiga. If you're running a VNC server, you'll be able to connect to it from just about anything. The free version of VNC is rather limited and does not support encryption or file transfers. However, other versions, such as TightVNC, do. Tight VNC is also free to use and adds many enhancements including more efficient data compression and local cursor handling while maintaining compatibility with the original VNC servers.

RDP and VNC require some knowledge of networking to get them running. If you want to connect over the Internet, you may have to deal with changing (dynamic) IP addresses and firewall issues.

Most vendors of remote access software are keen to offer free trials, so for an urgent one-off remote connection to fix a friend's PC, you can get them to sign up for whichever package you're using. Log Me In goes one stage further in providing a free version of its remote control solution, which is an ideal starting point, as it comes with all the ease of setup provided by a web-based service.



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# Don't forget security issues

The convenience of being able to access your PC remotely can be a great boost to productivity, but today the Internet is a dangerous place and you don't want to open up your PC to just anybody. Similarly, if you're planning on using your work PC to call home or vice versa, your company's IT department may have some serious words to say on the matter.

All the remote access programs and services we've reviewed in this group test use various levels of data encryption. This is to ensure that no user names or passwords travel across the Internet in plain text and, furthermore, to make sure that communications cannot be effectively intercepted.

Two commonly used encryption systems found in remote control software are Secure Sockets Layer (SSL) and the Advanced Encryption Standard (AES). SSL is very commonly used on the Internet for secure communications. You've probably used it when accessing secure web pages in online shops. URLs that start with 'https' rather than 'http' are using a combination of SSL and HTTP to protect your personal details as they are transmitted to the vendor. The protocol is endorsed by many credit card companies for ecommerce.

AES is a newer encryption standard and is used by the US Government for secure communications. The maximum-strength version of AES uses 256bit keys and is supported in this form by Log Me In Pro and PC Anywhere to provide industrial-strength security.

While your communications are unlikely to be intercepted, it's still important to use passwords that would be difficult to guess. Mixtures of upper and lower-case letters and numbers should be used – memorable nonsense words can also be a good idea. If your remote control package supports IP filtering, you can allow or disallow individual or ranges of IP addresses explicitly. For example, you could configure your home PC to accept connections only from your office and nowhere else on the Internet.

If you want to use remote access software at work, you'll normally have to gain the permission of your IT department. Your connection to the outside world could be seen as a serious and perhaps disciplinary matter. Rather than waiting for incoming communications, most Internet-based remote access solutions work by making outgoing connections to a server that brokers the incoming connection requests from the remote user. Corporate firewalls are usually less strict about outgoing connections than incoming ones, so these remote access services can usually negotiate their way around your company's defences.

Luckily, the software vendors are aware of this and some provide information specifically to help you gain permission from your IT manager. If enough people in your company need remote access, corporate versions of the packages are available that can be centrally administered by your IT department.

You can find more detailed security information for two of the packages reviewed here in the links below.

### Resources

**GotomyPC:**
https://www.gotomypc.com/downloads/pdf/m/GoToMyPC_Personal_Security_White_Paper.pdf
**Log Me In Pro** https://secure.logmein.com/wp_lmi_security.pdf

# Editor's Choice

**Editor's Choice** 3am Labs Log Me In Pro 2.30.523
**Recommended** Laplink Everywhere

3am Labs Log Me In Pro 2.30.523

Laplink Everywhere

Remote access software is all about convenience and increased productivity and should require as little user effort as possible. If you need to retrieve a file from your work PC, it should be as simple as copying it from one local folder to another. If you need remote access to an application on your home PC, it should operate just as though you were sitting in front of it at home.

To deserve an award, the software must be easy to install and require no knowledge of networking or firewalls. If you want to help someone fix a PC problem, they shouldn't need advanced computing skills.

PC Anywhere is powerful with top-notch support tools for skilled and professional users, especially in business environments, but its price and scope are far above what is required for typical small-business or home use. At the other end of the scale, Anyplace Control is simple and effective if the number of PCs you want to connect between is small and well defined.

Our Recommended award goes to Laplink Everywhere, which offers features that make accessing data on your home PC quick and easy. Integration with email and Google Desktop Search, together with a standalone dual-pane file transfer utility, means most of the time you'll be able to avoid using a remote control session. Unfortunately, the remote control function isn't as good as some other offerings. A one-year subscription to Laplink Everywhere 4 with remote control limited to one hour a month costs only £29.32, making it better value than its direct competitors. If you want to feel smug, buy this and run Log Me In Free at the same time to add the remote control functions for nothing.

Our Editor's Choice winner is Log Me In Pro, which takes only moments to set up and connect. It doesn't require your credit card details before you start using it and if you don't want to pay for the full version, you can keep using the remote control-only version for free.

If your remote and home PCs are on the same network it'll use your Lan connection at full speed. File transfers and configuration are managed on your local PC, and remote printing is set up automatically without the need for driver installation. Even over the Internet, its remote control is fast. Multiple monitors are supported, as is smooth window scaling. Log Me In is available in versions ranging from the simple but effective free ones, to those that can perform full remote diagnostics without the remote user having to sign up for the service. **PCW**

# Travel light with a tablet

**If you work on the move, lighten the load with one of these devices, tested by Leo Waldock**

Despite Microsoft investing heavily in them, tablet PCs haven't had an easy ride. However, if used in the right environment, they can be incredibly useful. All tablets have a pen-based input system that uses an electromagnetic digitiser panel behind the screen to detect the movement of the tablet's stylus. This makes them ideal for handwriting recognition. There are two main types: the hybrid (or convertible) and the slate. A hybrid tablet looks similar to a conventional notebook and houses a keyboard, usually with the disadvantage of being fairly heavy. The slate style, however, lacks a keyboard and is usually far lighter and more portable, which points to the very heart of what a tablet is all about. It's notebook technology that is used in conjunction with Windows XP Tablet PC Edition 2005, to give you a whole new way of working.

Here we look at five of the best tablets currently available for business users.

## Acer Travelmate C202TMi

**Price** £1,409 **Contact** www.acer.co.uk **Overall** ★★★☆☆

Where most convertibles use a pivot that allows the screen to twist round and lie back down, the Acer Travelmate C202TMi has a sliding mechanism that looks as though it was copied from a deckchair. This convertible tablet is simple to use and holds the screen at a good natural viewing angle, providing enough support to prevent screen shake when you type. The 12.1in screen is the clearest and brightest in this round-up, but we feel there's no need to include Geforce Go6200 graphics adapter; an integrated Intel 915G chip is adequate for a tablet.

We got a horrible shock when our battery tests reported a life of 32 minutes, which hardly gives you enough time to check your email, let alone give a presentation. However, further investigation showed that Acer supplies two batteries with this model; a small three-cell 2,000mAh unit for those occasions when you won't be far from a mains cable, and a bigger six-cell 4,800mAh battery for proper mobile working. Acer can supply a second six-cell Mediabay battery as an optional extra.

The layout of the Acer is excellent, with a dual-layer Lite-on DVD writer on the left side, as well as an SD slot, PC Card slot, Lan and modem ports. On the back there's a docking station connector and on the right are the audio jacks, three USB, a mini Firewire and a VGA port.

The downside is that the Acer weighs in at a fairly hefty 2.45kg, which will discourage mobile working.

## Fujitsu Siemens Lifebook P1510

**Price** £1,385 **Contact** www.fujitsu-siemens.co.uk **Overall** ★★★★☆

Fujitsu Siemens claims the Lifebook P1510 is the world's lightest convertible tablet, and there's plenty of technology packed into the 1kg chassis. It looks like a conventional notebook, but the screen measures 8.9in, so everything is scaled down in size.

The screen, which is bright and clear, has a resolution of 1,024 x 600 and gives an unusual aspect ratio of 17:10. This makes it feel narrow when you're using the tablet in portrait mode.

Five buttons sit at the bottom right and assist general navigation. During testing, we found the response to stylus and mouse clicks a little slow – this is probably thanks to the lethargic 1.2GHz processor. This Ultra Low Voltage model has 2MB of cache, but the 400MHz FSB and low clock speed really hold it back.

The mouse buttons are a bit rudimentary and the keyboard has a conventional layout, but is very small so larger fingers may have problems.

You get a fair amount of hardware included in the price. There's an external dual-layer DVD writer that connects using two USB ports (one for communication and one for power), and a port replicator, which also acts as a support when you are typing. The software package is basic, but includes Corel Grafigo – a paint application specific to Windows XP Tablet Edition that costs about £80.

One minor complaint is that the diminutive chassis can't accommodate a PC Card slot; instead you get a Compact Flash alternative. Niggles aside, the P1510 is a small and well-designed tablet that impressed us a great deal.

# HP Compaq tc4200 PV984ET

**Price** £1,175 **Contact** www.hp.com/uk **Overall** ★★★★

The neutral looks, superb mouse buttons and Trackpoint controller of the HP Compaq tc4200 series will no doubt appeal to business users.

This PV984ET model uses a fast 1.86GHz Pentium M processor with 512MB of DDR2 memory and a 60GB hard drive. While it's priced at an attractive £1,175, it is clear HP Compaq hopes you will lay out extra cash on some accessories. There's no optical drive supplied as standard, so you'll require either a USB Multibay II or another external drive to make use of the recovery CDs or the versions of Sonic Recordnow 7 and Intervideo WinDVD 5 – both are included in the software package. You may also consider buying the HP Docking Station, which raises the back of the tc4200 to give a more natural feel when you are typing.

The HP Wireless Assistant button on the left side enables and disables wireless and Bluetooth in a single operation, which is another tick in the box for business users who don't want to mess around in System Properties before a flight.

Spinning the screen round and laying it down flat results in the display automatically switching to portrait mode. There's a button at the base of the screen specifically intended for presentations. This is to open the application of your choice and select a suitable power scheme.

The HP is the lightest of the three big tablets in this round-up, but still weighs over 2kg so you'll soon tire of carrying it wherever you go.

# Motion Computing LS800

**Price** £1,351 **Contact** www.motioncomputing.com **Overall** ★★★★

Motion Computing's LS800 is the only slate tablet in this round-up, meaning it doesn't have a built-in keyboard. Instead, it's intended to be used solely with the stylus. You can also control the LS800 with the two microphones that work as a dual array and offer both acoustic echo cancellation and noise suppression to reduce background sounds.

The chassis is 22.1mm thick, so Motion has had to work to cram in all the components while maintaining battery life and keeping the price down. This has led to compromises, such as the processor only running at 1.2GHz and just 256MB of Ram. The 20GB capacity of the hard drive is limiting and the 8.4in screen with a resolution of 800 x 600 may be too small for some.

Performance-wise, the slow processor results in a notably slow Windows start-up. However, once it's up and running the tablet responds briskly enough during non-intensive applications.

Most tablets have a button to toggle the screen from portrait to landscape but, with the Motion, you jog the screen around through 90° at a time. Four button presses gets you back to where you started, which gives you the option of choosing whether you want the control buttons at the top, bottom, left or right.

Motion supplies a cradle to prop up the LS800 for easy viewing, or you can lay it nearly flat which is a great assistance when writing.

As a notebook the Motion LS800 would be a failure, but as a tablet it is a stunning success.

# Toshiba Tecra M4

**Price** £1,291 **Contact** www.toshiba.co.uk **Overall** ★★★½

The Toshiba Tecra M4 has the largest screen in this group test with a high resolution of 1,440 x 1,050. Impressive though this is, the downside is that the screen shakes on its pivot when you type in notebook mode. You get no such problems when you use the Toshiba as a tablet, but the 2.75kg weight means that it is impractical to carry the M4 around for extended periods of time – the best way to use the Tecra M4 is in tablet mode while it is on your desk.

Toshiba has included a long list of features including an internal optical drive and an array of microphones, aimed at VoIP (Voice over IP) telephony, rather than the voice-control feature of Tablet XP.

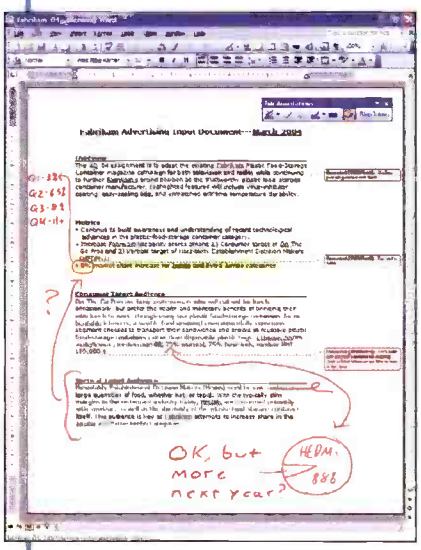
We had an issue with one of the Toshiba Easyguard features. The 60GB hard drive has a shock sensor that protects your data, but merely sliding the tablet across a desk causes a pop-up reporting that the disk head had been parked to avoid damage. We cancelled the message and started to type and the message popped up again repeatedly so we checked the 'Do not report' box and were not troubled any more, although the protection continued behind the scenes.

To our mind this sums up the Toshiba's mixed personality quite neatly. It's a relatively small notebook that would suit the business users (Pentium M, wireless, Gigabit Lan, Bluetooth), but it has tablet features bolted on that raise the cost by £300 or so. Unfortunately it's not much use as a tablet, and you can get a far better notebook for the same price.

FOR THE BEST TABLET PRICES go to www.pcw.co.uk/bestprices

## Windows XP Tablet PC Edition

At first sight, the Tablet PC Edition of Windows XP looks very familiar. It is heavily based on Windows XP Professional, but has an extra layer of software to handle the unique features of a tablet, including the pen-based input system. The software is tightly integrated with the hardware, so it is supplied as an OEM product and is not available to retail customers.



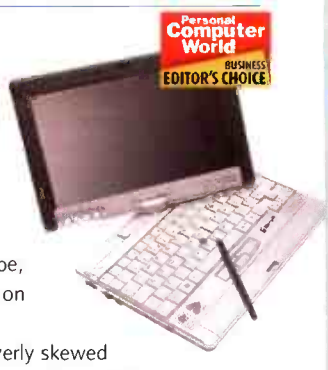

A tablet is designed to be used on the move so most models support Wifi, Bluetooth and infra-red. Microsoft has added a feature called Grab and Go to Windows XP Tablet, which ensures that the tablet and its software will perform flawlessly even if you pull the network cable out of the back and take your tablet for a walk. Some connections won't tolerate this sort of treatment, so Windows XP Tablet doesn't support legacy serial, parallel or PS/2 ports.

One of the best-performing features of XP Tablet Edition is the handwriting recognition. Even with an untidy scrawl, it's able to intelligently translate what you've written into text.

If you're unconvinced, head down to your local PC store and ask to try one out.

# Editor's Choice

## Editor's Choice Fujitsu Siemens Lifebook




Of the five tablet PCs tested in this round-up, the only real loser was the Toshiba Tecra M4, which is large and too heavy to use on the move, and suffers from screen shake when you type, making it awkward to use on your desk.

The HP Compaq is cleverly skewed towards the business user who gives plenty of presentations, while the Acer has a bright screen and an innovative mechanism to assist the transition from notebook to tablet.

We were impressed by the Motion, as its slate form factor and tiny size make it incredibly easy to use as a mobile device, but the outright winner is the Fujitsu Siemens Lifebook P1510, which receives an Editor's Choice award, as it strikes a superb balance between the usability of a small notebook and the innovative features of a tablet. **PCW**

## Tablet PCs

| MANUFACTURER | ACER | FUJITSU SIEMENS | HP COMPAQ | MOTION COMPUTING | TOSHIBA |
|---|---|---|---|---|---|
| Model | Travelmate C202TMi | Lifebook P1510 | tc4200 PV984ET | LS800 | Tecra M4 |
| Price inc VAT | £1,409 | £1,385 | £1,175 | £1,351 | £1,291 |
| URL | www.acer.co.uk | www.fujitsu-siemens.co.uk | www.hp.com/uk | www.motioncomputing.com | www.toshiba.co.uk |
| **HARDWARE SPECS** | | | | | |
| Processor | 1.7GHz Pentium M | 1.2GHz Pentium M ULV | 1.86GHz Pentium M | 1.2GHz Pentium M ULV | 1.73GHz Pentium M |
| Memory quantity/type | 512MB/DDR2 | 512MB/DDR2 | 512MB/DDR2 | 256MB/DDR2 | 512MB/DDR2 |
| Hard disk size | 80GB | 60GB | 60GB | 20GB | 60GB |
| Screen size | 12.1in | 8.9in | 12.1in | 8.4in | 14.1in |
| Native resolution | 1,024 x 768 | 1,024 x 600 | 1,024 x 768 | 800 x 600 | 1,440 x 1,050 |
| Built-in keyboard | ✔ | ✔ | ✔ | ✘ | ✔ |
| Number of USB2/Firewire pots | 3/1 | 2/0 | 3/0 | 2/0 | 3/1 |
| PC Card slots | PC Card Type II | Compact Flash | PC Card Type II | None | PC Card Type II |
| Wifi/Bluetooth/infra-red | 802.11b/g/✔/✔ | 802.11a/b/g/✔/✘ | 802.11a/b/g/✔/✔ | 802.11b/g/✔/✔ | 802.11a/b/g/✔/✔ |
| Optical drive | Internal DVD writer | External DVD writer | None | None | Internal combo drive |
| Graphics card | Geforce Go6200 64MB | Intel i915GM | Intel i915GM | Intel i915GM | Geforce Go6200 64MB |
| Bundled peripherals and software | None | Port replicator, Corel Grafigo | Sonic Recordnow 7, Intervideo WinDVD 5 | Port replicator | Microsoft Onenote 2003 |
| Dimensions in mm (w x d x h) | 315 x 35.3 x 238 | 232 x 34.5 x 167 | 285 x 34 x 235 | 227 x 22.1 x 170 | 328 x 36.9 x 289.7 |
| Weight | 2.45kg (with 4800mA battery) | 1kg | 2.15kg | 1kg | 2.75kg |
| Battery life tested by PCW | 32 minutes with 2,000mA battery, 1 hour 43 minutes with 4,800mA battery | 1 hour 46 minutes | 1 hour 40 minutes | 2 hours | 1 hour 22 minutes |
| **SCORES** | | | | | |
| Features | ★★★★☆ | ★★★★☆ | ★★★★☆ | ★★★☆☆ | ★★★★☆ |
| Ease of use | ★★★☆☆ | ★★★★☆ | ★★★☆☆ | ★★★★☆ | ★★☆☆☆ |
| Value for money | ★★★☆☆ | ★★★★☆ | ★★★★☆ | ★★★☆☆ | ★★★☆☆ |
| **OVERALL** | ★★★☆☆ | ★★★★☆ | ★★★★☆ | ★★★★☆ | ★★★☆☆ |

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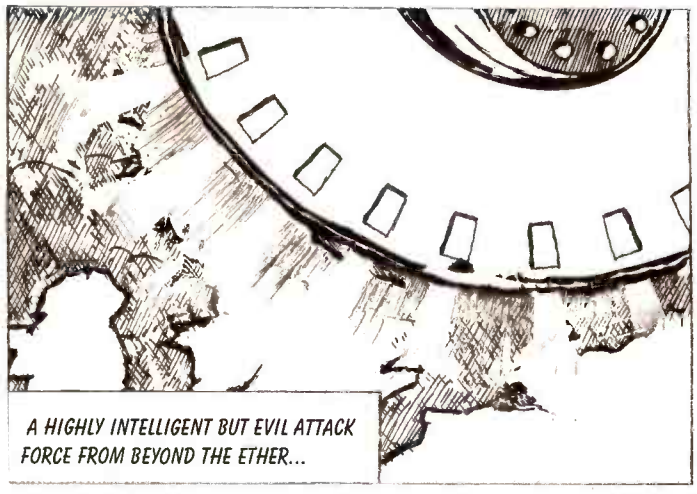


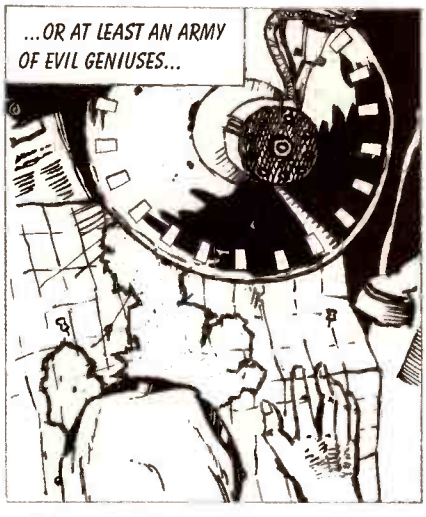


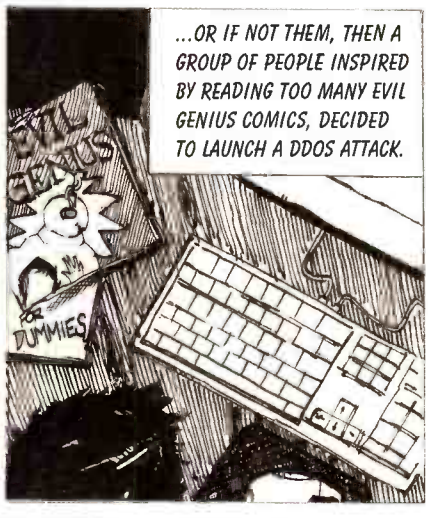

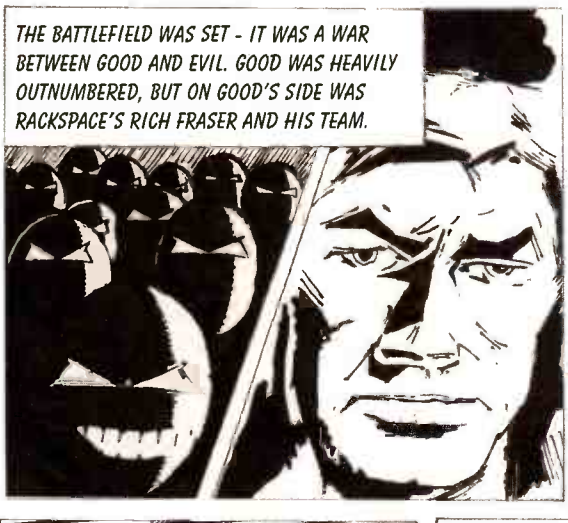

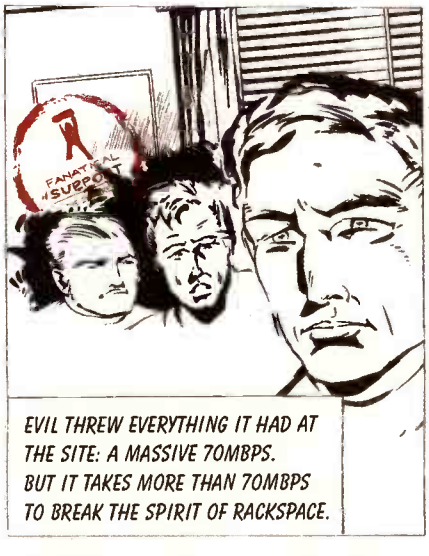


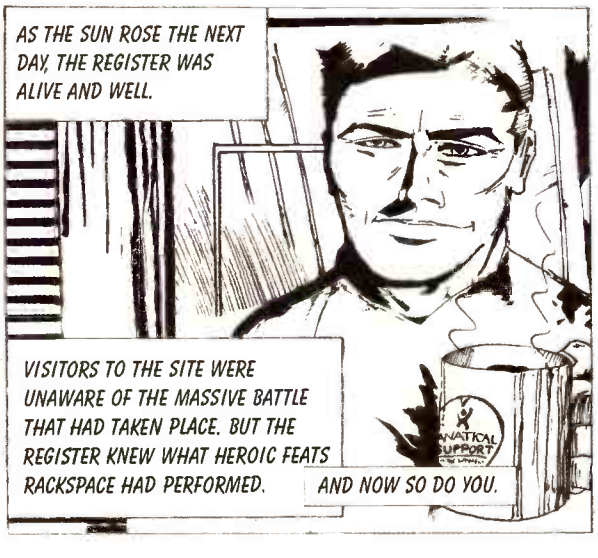


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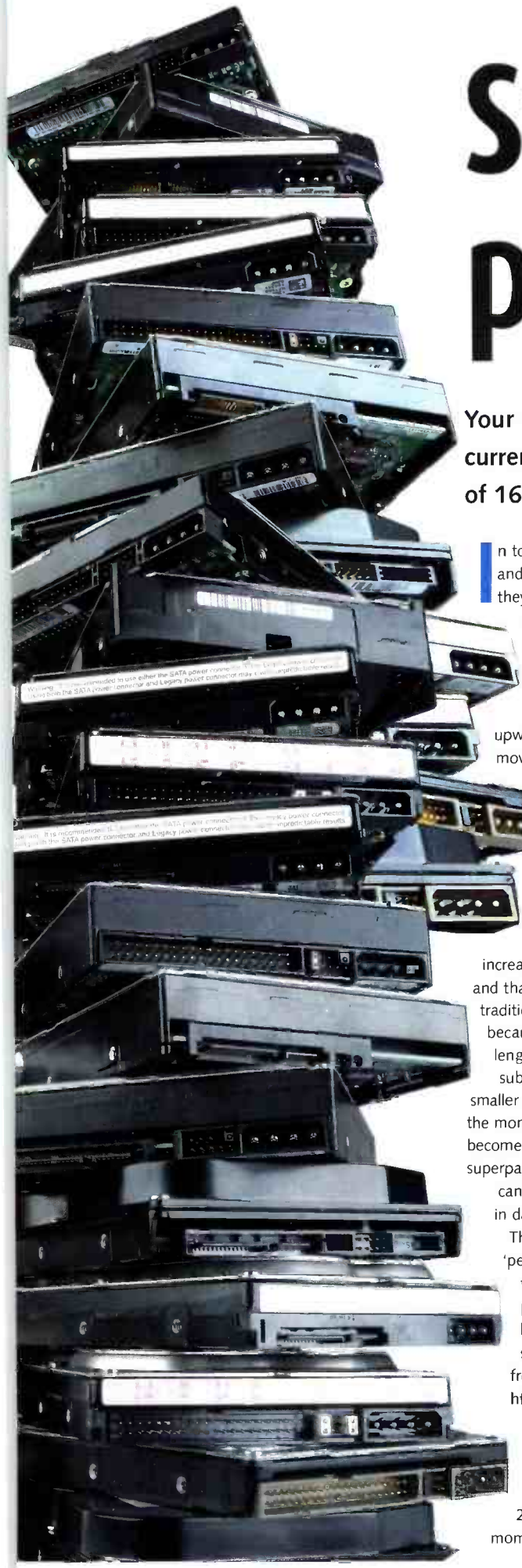


# Storage piled high

**Your ultimate hard disk reference guide: get to grips with current technology as Manuel Masiero tests the performance of 163 drives; and find out about future innovations**

In today's market, drives may be fast and excellent value but, technically, they've reached their limits. The terabyte border can only be crossed by new storage methods.

Hardware fanatics accepted this grudgingly: while only a few years ago hard disk capacities were shooting upwards all the time, there's been no further movement for over a year. 500GB of storage space is the current yardstick – and seems likely to remain so for some time. The guilty party is the recording method currently used by hard disks.

In order to store a whole terabyte on the hard disk, rather than the current 500GB limit, a dramatic increase in data density would be needed, and that increase is simply not possible with traditional 'longitudinal recording' (so called because the magnetic particles are laid out lengthwise end-to-end on the disk's substrate). The higher the data density, the smaller the magnetised particles need to be, and the more unstable their magnetic properties become. Below a certain size (known as the superparamagnetic limit), the magnetic charges can randomly reverse or disappear, resulting in data loss.

The way around this is to use 'perpendicular recording', a new technique that effectively turns the magnetic particles on their ends to allow them to be stacked more densely on the disk's surface (check out the Flash animation from Hitachi explaining the technology at http://tinyurl.com/6d7c9). According to Hitachi, a data density of up to 230Gbits per square inch can be achieved – more than twice as much as today. This would, for example, allow 20GB capacity Microdrives; at the moment they are limited to 6GB.

## The future's vertical

The first drives to use perpendicular recording have been announced by Seagate, Toshiba and Hitachi. The technical details look promising: for example, Seagate is shipping the 2.5in Momentus 5400.3 laptop hard disk series with up to 160GB capacity, compared to the previous largest 120GB models.

However, until the widespread adoption of the new technology, the manufacturers are content to limit themselves to looking after their existing products and small-format innovations. To illustrate this, while new 3.5in hard disks, such as the Western Digital (WD) Caviar SE16, are no faster than the competition, Seagate has significantly upped the speed stakes in the 2.5in segment. Its Momentus 7200.1 has a data transfer rate of 37.1Mbytes/sec, which is better than some 3.5in disks.

## Cheap as chips

A hard disk's average data transfer rate reflects its expected performance when reading and writing. On average, 3.5in disks achieve transfer rates of between 44 and 50Mbytes/sec. This makes them more than sufficient for use in office PCs. You can hardly go wrong when buying a 7,200rpm 3.5in drive: good disks such as the 160GB WD Caviar 1600BB can be bought for less than £60.

If you need maximum performance in a 3.5in drive, you can go for something like Maxtor's Diamondmax 10, Samsung's Spinpoint P120 or even the 10,000rpm WD Raptor. The higher transfer rates possible with these drives results in better performance with applications that constantly require large volumes of data. These include video-editing and database software, as well as some of the latest PC games, where fast drives really improve loading times. Drives such as the Samsung Spinpoint V80, which runs at 5,400rpm, are not much cheaper than their 7,200rpm counterparts; however, at around 30Mbytes/sec throughput, they lag behind in terms of performance. On the other hand, the

Samsung Spinpoint P80 Sata family is quieter than some 2.5in drives, which makes it ideal for a living room computer or quiet office PC.

### Does Sata 2 make sense?

Parallel ATA (Pata) and Serial ATA (Sata) don't differ much in price or performance. For a single disk, Sata has an advantage in terms of architecture: there's no master-slave topology as with Pata drives, just one drive per connector. In addition, they use thinner cables and plugs than Pata drives, which produces better air circulation and lower temperatures inside the PC casing. Pata or Sata interfaces only begin to come under strain with multiple disks. Use Sata if you need more performance, for example in a Raid 0 system. Pata reaches its limit at 133Mbytes/sec bandwidth, but Sata can handle up to 150Mbytes/sec, and Sata-2 doubles that; you'll never achieve this level of throughput with a single drive of any kind.

**'The terabyte border can only be crossed by new storage methods'**

### The smaller, the slower

2.5in hard disks, normally used in laptops, are also highly recommended for transportable external drives. Compact 2.5in drives such as the Fujitsu MHV-AT series already go up to data capacities of 120GB and can, as in the case of the Seagate Momentus 7200.1, achieve eye-catching transfer rates of up to 37.1Mbytes/sec. But for a 120GB 2.5in drive you'll have to fork out well over £150.

Microdrives, because of their high capacities (up to 6GB) and Compact Flash interface, are often used in professional cameras. The smallest hard disks (1.8in) are most often found in portable multimedia devices such as mp3 players. At around 15Mbytes/sec, they can't match the transfer rates of their 2.5in counterparts, but some models such as the Toshiba MK6006GAH can store up to 60GB of data.

### How we tested

The table below shows the measured figures for average transfer rate, access time and noise level. Average transfer rates and access times were measured using the utility HD Tune (www.hdtune.com), and maximum noise levels (during full-stroke disk access) measured in a portable anechoic chamber. Access times and noise levels were measured twice, once with automatic acoustic management (AAM) set to maximum and once with AAM disabled where possible. AAM can reduce the noise of a drive significantly, but it can also slow down data access times. **PCW**

| MANUFACTURER AND MODEL | GUIDE PRICE (£) | CAPACITY/BUFFER SIZE/ SPIN SPEED/NUMBER OF PLATTERS/NUMBER OF HEADS/ DATA DENSITY PER SQ INCH | AVERAGE TRANSFER RATE (MBYTES/SEC) | ACCESS TIME IN MS (WITH/WITHOUT ACOUSTIC MANAGEMENT*) | NOISE IN DBA (WITHOUT/WITH ACOUSTIC MANAGEMENT*) |
|---|---|---|---|---|---|
| **1.8IN PARALLEL ATA DRIVES AND MICRODRIVES** | | | | | |
| Toshiba GAH MK6006GAH | 142.16 | 60GB/2MB/4,200rpm/ 2/2/30Gbit | 16.9 | 18.8 | 21.6 |
| Toshiba GAL MK3006GAL | 82.24 | 30GB/2MB/4,200rpm/1/2/30Gbit | 16.9 | 19.2 | 20.6 |
| Hitachi Travelstar C4K60 HTC426020G7CE00 | 65.79 | 20GB/2MB/4,200rpm/1/2/33Gbit | 16.1 | 20.3 | 24 |
| Hitachi Travelstar C4K60 HTC426030G7CE00 | 78.71 | 30GB/2MB/4,200rpm/1/2/33Gbit | 16.1 | 20.3 | 24 |
| Hitachi Travelstar C4K40 HTC424020F7AT00 | 68.14 | 20GB/2MB/4,200rpm/1/2/29Gbit | 15.7 | 20.5 | 22.4 |
| Hitachi Travelstar C4K40 HTC424040F9AT00 | 99.86 | 40GB/2MB/4,200rpm/2/4/29Gbit | 15.7 | 20.5 | 22.4 |
| Hitachi Microdrive3K4 HMS360402D5CF00 | 99.95 | 2GB/128KB/3,600rpm/1/1/57Gbit | 5.7 | 20.5 | 24.6 |
| Hitachi Microdrive3K4 HMS360404D5CF00 | 109.95 | 4GB/128KB/3,600rpm/1/2/57Gbit | 5.7 | 20.5 | 24.6 |
| **2.5IN PARALLEL ATA DRIVES** | | | | | |
| Seagate Momentus 7200.1 ST910021A | 191.51 | 100GB/8MB/7,200rpm/2/4/81Gbit | 37.1 | 15.5/15.5 | 30.4/29.6 |
| Seagate Momentus 7200.1 ST980825A | 136.29 | 80GB/8MB/7,200rpm/2/3/81Gbit | 37.1 | 15.5/15.5 | 30.4/29.6 |
| Hitachi Travelstar 7K100 HTS721010G9AT00 | 146.86 | 100GB/8MB/7,200rpm/2/4/81Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Hitachi Travelstar 7K100 HTS721060G9AT00 | 95.16 | 60GB/8MB/7,200rpm/2/3/66Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Hitachi Travelstar 7K100 HTS721080G9AT00 | 117.49 | 80GB/8MB/7,200rpm/2/4/66Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Hitachi Travelstar E7K100 HTE721010G9AT00 | 151.56 | 100GB/8MB/7,200rpm/2/4/81Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Hitachi Travelstar E7K100 HTE721060G9AT00 | 97.51 | 60GB/8MB/7,200rpm/2/3/66Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Hitachi Travelstar E7K100 HTE721080G9AT00 | 122.19 | 80GB/8MB/7,200rpm/2/4/66Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Seagate Momentus 5400.2 ST9120821A | 163.81 | 120GB/8MB/5,400rpm/2/4/98Gbit | 32.1 | 16.3 | 28.2 |
| Fujitsu MHV-AH MHV2040AH | 56.39 | 40GB/8MB/5,400rpm/1/2/104Gbit | 30.8 | 18.2/20.4 | 26.7/26.1 |
| Fujitsu MHV-AH MHV2080AH | 89.29 | 80GB/8MB/5,400rpm/2/4/104Gbit | 30.8 | 18.2/20.4 | 26.7/26.1 |
| Hitachi Travelstar E7K60 HTE726040M9AT00 | 85.76 | 40GB/8MB/7,200rpm/2/4/50Gbit | 30.5 | 14.9/16.0 | 28.2/27.2 |
| Hitachi Travelstar E7K60 HTE726060M9AT00 | 102.21 | 60GB/8MB/7,200rpm/2/4/50Gbit | 30.5 | 14.9/16.0 | 28.2/27.2 |
| Hitachi Travelstar E5K100 HTE541040G9AT00 | 57.56 | 40GB/8MB/5,400rpm/1/2/70Gbit | 29.3 | 17.8/18.6 | 25.3/25.2 |
| Hitachi Travelstar 5K100 HTS541010G9AT00 | 105.74 | 100GB/8MB/5,400rpm/2/4/86Gbit | 28.1 | 17.9/18.1 | 28.0/26.1 |
| Hitachi Travelstar 5K100 HTS541040G9AT00 | 54.04 | 40GB/8MB/5,400rpm/1/2/70Gbit | 28.1 | 17.9/18.1 | 28.0/26.1 |
| Hitachi Travelstar 5K100 HTS541060G9AT00 | 78.71 | 60GB/8MB/5,400rpm/2/3/70Gbit | 28.1 | 17.9/18.1 | 28.0/26.1 |
| Hitachi Travelstar 5K100 HTS541080G9AT00 | 82.24 | 80GB/8MB/5,400rpm/2/4/70Gbit | 28.1 | 17.9/18.1 | 28.0/26.1 |
| Hitachi Travelstar 5K80 HTS548020M9AT00 | 48.16 | 20GB/8MB/5,400rpm/1/1/70Gbit | 28 | 19.0/19.9 | 26.9/25.5 |
| Hitachi Travelstar 5K80 HTS548040M9AT00 | 55.21 | 40GB/8MB/5,400rpm/1/2/70Gbit | 28 | 19.0/19.9 | 26.9/25.5 |
| Hitachi Travelstar 5K80 HTS548060M9AT00 | 65.79 | 60GB/8MB/5,400rpm/2/3/70Gbit | 28 | 19.0/19.9 | 26.9/25.5 |
| Hitachi Travelstar 5K80 HTS548080M9AT00 | 82.24 | 80GB/8MB/5,400rpm/2/4/70Gbit | 28 | 19.0/19.9 | 26.9/25.5 |
| Toshiba GAX MK1032GAX | 131.59 | 100GB/16MB/5,400rpm/2/4/68Gbit | 27.8 | 17.4 | 27.9 |
| WD Scorpio WD400VE | 56.39 | 40GB/8MB/5,400rpm/1/2/80Gbit | 27.7 | 17.9/26.7 | 23.4/23.2 |
| WD Scorpio WD600VE | 69.31 | 60GB/8MB/5,400rpm/2/3/80Gbit | 27.7 | 17.9/26.7 | 23.4/23.2 |
| WD Scorpio WD800VE | 86.94 | 80GB/8MB/5,400rpm/2/4/80Gbit | 27.7 | 17.9/26.7 | 23.4/23.2 |
| Samsung Spinpoint M40 MP0402H | 47.88 | 40GB/8MB/5,400rpm/0/60Gbit | 25.6 | 17.1/19.9 | 25.0/24.8 |
| Samsung Spinpoint M40 MP0804H | 62.95 | 80GB/8MB/5,400rpm/0/60Gbit | 25.6 | 17.1/19.9 | 25.0/24.8 |
| Hitachi Travelstar 4K40 HTS424020M9AT00 | 48.16 | 20GB/2MB/4,200rpm/1/1/70Gbit | 22.5 | 19.4/20.8 | 24.0/22.6 |
| Fujitsu MHV-AT MHV2040AT | 56.39 | 40GB/8MB/4,200rpm/1/2/104Gbit | 22.4 | 19.8/22.1 | 25.0/24.8 |
| Fujitsu MHV-AT MHV2060AT | 65.79 | 60GB/8MB/4,200rpm/1/2/104Gbit | 22.4 | 19.8/22.1 | 25.0/24.8 |
| Fujitsu MHV-AT MHV2080AT | 79.89 | 80GB/8MB/4,200rpm/2/4/104Gbit | 22.4 | 19.8/22.1 | 25.0/24.8 |

* Where only one figure is shown, acoustic management is not configurable on these drives

| MANUFACTURER AND MODEL | GUIDE PRICE (£) | CAPACITY/BUFFER SIZE/ SPIN SPEED/NUMBER OF PLATTERS/NUMBER OF HEADS/ DATA DENSITY PER SQ INCH | AVERAGE TRANSFER RATE (MBYTES/SEC) | ACCESS TIME IN MS (WITH/WITHOUT ACOUSTIC MANAGEMENT*) | NOISE IN DBA (WITHOUT/WITH ACOUSTIC MANAGEMENT*) |
|---|---|---|---|---|---|
| **2.5IN PARALLEL ATA DRIVES (CONTINUED)** | | | | | |
| Fujitsu MHV-AT MHV2100AT | 108.09 | 100GB,8MB/4,200rpm/2/4/104Gbit | 22.4 | 19.8/22.1 | 25.0/24.8 |
| Fujitsu MHV-AT MHV2120AT | 161.47 | 120GB/8MB/4,200rpm/2/4/104Gbit | 22.4 | 19.8/22.1 | 25.0/24.8 |
| Toshiba GAS MK1031GAS | 112.79 | 100GB/8MB/4,200rpm/2/4/80Gbit | 22.3 | 18.7 | 23.8 |
| Hitachi Endurastar J4K30 HEJ423020F9AT00 | 140.99 | 20GB/8MB/4,172rpm/1/2/57Gbit | 16.8 | 19.8 | 25.8 |
| Hitachi Endurastar J4K30 HEJ423030F9AT00 | 178.59 | 30GB/8MB/4,172rpm/1/2/57Gbit | 16.8 | 19.8 | 25.8 |
| Hitachi Endurastar J4K20 HTA422020F9ATJ0 | 131.59 | 20GB/8MB/4,172rpm/1/2/38Gbit | 14.4 | 20.4/22.6 | 25.4/24.3 |
| **2.5IN SERIAL ATA DRIVES** | | | | | |
| Seagate Momentus 7200.1 ST910021AS | 211.49 | 100GB/8MB/7,200rpm/2/4/81Gbit | 37.1 | 15.5/15.5 | 30.4/29.6 |
| Seagate Momentus 7200.1 ST980825AS | 143.34 | 80GB/8MB/7,200rpm/2/3/81Gbit | 37.1 | 15.5/15.5 | 30.4/29.6 |
| Hitachi Travelstar 7K100 HTS721010G9SA00 | 150.39 | 100GB/8MB/7,200rpm/2/4/81Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Hitachi Travelstar 7K100 HTS721060G9SA00 | 96.34 | 60GB/8MB/7,200rpm/2/3/66Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Hitachi Travelstar 7K100 HTS721080G9SA00 | 121.01 | 80GB/8MB/7,200rpm/2/4/66Gbit | 35.8 | 15.5/15.7 | 30.8/28.2 |
| Seagate Momentus 5400.2 ST9120821AS | 193.86 | 120GB/8MB/5,400rpm/2/4/98Gbit | 32.1 | 16.3 | 28.2 |
| Fujitsu MHV-BH MHV2040BH | 57.56 | 40GB/8MB/5,400rpm/2/3/82Gbit | 30.1 | 18.2/20.5 | 28.5/27.7 |
| Fujitsu MHV-BH MHV2060BH | 72.84 | 60GB/8MB/5,400rpm/2/3/82Gbit | 30.1 | 18.2/20.5 | 28.5/27.7 |
| Fujitsu MHV-BH MHV2080BH | 88.11 | 80GB/8MB/5,400rpm/2/3/82Gbit | 30.1 | 18.2/20.5 | 28.5/27.7 |
| Fujitsu MHV-BH MHV2100BH | 129.24 | 100GB/8MB/5,400rpm/2/4/82Gbit | 30.1 | 18.2/20.5 | 28.5/27.7 |
| Fujitsu MHV-BH MHV2120BH | 192.69 | 120GB/8MB/5,400rpm/2/4/82Gbit | 30.1 | 18.2/20.5 | 28.5/27.7 |
| Fujitsu MHT-BH MHT2040BH | 57.56 | 40GB/8MB/5,400rpm/1/2/69Gbit | 27.5 | 18.4/21.4 | 27.5/26.6 |
| Fujitsu MHT-BH MHT2060BH | 72.84 | 60GB/8MB/5,400rpm/2/4/69Gbit | 27.5 | 18.4/21.4 | 27.5/26.6 |
| Fujitsu MHT-BH MHT2080BH | 88.11 | 80GB/8MB/5,400rpm/2/4/69Gbit | 27.5 | 18.4/21.4 | 27.5/26.6 |
| **3.5IN PARALLEL ATA DRIVES** | | | | | |
| Samsung Spinpoint P120 SP2014N | 70.49 | 200GB/8MB/7,200rpm/2/4/60Gbit | 58.2 | 14.3/15.9 | 29.5/29.3 |
| Samsung Spinpoint P120 SP2514N | 79.91 | 250GB/8MB/7,200rpm/2/4/60Gbit | 58.2 | 14.3/15.9 | 29.5/29.3 |
| Seagate Barracuda 7200.8 ST3250823A | 81.06 | 250GB/8MB/7,200rpm/2/4/91.5Gbit | 55.5 | 15.5 | 31.5 |
| Seagate Barracuda 7200.8 ST3300831A | 99.86 | 300GB/8MB/7,200rpm/3/5/91.5Gbit | 55.5 | 15.5 | 31.5 |
| Seagate Barracuda 7200.8 ST3400832A | 185.64 | 400GB, 8MB, 7,200rpm, 3, 6, 91.5Gbit | 55.5 | 15.5 | 31.5 |
| WD Caviar SE WD3200JB | 117.49 | 320GB/8MB/7,200rpm/3/6/107Gbit | 54.5 | 13.5/17.1 | 31.5/28.5 |
| Hitachi Deskstar T7K250 HDT722516DLAT80 | 61.09 | 160GB/8MB/7,200rpm/2/3/92Gbit | 53.4 | 12.7/17.6 | 33.1/28.3 |
| Hitachi Deskstar T7K250 HDT722525DLAT80 | 79.89 | 250GB/8MB/7,200rpm/2/4/92Gbit | 53.4 | 12.7/17.6 | 33.1/28.3 |
| WD Caviar SE WD1200JB | 59.91 | 120GB/8MB/7,200rpm/2/3/80Gbit | 52.5 | 13.2/20.0 | 34.6/28.2 |
| WD Caviar SE WD1600JB | 61.09 | 160GB/8MB/7,200rpm/2/4/80Gbit | 52.5 | 13.2/20.0 | 34.6/28.2 |
| WD Caviar SE WD2000JB | 68.14 | 200GB/8MB/7,200rpm/3/5/80Gbit | 52.5 | 13.2/20.0 | 34.6/28.2 |
| WD Caviar SE WD2500JB | 75.19 | 250GB/8MB/7,200rpm/3/6/80Gbit | 52.5 | 13.2/20.0 | 34.6/28.2 |
| WD Caviar SE WD800JB | 41.11 | 80GB/8MB/7,200rpm/1/2/80Gbit | 52.5 | 13.2/20.0 | 34.6/28.2 |
| WD Caviar WD1200BB | 56.39 | 120GB/2MB/7,200rpm/2/3/80Gbit | 52.1 | 13.4/20.2 | 36.5/35.8 |
| WD Caviar WD1600BB | 59.91 | 160GB/2MB/7,200rpm/2/4/80Gbit | 52.1 | 13.4/20.2 | 36.5/35.8 |
| WD Caviar WD2000BB | 65.79 | 200GB/2MB/7,200rpm/3/5/80Gbit | 52.1 | 13.4/20.2 | 36.5/35.8 |
| WD Caviar WD2500BB | 79.11 | 250GB/2MB/7,200rpm/3/6/80Gbit | 52.1 | 13.4/20.2 | 36.5/35.8 |
| WD Caviar WD400BB | 35.24 | 40GB/2MB/7,200rpm/1/2/80Gbit | 52.1 | 13.4/20.2 | 36.5/35.8 |
| WD Caviar WD800BB | 42.29 | 80GB/2MB/7,200rpm/1/2/80Gbit | 52.1 | 13.4/20.2 | 36.5/35.8 |
| Maxtor Diamondmax 10 6B250R0 | 102.21 | 250GB/16MB/7,200rpm/3/5/75Gbit | 50.9 | 13.9/19.8 | 34.8/28.2 |
| Maxtor Diamondmax 10 6B300R0 | 110.56 | 300GB/16MB/7,200rpm/3/6/75Gbit | 50.9 | 13.9/19.8 | 34.8/28.2 |
| Maxtor Diamondmax 10 6B160P0 | 59.98 | 160GB/8MB/7,200rpm/2/4/75Gbit | 50.7 | 14.2/20.7 | 33.6/28.1 |
| Maxtor Diamondmax 10 6B200P0 | 69.3 | 200GB/8MB/7,200rpm/2/4/75Gbit | 50.7 | 14.2/20.7 | 33.6/28.1 |
| WD Caviar RE WD1200SB | 63.44 | 120GB/8MB/7,200rpm/2/3/80Gbit | 50 | 13.3/20.3 | 37.8/30.8 |
| WD Caviar RE WD1600SB | 65.79 | 160GB/8MB/7,200rpm/2/3/80Gbit | 50 | 13.3/20.3 | 37.8/30.8 |
| WD Caviar RE WD2500SB | 79.89 | 250GB/8MB/7,200rpm/3/6/80Gbit | 50 | 13.3/20.3 | 37.8/30.8 |
| WD Caviar RE WD3200SB | 103.39 | 320GB/8MB/7,200rpm/3/6/100Gbit | 50 | 13.3/20.3 | 37.8/30.8 |
| Hitachi Deskstar 7K500 HDS725050KLAT80 | 260.84 | 500GB/8MB/7,200rpm/5/10/76Gbit | 49 | 12.9/18.1 | 36.4/35.1 |
| Samsung Spinpoint P80 SP0802N | 47.53 | 80GB/2MB/7,200rpm/unknown/60Gbit | 49 | 13.9/15.9 | 35.5/33.6 |
| Samsung Spinpoint P80 SP1203N | 58.11 | 120GB/2MB/7,200rpm/unknown/60Gbit | 49 | 13.9/15.9 | 35.5/33.6 |
| Samsung Spinpoint P80 SP1604N | 63.98 | 160GB/2MB/7,200rpm/unknown/60Gbit | 49 | 13.9/15.9 | 35.5/33.6 |
| Samsung Spinpoint P80 SP0812N | 41.71 | 80GB/8MB/7,200rpm/unknown/60Gbit | 48.6 | 13.3/16.0 | 29.5/30.1 |
| Samsung Spinpoint P80 SP1213N | 54.99 | 120GB/8MB/7,200rpm/unknown/60Gbit | 48.6 | 13.3/16.0 | 29.5/30.1 |
| Samsung Spinpoint P80 SP1614N | 61.01 | 160GB/8MB/7,200rpm/unknown/60Gbit | 48.6 | 13.3/16.0 | 29.5/30.1 |
| Excelstor Callisto ESJ840C | 31.71 | 40GB/2MB/7,200rpm/1/1/62Gbit | 46.7 | 14.5/18.2 | 33.0/27.1 |
| Excelstor Callisto ESJ880C | 38.76 | 80GB/2MB/7,200rpm/1/2/62Gbit | 46.7 | 14.5/18.2 | 33.0/27.1 |
| Hitachi Deskstar 7K80 HDS728040PLAT20 | 35.24 | 40GB/2MB/7,200rpm/1/1/62Gbit | 46.7 | 13.5/19.1 | 32.2/27.6 |
| Hitachi Deskstar 7K80 HDS728080PLAT20 | 42.28 | 80GB/2MB/7,200rpm/1/2/62Gbit | 46.7 | 13.5/19.1 | 32.2/27.6 |
| Samsung Spinpoint PL40 SP0411N | 39.1 | 40GB/2MB/7,200rpm/unknown/60Gbit | 46.7 | 14.3/16.9 | 28.9/27.0 |
| Seagate Barracuda 7200.7 Plus ST3200822A | 69.37 | 200GB/8MB/7,200rpm/2/4/100Gbit | 46.7 | 14.5 | 28.6 |
| Maxtor Maxline III 7B250R0 | 89.29 | 250GB/16MB/7,200rpm/3/5/45Gbit | 46.3 | 14.0/20.4 | 35.2/28.9 |

| MANUFACTURER AND MODEL | GUIDE PRICE (£) | CAPACITY/BUFFER SIZE/ SPIN SPEED/NUMBER OF PLATTERS/NUMBER OF HEADS/ DATA DENSITY PER SQ INCH | AVERAGE TRANSFER RATE (MBYTES/SEC) | ACCESS TIME IN MS (WITH/WITHOUT ACOUSTIC MANAGEMENT*) | NOISE IN DBA (WITHOUT/WITH ACOUSTIC MANAGEMENT*) |
|---|---|---|---|---|---|
| **3.5IN PARALLEL ATA DRIVES (CONTINUED)** | | | | | |
| Maxtor Maxline III 7B300R0 | 151.56 | 300GB/16MB/7,200rpm/3/6/45Gbit | 46.3 | 14.0/20.4 | 35.2/28.9 |
| Hitachi Deskstar 7K400 HDS724040KLAT80 | 187.99 | 400GB/8MB/7,200rpm/5/10/62Gbit | 45.9 | 12.6/16.6 | 38.2/34.4 |
| Seagate Barracuda 7200.7 Plus ST3120026A | 61.09 | 120GB/8MB/7,200rpm/2/3/80Gbit | 44.9 | 14.5 | 28.6 |
| Seagate Barracuda 7200.7 Plus ST3160023A | 62.26 | 160GB/8MB/7,200rpm/2/4/80Gbit | 44.9 | 14.5 | 28.6 |
| Hitachi Deskstar 7K250 HDS722512VLAT80 | 60.16 | 120GB/8MB/7,200rpm/2/3/62Gbit | 44.8 | 13.1/16.9 | 30.8/27.6 |
| Hitachi Deskstar 7K250 HDS722516VLAT80 | 62.88 | 160GB/8MB/7,200rpm/2/4/62Gbit | 44.8 | 13.1/16.9 | 30.8/27.6 |
| Hitachi Deskstar 7K250 HDS722525VLAT80 | 82.24 | 250GB/8MB/7,200rpm/3/6/62Gbit | 44.8 | 13.1/16.9 | 30.8/27.6 |
| Seagate Barracuda 7200.7 ST3120022A | 52.86 | 120GB/2MB/7,200rpm/2/3/80Gbit | 44.8 | 14.7 | 28.5 |
| Seagate Barracuda 7200.7 ST3160021A | 64.07 | 160GB/2MB/7,200rpm/2/4/80Gbit | 44.8 | 14.7 | 28.5 |
| Seagate Barracuda 7200.7 ST340014A | 35.24 | 40GB/2MB/7,200rpm/1/1/80Gbit | 44.8 | 14.7 | 28.5 |
| Seagate Barracuda 7200.7 ST380011A | 39.94 | 80GB/2MB/7,200rpm/1/2/80Gbit | 44.8 | 14.7 | 28.5 |
| Seagate Barracuda 7200.7 ST380013A | 57.56 | 80GB/2MB/7,200rpm/1/2/80Gbit | 44.8 | 14.7 | 28.5 |
| **3.5IN SERIAL ATA DRIVES** | | | | | |
| WD Raptor WD360GD | 86.94 | 37GB/8MB/10,000rpm/1/2/80Gbit | 62.1 | 7.9/8.0 | 37.0/35.4 |
| WD Raptor WD740GD | 142.16 | 74GB/8MB/10,000rpm/2/4/80Gbit | 62.1 | 7.9/8.0 | 37.0/35.4 |
| Seagate Barracuda 7200.8 ST3250823AS | 88.11 | 250GB/8MB/7,200rpm/2/4/91.5Gbit | 57.6 | 16.1 | 32.0 |
| Seagate Barracuda 7200.8 ST3300831AS | 106.91 | 300GB/8MB/7,200rpm/3/5/91.5Gbit | 57.6 | 16.1 | 32.0 |
| Seagate Barracuda 7200.8 ST3400832AS | 199.74 | 400GB/8MB/7,200rpm/3/6/91.5Gbit | 57.6 | 16.1 | 32.0 |
| Samsung Spinpoint P120 SP2004C | 72.19 | 200GB/8MB/7,200rpm/2/4/60Gbit | 56.8 | 14.1/15.9 | 31.5/30.8 |
| Samsung Spinpoint P120 SP2504C | 74.61 | 250GB/8MB/7,200rpm/2/4/60Gbit | 56.8 | 14.1/15.9 | 31.5/30.8 |
| WD Caviar SE WD3200JD | 99.86 | 320GB/8MB/7,200rpm/3/6/107Gbit | 54.5 | 13.3/20.2 | 36.0/29.0 |
| WD Caviar SE16 WD4000KD | 168.01 | 400GB/16MB/7,200rpm/3/6/100Gbit | 54.3 | 12.9/19.3 | 35.7/34.1 |
| WD Caviar SE WD1200JD | 59.91 | 120GB/8MB/7,200rpm/2/3/80Gbit | 52.4 | 13.2/20.2 | 36.0/29.0 |
| WD Caviar SE WD1600JD | 69.31 | 160GB/8MB/7,200rpm/2/4/80Gbit | 52.4 | 13.2/20.2 | 36.0/29.0 |
| WD Caviar SE WD2000JD | 70.49 | 200GB/8MB/7,200rpm/3/5/80Gbit | 52.4 | 13.2/20.2 | 36.0/29.0 |
| WD Caviar SE WD2500JD | 77.54 | 250GB/8MB/7,200rpm/3/6/80Gbit | 52.4 | 13.2/20.2 | 36.0/29.0 |
| WD Caviar SE WD400JD | 42.29 | 40GB/8MB/7,200rpm/1/1/80Gbit | 52.4 | 13.2/20.2 | 36.0/29.0 |
| WD Caviar SE WD800JD | 45.81 | 80GB/8MB/7,200rpm/1/2/80Gbit | 52.4 | 13.2/20.2 | 36.0/29.0 |
| Seagate Barracuda 7200.7 ST3200822AS | 75.19 | 200GB/8MB/7,200rpm/2/4/100Gbit | 52.3 | 12.5 | 36.2 |
| Maxtor Diamondmax 10 6B250S0 | 93.99 | 250GB/16MB/7,200rpm/3/5/75Gbit | 50.9 | 13.9/19.8 | 34.8/28.2 |
| Maxtor Diamondmax 10 6B300S0 | 97.47 | 300GB/16MB/7,200rpm/3/6/75Gbit | 50.9 | 13.9/19.8 | 34.8/28.2 |
| Maxtor Diamondmax 10 6B080M0 | 42.24 | 80GB/8MB/7,200rpm/1/2/75Gbit | 50.7 | 14.2/20.7 | 33.6/28.1 |
| Maxtor Diamondmax 10 6B120M0 | 50.17 | 120GB/8MB/7,200rpm/2/3/75Gbit | 50.7 | 14.2/20.7 | 33.6/28.1 |
| Maxtor Diamondmax 10 6B160M0 | 56.4 | 160GB/8MB/7,200rpm/2/4/75Gbit | 50.7 | 14.2/20.7 | 33.6/28.1 |
| Maxtor Diamondmax 10 6B200M0 | 63.44 | 200GB/8MB/7,200rpm/2/4/75Gbit | 50.7 | 14.2/20.7 | 33.6/28.1 |
| WD Caviar SE16 WD2500KS | 86.94 | 250GB/16MB/7,200rpm/3/6/80Gbit | 50.6 | 13.6/18.7 | 42.6/29.9 |
| WD Caviar RE WD1200SD | 65.79 | 120GB/8MB/7,200rpm/2/3/80Gbit | 50 | 13.3/20.3 | 37.8/30.8 |
| WD Caviar RE WD1600SD | 82.24 | 160GB/8MB/7,200rpm/2/3/80Gbit | 50 | 13.3/20.3 | 37.8/30.8 |
| WD Caviar RE WD2500SD | 82.24 | 250GB/8MB/7,200rpm/3/6/80Gbit | 50 | 13.3/20.3 | 37.8/30.8 |
| WD Caviar RE WD3200SD | 111.61 | 320GB/8MB/7,200rpm/3/6/107Gbit | 50 | 13.3/20.3 | 37.8/30.8 |
| Hitachi Deskstar T7K250 HDT722516DLA380 | 55.17 | 160GB/8MB/7,200rpm/2/3/92Gbit | 49.4 | 12.6/17.6 | 34.1/29.8 |
| Hitachi Deskstar T7K250 HDT722525DLA380 | 79.84 | 250GB/8MB/7,200rpm/2/4/92Gbit | 49.4 | 12.6/17.6 | 34.1/29.8 |
| Samsung Spinpoint P80 HD080HJ | 43.2 | 80GB/8MB/7,200rpm/1/2/60Gbit | 49.1 | 13.7/15.8 | 40.1/31.7 |
| Samsung Spinpoint P80 HD160JJ | 59.07 | 160GB/8MB/7,200rpm/2/4/60Gbit | 49.1 | 13.7/15.8 | 40.1/31.7 |
| Hitachi Deskstar 7K500 HDS725050KLA360 | 269.06 | 500GB/16MB/7,200rpm/5/10/76Gbit | 48.8 | 13.0/18.1 | 36.4/35.1 |
| Samsung Spinpoint P80 SP0812C | 39.95 | 80GB/8MB/7,200rpm/unknown/60Gbit | 48.6 | 13.3/16.0 | 29.5/30.1 |
| Samsung Spinpoint P80 SP1213C | 56.05 | 120GB/8MB/7,200rpm/unknown/60Gbit | 48.6 | 13.3/16.0 | 29.5/30.1 |
| Samsung Spinpoint P80 SP1614C | 58.69 | 160GB/8MB/7,200rpm/unknown/60Gbit | 48.6 | 13.3/16.0 | 29.5/30.1 |
| Hitachi Deskstar 7K250 HDS722512VLSA80 | 51.69 | 120GB/8MB/7,200rpm/2/3/62Gbit | 46.9 | 12.6/16.6 | 32.2/28.8 |
| Hitachi Deskstar 7K250 HDS722516VLSA80 | 59.61 | 160GB/8MB/7,200rpm/2/4/62Gbit | 46.9 | 12.6/16.6 | 32.2/28.8 |
| Hitachi Deskstar 7K250 HDS722525VLSA80 | 79.77 | 250GB/8MB/7,200rpm/3/6/62Gbit | 46.9 | 12.6/16.6 | 32.2/28.8 |
| Hitachi Deskstar 7K250 HDS722580VLSA80 | 39.66 | 80GB/8MB/7,200rpm/1/2/62Gbit | 46.9 | 12.6/16.6 | 32.2/28.8 |
| Excelstor Callisto ESJ880S | 38.55 | 80GB/8MB/7,200rpm/1/2/62Gbit | 46.7 | 14.0/19.7 | 31.8/28.9 |
| Excelstor Ganymede ESJ680S | 34.64 | 80GB/8MB/7,200rpm/1/2/62Gbit | 46.7 | 14.2/17.9 | 32.0/27.2 |
| Seagate Barracuda 7200.7 ST3120026AS | 57.52 | 120GB/8MB/7,200rpm/2/3/80Gbit | 46.7 | 12.7 | 35.6 |
| Seagate Barracuda 7200.7 ST3160023AS | 75.19 | 160GB/8MB/7,200rpm/2/4/80Gbit | 46.7 | 12.7 | 35.6 |
| Seagate Barracuda 7200.7 ST380013AS | 45 | 80GB/8MB/7,200rpm/1/2/80Gbit | 46.7 | 12.7 | 35.6 |
| Maxtor Maxline III 7B250S0 | 88.25 | 250GB/16MB/7,200rpm/3/5/75Gbit | 46.3 | 14.0/20.4 | 35.2/28.9 |
| Maxtor Maxline III 7B300S0 | 100.91 | 300GB/16MB/7,200rpm/3/6/75Gbit | 46.3 | 14.0/20.4 | 35.2/28.9 |
| Seagate Barracuda 7200.7 ST3120827AS | 68.14 | 120GB/8MB/7,200rpm/2/3/80Gbit | 46 | 12.8 | 38.1 |
| Seagate Barracuda 7200.7 ST3160827AS | 64.61 | 160GB/8MB/7,200rpm/2/4/80Gbit | 46 | 12.8 | 38.1 |
| Seagate Barracuda 7200.7 ST380817AS | 48.16 | 80GB/8MB/7,200rpm/1/2/80Gbit | 46 | 12.8 | 38.1 |
| Hitachi Deskstar 7K400 HDS724040KLSA80 | 187.94 | 400GB/8MB/7,200rpm/5/10/62Gbit | 45.9 | 12.8/16.9 | 37.8/34.7 |

* Where only one figure is shown, acoustic management is not configurable on these drives

Personal Computer World

vnu labs

# How we test

**Performance testing is an important part of PCW's reviewing process and to obtain our authoritative results we use the UK's best PC testing resource – VNU Labs. Here we explain why you can trust our results and give you a tour of our most frequently used benchmark programs.**

One of the main reasons people upgrade their PCs is because their old model seems 'too slow'. But how do you tell whether the one you're going to replace it with is any faster? At *PCW* we take PC testing very seriously and we have the UK's best PC testing labs – VNU Labs – on tap to help us give you reliable, authoritative performance figures, to help you with your purchasing decisions.

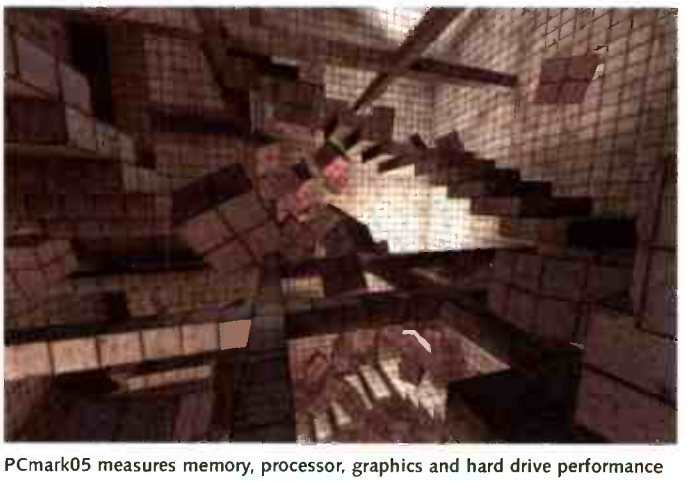
It's true that speed isn't everything, but it's an important part of the buying equation, especially when there are so many components out there. As many of our PC group tests are based on price bands, checking the performance is even more important – if the core system is underperforming, you need to know before you part with your hard-earned cash.

In VNU's UK Labs, which is part of the European VNU Labs network, our staff have over 20 years of combined testing experience. We know all the perils and pitfalls of practical benchmarking and we contribute to the development of industry-standard benchmarks through our full membership of Bapco (www.bapco.com), the non-profit benchmark consortium. We are also a media member of the Futuremark Benchmark Development Program (www.futuremark.com). Listed below are the main benchmarks we use for testing PC systems and components.

- Bapco Sysmark 2004 SE – an application-based benchmark that tests real-world system performance.
- Futuremark 3Dmark03 – a 3D graphics benchmark designed to test the performance of DirectX 8 graphics cards.
- Futuremark 3Dmark05 – the latest version of 3Dmark that tests DirectX 9 3D graphics performance.
- Ubisoft Far Cry – we use the Fort level timedemo to see how graphics cards perform in a real DirectX 9 game.
- Futuremark PCmark05 – a synthetic benchmark used to test the performance of a PC's major subsystems.
- Bapco Mobilemark 2005 – used to assess the battery life of notebooks using real-world applications and usage scenarios.
- Test beds – we use standardised AMD and Intel-based test rigs to test components and peripherals.

There's more information about our testing procedures and benchmarks on our Labs site at www.reportlabs.com/testbed/bguides/benchmarks.php.

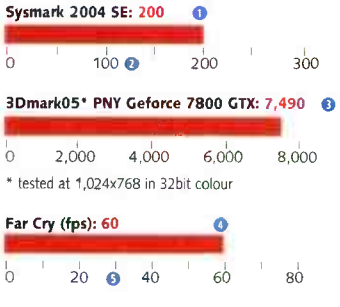
3Dmark03 is used to test DirectX 7/8 graphics cards



PCmark05 measures memory, processor, graphics and hard drive performance

3Dmark05 pushes modern graphics cards to their limits

## Performance




1. A score of 200 indicates that the system is twice as fast as the reference PC
2. The reference PC (2GHz P4 512MB of Ram) scores 100
3. A Geforce 7800 GTX would score in the region of 7,490
4. A score of 60fps (frames per second) or higher is most desirable
5. A result of 30fps or above means the machine can produce playable frame rates at the tested resolution

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Howard Rubin, Director, IS Technical Services (right)
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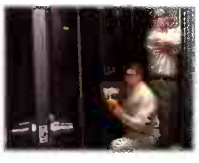

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# Faster, slimmer, better

*Windows XP can put an enormous strain on your PC's resources, but it doesn't have to. Jörg Geiger and Artur Hoffmann show you how to transform a standard installation of XP into a spry and speedy operating system*

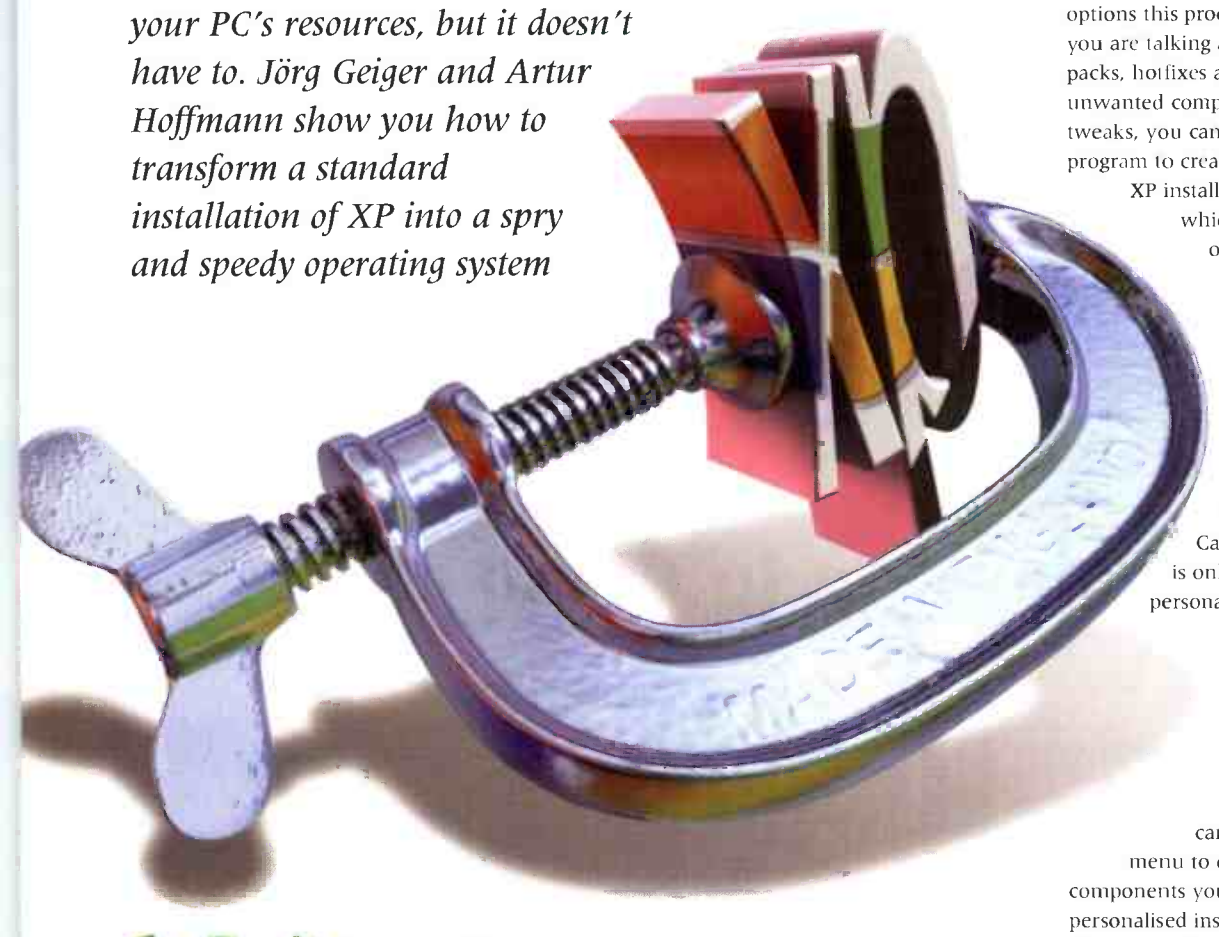


ILLUSTRATION: IAN NAYLOR

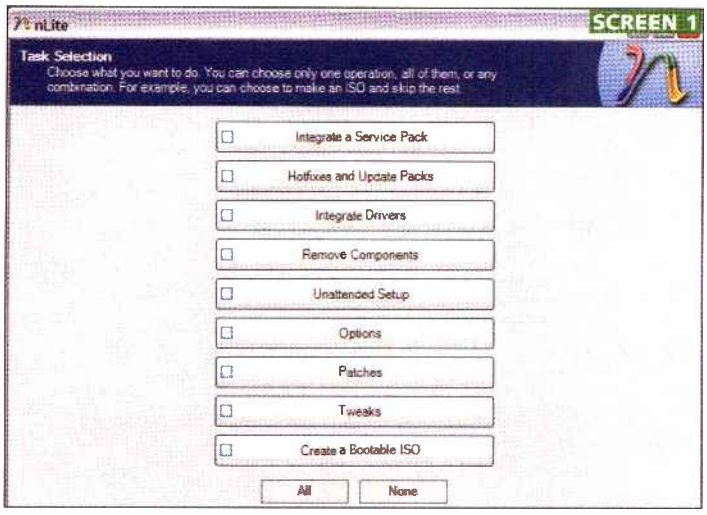
Windows XP is designed to be compatible with the broadest possible amount of hardware and software. As a result, more operating system services than necessary are started or modules you don't need are loaded. This can lead to problems; in extreme cases, installation can take hours, lots of unwanted and sometimes useless programs and services are installed and the user interface is optimised simply to look pretty. All this can be to the detriment of system performance and reliability. If you've installed Windows XP a couple of times, you'll be familiar with the amount of time you need to spend customising it to your requirements – installing up-to-date drivers and getting rid of unnecessary ballast, with the aim of creating a fast, slim and secure operating system from the resource-gobbling monster that is the default Windows XP.

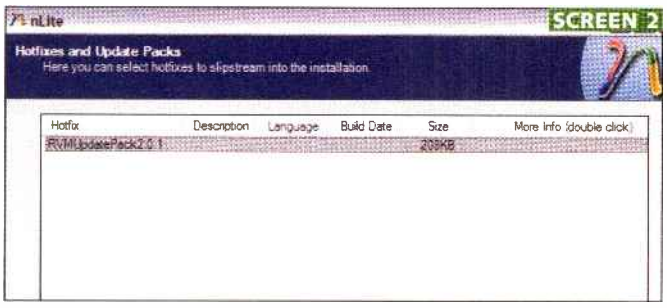
## Nlite to the rescue

One easy way to get to the root of the problem is to use the freeware program Nlite to create a made-to-measure Windows XP installation CD. The biggest benefit of this is the almost endless configuration options this procedure offers. Whether you are talking about integrating service packs, hotfixes and drivers, removing unwanted components or adding Registry tweaks, you can use this remarkable little program to create your own personalised XP installation CD. The software, which is just 1.37MB in size, is on the Nlite website (www.nliteos.com) or, if you've bought the CD or DVD version of *PCW*, you'll find it on the cover disc. We used version 1.0 Beta 6 and, despite its beta status, it gave us no problems. The program has since moved to Release Candidate 5 status. The program is only free for non-commercial personal use.

The big benefit of this free software is its modular construction: you don't have to perform all the XP modifications shown in this feature in the sequence shown. You can use the program's main menu to decide exactly which XP components you want to include on your personalised installation CD and which to leave out (see screen 1). This makes it possible, for example, to make updated Windows XP CDs that include hotfixes, altered system settings, or with unwanted XP components left out.

You do need about three hours and a bit of patience to use this utility effectively. Whatever you do, make sure after creating your Mini XP CD you take time to test it. To test your customised CD, use an empty partition or separate hard disk to reduce the risk of losing your data. Alternatively, it's an ideal use for software like Microsoft Virtual PC (www.microsoft.com/windows/virtualpc)




**Above: When integrating hotfixes, it's a good idea to use a preprepared collection of updates as this saves a lot of time compared to adding patches one by one**

**Left: Thanks to Nlite's modular construction, you can decide for yourself which components to include on your XP CD**

or VMware Workstation (www.vmware.com). You can use virtual PCs created with these utilities to carry out a risk-free installation of the Nlite-modified XP version. You don't even have to burn a CD or DVD, as both Virtual PC and VMware can use ISO image files directly to install the OS. Whichever route you take, you'll need a valid Windows XP licence key, and the installation will still be subject to the Microsoft licensing and product activation requirements.

## Get prepared

Before you copy the contents of your XP installation CD to your hard disk, you must make sure that Windows Explorer is configured to show all files: to do this, select Tools/Folder Options and click on the View tab. In the Files and Folders section, remove the tick in front of 'Hide protected operating system files'. In the 'Hidden files and folders' section, select the 'Show hidden files and folders' option. After doing this, copy the complete XP CD contents to your hard disk, into a single folder called, for example, xp_cd.

You'll need Microsoft's .Net Framework version 1.1 (http://msdn.microsoft.com/netframework) to use Nlite. If this isn't already installed on your computer, the Nlite installer will prompt you and install it if you wish. After starting Nlite for the first time, select the language you want to use and click on Next. In the following dialogue click on Search and select the path to the folder in which you have placed the contents of the original Windows CD (in our example xp_cd). Nlite analyses the files and reports their size and version. Clicking on Next takes you to the Templates dialogue. The first time you use the program this list is empty, so click on Next again to get to the main menu which is the starting point for all the actions described below. You must have an original Microsoft Windows XP CD. Nlite can't normally use recovery CDs, which often ship with complete systems, as the contents and directory structure of such media are usually different from full XP installation CDs.

## Slipstreaming Service Pack 2

By now, most of you will probably have installed Service Pack 2 (SP2) on your XP system, although your original CD may only have Windows XP with or without Service Pack 1. In practice this means that every time you install XP, you also need to re-install SP2, which is irritating and very time consuming. To save this hassle you can integrate SP2 with your new installation CD. This process is known as slipstreaming.

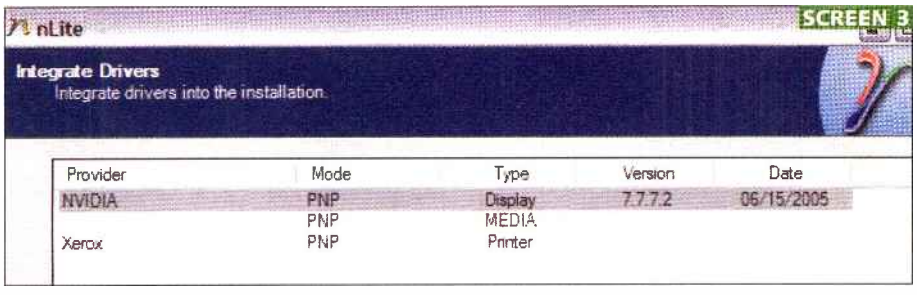
**'To save hassle you can integrate SP2 with your new installation CD'**

You can download SP2, all 270MB of it, from the Microsoft website at http://tinyurl.com/5bobl – this the downloadable network install version. This will give you every update until August 2004 including those contained in SP1 and its patches, bug fixes and extras. It's not necessary to slipstream SP1 first. In the main Tasks menu of Nlite, choose Service Pack Integration and click on Next to proceed. Click on Find and enter the path to the location where you have stored the SP2 executable file (WindowsXP-KB835935-SP2-ENU.exe if you followed the link above). Confirm your choice by clicking on Open. Nlite will then decompress the file and add the components to the installation folder. You can check that the slipstreaming has succeeded by returning to the Choose Windows Installation Files or Installation CD dialogue and clicking on the Update icon. In the information area, the version should be given as Build 2180.

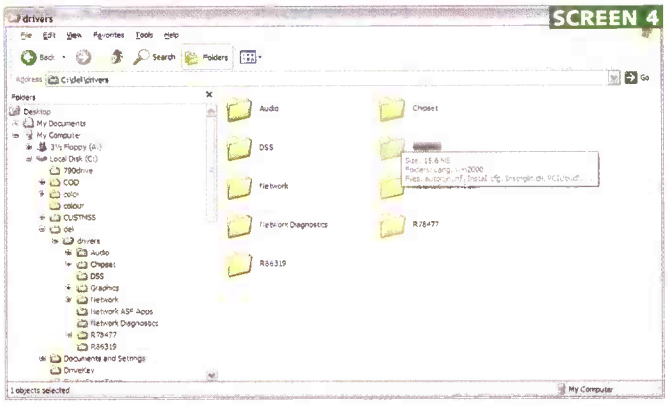
## Integrating the latest hotfixes

While you will only have to slipstream SP2 once, the integration of the latest hotfixes is a recurring task. You'll have to update your customised install version of XP at least once a month when Microsoft releases its regular patches. To do this, in the Nlite 1.0 menu, click on Hotfix Integration and click on Next to proceed. Click on Insert and then select all the hotfixes that you want to incorporate (see screen 2). Have a look at the 'Sources for hotfixes' box on page 106 to find out where you can get the current hotfixes.

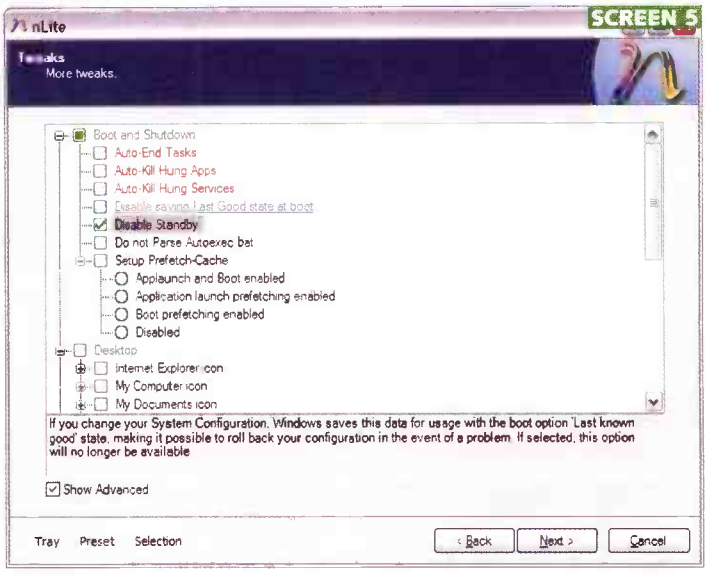
After selecting the hotfix files, click on Next and then on Yes to start the integration routine. As this procedure uses a lot of system resources, it's advisable to set the process priority to High from the dropdown menu. After the process is done, close the tool by clicking on Finish. To check whether Nlite has really integrated all the hotfixes,




**Caution advised: in theory driver slipstreaming is possible with Nlite, but you should be aware that it does not always work correctly**




Above: Drivers have to be stored on your hard disk in a specific manner, and only inf files work properly with Nlite




Right: It's easy to incorporate your own Registry tweaks and customised system settings into an installation CD made with Nlite

change to the folder to which you copied the XP CD and look in the i386\SVCPACK directory. The number of files in this folder must be the same as the number of hotfixes which you selected.

### Integrating drivers

Integrating updated drivers, like adding hotfixes, is a recurring task. This is even more the case if the PC is used not just for work but also as a games machine, video-editing system or TV replacement. In this context, it is important to know which hardware components your system contains but, particularly with off-the-shelf systems, it isn't always clear which makes and models of hardware have been used. To help find out you can use utilities such as Sisoftware Sandra 2005 SR2 (www.sisoftware.net), Dr Hardware 2005 6.5.0d (www.dr-hardware.com/) or Everest Ultimate Edition (www.lavalys.com).

Nlite does offer some help with driver slipstreaming, even if it is a bit limited (see screen 3). It can only install drivers with the help of an inf file (see screen 4). In the menu, click on Driver Integration/Next and then in the next dialogue choose Insert, browse to the driver's inf file and click on Open to add the driver to the list of components to be integrated. These steps have to be repeated until all the drivers with their own inf files have been selected.

It's more difficult to integrate text mode drivers, such as those required to use Raid and Serial ATA (Sata) controllers. If there is a text mode driver among the control software, Nlite pops up a warning message. In the next dialogue, activate the Text mode driver option, select the device under Text mode integration options and confirm your choice with OK. Once all the drivers to be integrated have been selected, click on Next and confirm the 'Use changes' dialogue by clicking on Yes. If Nlite has incorporated the drivers, close the utility by clicking on Next/Finish.

However, Nlite does display some weaknesses: there are problems if the driver does not use an inf file but instead uses its own installation routine. A further challenge for driver slipstreaming concerns control software for chipsets. Just selecting the complete driver package is not enough; it's more often necessary to store the drivers for each component in their own subdirectory. Nlite isn't yet in a position to automatically install applications integrated with drivers, such as the ATI Control Center. You'll have to write a special batch file to do the job. The amount of effort involved in this is out of all proportion to the benefit, which makes driver slipstreaming into something more suited to dedicated professionals or enthusiasts with plenty of time to spare.

Nlite's developers are aware of these problems and advise users that if no inf files are available, they should only incorporate those drivers into the installation CD which are absolutely necessary for smooth operation.

### Throw ballast overboard

Apart from the integration of service packs and hotfixes, Nlite's most important functions are concerned with removing Windows components and applications that aren't required, such as Outlook Express, MSN Explorer and Internet Information Services. The advantages of a slimline XP structure like this are that an installation CD made with Nlite remains small, the setup routine runs noticeably faster and the slimmed-down operating system is quicker and more reliable in day-to-day use.

In the Nlite main menu, click on Remove Components/Next. The first task is to tell the program which functions you absolutely require and what the PC is mainly used for. The purpose of this exercise is to prevent accidental deletion of components upon which something you do need depends. In our example we are using a 'typical' computer on a local wireless network (WLan) which is used for video editing. In the Compatibility dialogue, select the Camera and camcorder, drivers, Ethernet DHCP Functionality, Printers (Local, Network and PDF) and Windows Update Website. A click on OK takes you to the Remove Components dialogue in which you can mark for deletion, in an Explorer-like tree, all the XP functions and applications you don't require.

## Sources for hotfixes

Listings of current updates, patches and hotfixes for Windows XP can be obtained from sources other than Microsoft (www.microsoft.com), but you should be cautious of downloading the hotfix files themselves from third-party sources. However, if you want to try this route, there's a collection of post-SP2 hotfixes on RyanVM's website at www.ryanvm.net/msfn/.

Another good starting point is the regularly updated MSFN Unattended Windows database at http://unattended.msfn.org/unattended.xp/view/web/5/. There's a link to the forum that contains details of all the important Windows XP updates Microsoft has released since the official release of SP2 in August 2004, together with links to download each of them. It's a slow and tedious process collecting these downloads, and most users will probably opt to omit this step and simply allow Windows Update to do its stuff post-installation.

To make selection easier, the components are split into nine categories: Applications, Operating system, Services, Hardware support, Multimedia, Network, Languages, Drivers and Additional folders. There is a brief description that tells you about the uses and dependencies of each entry. If you don't want to carry out the selection process for yourself, you can use one of the two predefined settings. You can load them using File/Load/Safe/Remove components (conservative settings) or File/Load/Recommended/Remove components. The advantage of using one of these presets is that all the XP components are already selected, so all you have to do is to deselect the bits you wish to keep. If you're unsure about a particular component, keep it.

Start the process of removing the Windows slack by clicking on Next/Yes. When the process has finished, Nlite informs you of how much hard disk storage space you have clawed back.

### Automated installation

To make the operating system setup process easier, Nlite lets you set up Windows XP for unattended installation, meaning that during the installation you don't need to confirm choices or click any buttons. The setup routine reads mandatory details such as the Windows serial number, language and regional and network settings from an 'answer file', winnt.sif. Nlite has a function you can use to generate this answer file. You could alternatively use Microsoft's setupmgr.exe utility to do this, which is one of the SP2 Support Tools (see box below).

In the Nlite selection menu choose Unattended Installation/Next and bring the Info tab to the front. There are five alternatives available in the Unattended Mode section. DefaultHide has proved itself to be a good choice. Although you do have to provide some user input, this method is not so prone to mistakes, unlike the FullUnattended option. For example, in fully automated mode it isn't possible to install non-WHQL certified drivers (that is, drivers certified by Microsoft's Windows Hardware Quality Labs).

**'If you're unsure whether to delete a particular component, keep it'**

Enter the information required in the General page 1/2 tab (the serial number and Start menu style, for instance) and check the details under Program Path are correct. You do not usually need to alter anything in General page 2/2 as private computers are not normally part of a domain. On the Personal tab, enter the normal range of information requested during setup, such as user name, admin password and workgroup. On the Display tab specify your preferred colour depth, resolution and monitor frequency; private users can Ignore the settings on the Components tab. Click on Next/Yes to generate the winnt.sif file.

If you want to go into the subject in greater depth, you'll find more information in the Microsoft Knowledgebase (support.microsoft.com/kb/155197) or in its Technet area (http://tinyurl.com/6zdl4).

### A personalised XP

Performing a fresh installation of Windows XP is by no means the end of the job. Apart from installing the drivers if they were not integrated with Nlite, you'll have to install the basic software you want to use and adjust various system settings to match your preferences. We won't give you an in-depth description of how to add software to an Nlite XP installation, but there's lots of helpful information at the MSFN forum (www.msfn.org/board/index.php?).

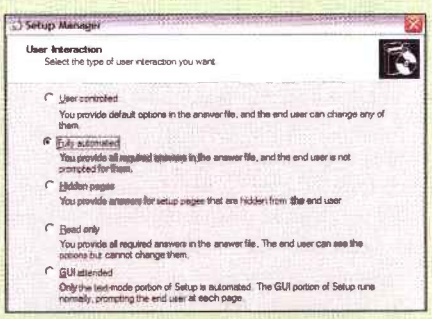
However it is easier to adjust the basic system settings. In the Nlite main menu click on Tweaks/Next and bring the Tweaks tab to the front, then activate the 'Show advanced' setting. A list of about 140 Registry tweaks are shown, split into 13 categories (see screen 5), including Security, Speed and Start Menu. Moving the cursor over an entry displays a brief description. Tweaks marked in red should be used with discretion as they can seriously impact your system's functionality. For example the NoWindows Update switch turns automatic Windows updating off. Once all the desired tweaks are activated, click on Next/Yes to continue.

### Burning your customised XP CD

In the main selection menu, click on Bootable ISO Image, Next, type the CD's title, for example NliteXP, into the ISO Label field and then choose Create ISO to continue, specify the destination folder and select Save. You can use any CD burning program which can handle ISO files to write the image file. If you are using Nero 6.x, start the Nero Burning Rom module, close the New Compilation dialogue and choose Recorder/Burn Image, activating the Close CD and Disk-at-once options. Alternatively, you could use the freeware CD Burner XP Pro (www.cdburnerxp.se) which can also burn ISO files.

## Unattended XP installation, the official method

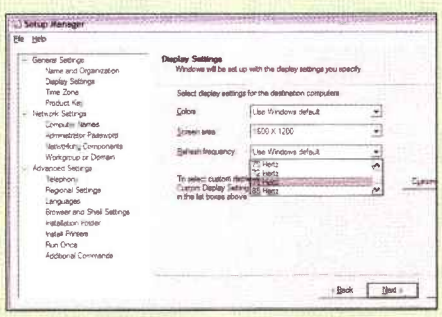
Creating an unattended XP installation can be done using Microsoft's setupmgr.exe utility, which you can find in the Support\Tools directory on the XP CD inside the deploy.cab cabinet file. To extract this file, you can use Windows Explorer in XP, or a free utility such as Setup CD-Rom Viewer from http://jp-bridge.com/en/cdview/.




**Choose your installation method**

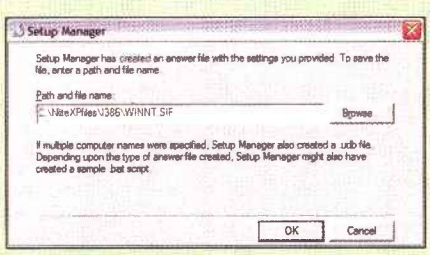
Start setupmgr.exe, select Create new answer file and click on Next.

Specify the user intervention type as fully automated and choose Install from CD.



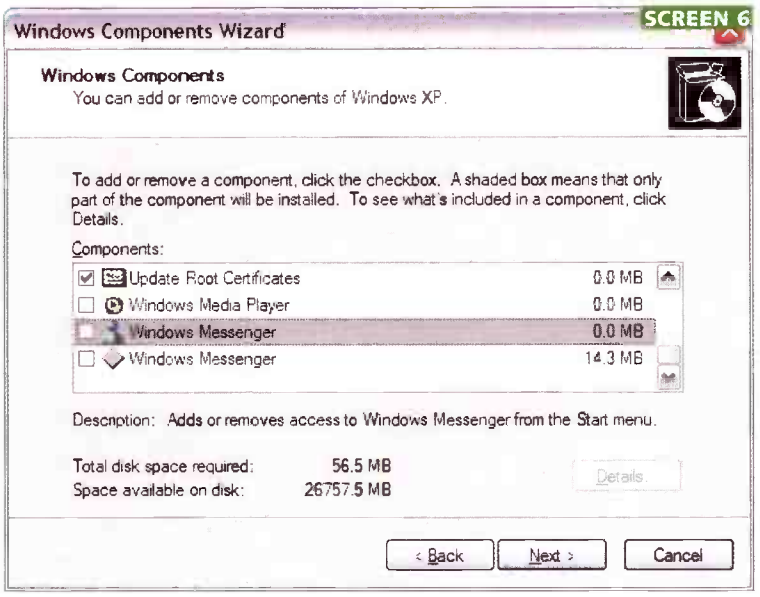

**Specify your settings**

The required settings are split into three categories: General settings, Network settings and Advanced settings.




**Save your answer file**

By default, your answer file will be saved as unattend.txt but you should save it as winnt.sif in the local installation CD's i386 directory.




The first task in slimming down Windows is to use XP's own uninstall facilities

## Slimming down Windows XP

If you want to slim down an existing Windows installation you can use another great utility called XPLite Professional.

Windows XP users who want to customise their systems are continually occupied with tweaking, tuning and optimising in order to get the last drop of performance and prevent system resources begin drained. Experience shows that XP can be readily optimised in a variety of ways, but you won't get very far when it comes to removing superfluous components, at least not without external utilities. A big help if you need to create a made-to-measure version of Windows is XPLite Professional (www.litepc.com). This shareware program analyses your Windows installation, reports on all installed components and makes it possible to throw the unnecessary bits overboard. It costs $39.95 (approx £23) and there's also a free trial version available. If, after performing such a clearout, you find that your computer is no longer stable or won't perform certain functions because of dependencies on deleted components, then they can be easily reinstated. In addition, the program creates a system restore point before every alteration, which reduces the danger of ending up with a non-functioning system.

On the following pages, we'll show you how to put Windows on a risk-free diet and explain which bits of XP you can remove without XPLite Pro 1.6's assistance.

## Removing standard components

The full version of XPLite can, in theory, completely remove up to 162 components from a Windows XP system. On a test computer with a standard installation of XP, there are 154 of these components. Some of these can be removed with the use of built-in uninstall routines and others by simply deleting the relevant files and folders, so we'll look at these first.

The first task in creating a slimline Windows setup is to uninstall unnecessary Microsoft applications. These might include things like Paint, MSN Explorer and games. These components all have one big thing in common: they can all be removed from the Control Panel's Add or Remove Programs dialogue. There's no need to dig deep into the system. Select Control Panel from the Start menu, open Add/Remove Programs and click on Add/Remove Windows components. This will start the Windows Components wizard; uncheck all the applications you wish to remove. Items that can be removed safely from all systems include MSN Explorer, the Start menu entry for Windows Messenger as well as all programs listed under Accessories in the Start menu including the Calculator, Paint and various games (see screen 6).

This first round of manual cleaning up relieves Windows XP of 22 components, recovers 40MB of hard disk space and makes the Programs folder a lot less cluttered.

## Removing Windows Messenger

By default, Windows XP does not show all installed operating system components in the Windows Component Console. The 'hide' switch is responsible for this behaviour. Before uninstalling Windows Messenger you need to edit the sysoc.inf system file. Open Windows Explorer, navigate to the Windows\INF folder and double-click to open sysoc.inf. If you cannot find the file on your system, you will have to tell Windows Explorer that it should also shows hidden files.

Remove the word 'hide' from the following line

```
msmsgs=ms grocm. dll, OcEntry ↙
msmsgs.inf, hide, 7
```

(Key: ↙ code string continues)

in the [Components] section. Save the file, close the editor and proceed as described in the section above. You will now be able to select and remove Windows Messenger from the system using the Add/Remove Windows components applet. XPLite Pro should now display just 131 components remaining on a fresh Windows installation.

## Dump multimedia and system tools

Apart from those components you can remove from the system control software, Windows XP also contains components for which there is no uninstallation tool and you therefore have to remove them manually. Among these are, for example, Windows Movie Maker, Picture and Backgrounds as well as Sample Music Files and Sample Pictures. To remove these items, simply navigate to the relevant folder and delete the contents. It's advisable to first of all open the My Documents folder and delete any unwanted jpeg and wma files from the Sample Music and Sample Pictures folders.

Other potential candidates for deletion are desktop backgrounds (Windows\Web\Wallpaper), screensavers (.scr files in Windows\System32), Windows sounds (Windows\Media) and the Windows Tour (System32\tourstart.exe). Unless you need them, you can also safely get rid of the screen magnifier (System32\magnify.exe), and onscreen keyboard (System32\osk.exe) as well as the Accessibility Wizard (System32\accwiz.exe) and the UtilityManager (System32\utilman.exe).

If you use third-party utilities, you can ditch some built-in system tools, including the XP defragmenter (System32\dfrg.msc), backup tool (System32\ntbackup.exe) and disk cleanup utility (System32\cleanmgr.exe). The same goes for the remote desktop

## Hardware profiles

Creating hardware profiles is a little-used but nonetheless effective way to make better use of the operating system's resources. The basic principle relies on the fact that at startup Windows only initialises those devices listed in the corresponding hardware profile. You can make use of this behaviour to deactivate hardware components present in your PC, but not used often. This frees up system resources as Windows does not load drivers for inactive devices into Ram. Typical candidates for this treatment are soundcards, television and radio cards as well as USB peripheral devices.

connection (System32\mstsc.exe), sound recorder (System32\sndrec32.exe) and Hyperterminal (Program Files\Windows NT\hypertrm.exe).

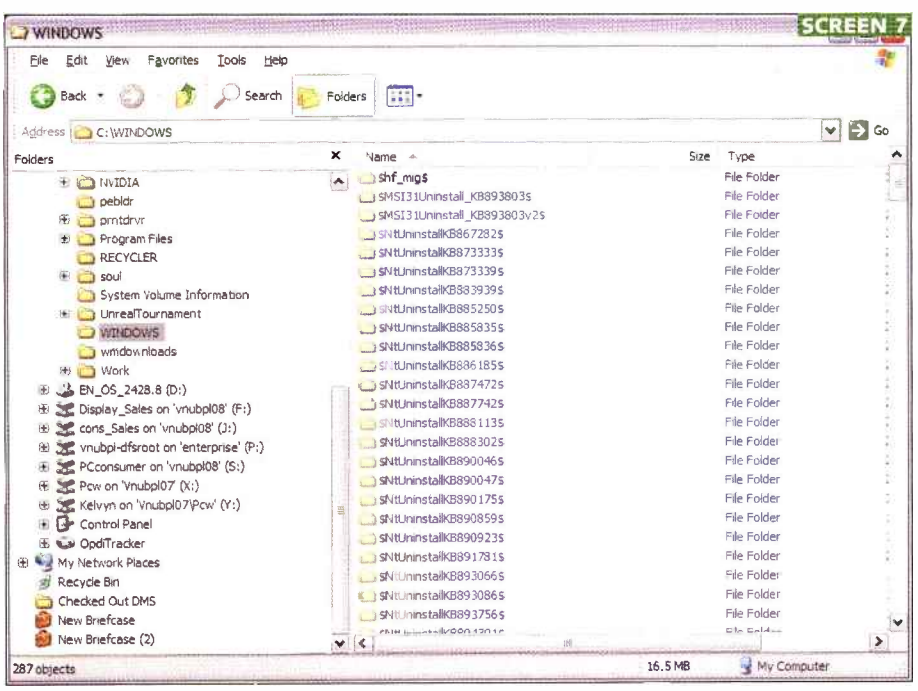
You can reduce the total number of XP components by about 20 very easily; XPLite will now report 112 installed components. You can also get rid of all the Service Pack and Windows Update backups that are stored on the hard disk (see screen 7). XP stores these in the Windows directory. These folders are easy to recognise because their directory names begin with a $ character. On desktop PCs, you can easily save a few hundred megabytes of space like this, although you then won't be able to uninstall these updates – a re-install of Windows will be needed if you want to get rid of them.

### Windows Media Player

Apart from the recently introduced Windows XP 'Reduced Media Edition', or XP N, Windows Media Player 9 (WMP 9) is a basic item in XP. However, unlike the components listed in the section above, the Windows Media Player is embedded deep in the system architecture. All systems also include the antiquated WMP 6.4. A clean uninstall of these two components isn't possible using built-in tools, even though it is present in the Control Panel's list of software which can be removed – this is just an entry for removing the Start menu entry and not the application itself (which incidentally also applies to Windows Messenger and Outlook Express).

Microsoft's official line is that the lack of an uninstallation routine is to prevent users from removing the media player by mistake. And it really would be a grave mistake because, without it, multimedia elements embedded on web pages can cause the system to crash, and it becomes almost impossible to play audio or video, since deleting WMP gets rid of a large majority of the computer's available audio and video codecs.

If, in spite of this, you still want to remove all traces of Media Player, you will have to use XPLite. After starting the program, open the Add/Remove Component tab, bring it to the front and double-click on Multimedia. Remove the check mark in front of Windows Media Player and click on Next, to start the deinstallation. After the end of the deletion process – which removes both Windows Media Player 9 and its 6.4 predecessor, Skins and the Player Tour – you need to restart your computer.




All hotfix backups saved on hard disk can be removed

### Caution with Outlook Express

The same is true for Outlook Express as for Windows Media Player. In theory, you can remove the default news and email client from the system, but uninstalling Outlook Express has wide-reaching consequences which affect, among others, Microsoft Office users. The office suite's Personal Information Manager, Outlook, can only be installed if Outlook Express is present on the system. In addition, removing Outlook Express also gets rid of the Windows address book. The third, less serious, problem is that the file associations for MHT files (Internet Explorer web archives) go missing. This means that deleting Outlook Express is only recommended for you if you want to work with another email client, can do without the Windows address book and don't mind paying for XPLite Pro. If that description fits you, then uninstall Outlook Express using the process described in the previous section for WMP. You will find the entry for Outlook Express in the Communication and Messaging category.

### Fight the flab with XPLite

Windows Media Player and Outlook Express are not the only components that you can remove by using XPLite Professional. The program can also wipe other XP system components such as Internet Explorer (see box above), DirectX and the Find wizard from your hard disk. ↘

## Windows without Internet Explorer

Instead of simply ignoring Microsoft's browser and using Firefox or Opera, you can remove Internet Explorer 6 from your system with the help of XPLite Professional – without affecting stability or usability.

Internet Explorer is so deeply embedded in the system that even the US Supreme Court has in the past been involved with the browser's status.

The question is, can the browser be removed from Windows using built-in utilities without affecting system stability and usability? In principle, yes, for older versions of Windows (pre-Windows 2000 (SP2 and later) or XP). How to remove IE from all versions of Windows from 98 onwards is covered in detail in Microsoft's Knowledgebase article 293907. Alternatively, you could use the freeware program IEradicator 2001 (www.litepc.com/ieradicator.html).

How does a system behave if there is no browser available? Our tests showed there were no serious problems on a system with a freshly installed copy of Windows XP, as long as XPLite Professional had not removed all the IE-related components. The effect is similar if IE is removed from a system which is running. If you deselect the browser in XPLite, the utility also removes the Windows Update Manager and Macromedia Shockwave Flash. The first system start without IE takes several minutes, but it is quite stable. There are no particular problems using Outlook Express 6, Outlook 2002 and WMP 9, but you'll have to adjust the orphaned IE-related file associations using the Control Panel.

## XP (almost) without services

Just as you can relieve Windows XP of all its superfluous components, you can also reduce the number of active services to a minimum. You can check which services are running on a system by looking in the Services management console's Services list. To start this snap-in, choose Run from the Start menu, enter services.msc into the box and click OK.

The easiest way to make a minimal configuration is to use the free command-line tool SVC2 KXP 2.2 Build 2 (www.ntsvcfg.de/ntsvcfg_eng.html). After starting the program you can choose from four options. We recommend selecting 'Set suggested values according to www.ntsvcfg.de'. After restarting, check which XP Services are now deactivated.

Windows XP will even start if only one background service, the Remote Procedure Call (RPC), which can't be turned off, is activated. However, with no background services the system can't be used for anything productive.

The individual applications, system components and services are split into 12 categories, for example Communication and Messaging, Server Components and System Tools and Utilities. This makes it easier to find a particular XP feature. One point in the program's favour is that the vast majority of components can be removed without danger – regardless of the current configuration and what the computer is used for.

Only a few features, such as Wireless Zero Configuration, Remote Access Dial-Up Support and Windows Installer should be left alone, as removing them can have dire consequences, such as placing strict limitations on networking and dial-up functionality. In addition, removing them prevents programs using the Microsoft installer being installed – in the real world, this renders the system all but useless.

### Quicker and more secure?

Our testers worked out just how much storage space can be freed up without endangering security and system functionality with the help of a fresh installation of Windows XP Professional SP2. We used a Pentium M notebook with built-in wireless networking and an Internet connection via a wireless router connected to broadband.

A fresh installation of XP including drivers but not the swap file (pagefile.sys), requires 1,110MB of hard disk storage space. After uninstalling all 162 components this is reduced by 694MB to 416MB. But caution is required: XPLite does offer a large number of possible reductions in size, but it's obviously not sensible to do them all at once. Remember that too radical a pruning will endanger the operating system's basic functionality.

**'On no account should you remove features under Advanced Components'**

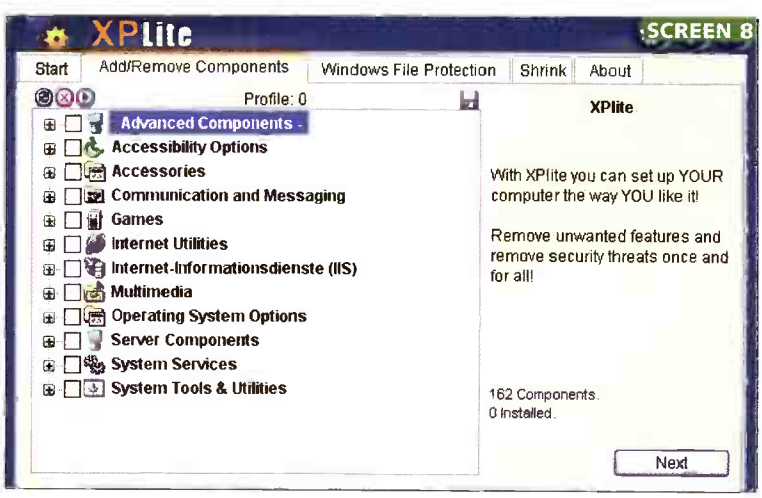
This was obvious in the test lab. Immediately after the Welcome screen, a message popped up pointing out that the XP installation CD should be inserted because files needed to be copied to the DLL cache. As we wanted to empty the cache, our testers clicked on Cancel. Neither an Internet connection via the WLan nor a network connection could be established. Software installations failed because the Windows installer reported incompatibilities. And the fact that Internet Explorer was missing, or more precisely the IE HTML Rendering Engine, was made very obvious. For example, it was impossible to start Device Manager or the Computer Management MMC Snap-in. This made troubleshooting and the manual starting of services much more difficult. If you want to avoid such problems, then we recommend that you start with the minimal configuration described below and use it to test your system. If there are difficulties, any components required can be added back again using XPLite.

### 50 per cent Windows

On no account should you remove the features grouped under the Advanced Components heading in XPLite – it's probably fortunate that these can't be accessed in the free trial version. As explained above, we removed all the Advanced Components in our test lab and ended up with a non-functioning system (see screen 8). So we started putting back components to add the missing functionality. Beginning with reactivating the Windows Management Instrumentation (WMI) components from the Advanced Components category, our testers tried to configure a working system. As already explained, the IE HTML Rendering Engine is fundamental for troubleshooting; and Wireless Zero Configuration activates the wireless network connection. Our testers first of all had to change the corresponding service name's start type to Automatic. These are the only three components that are necessary to reactivate the WLan Internet connection and to surf the web with Firefox. It's just as quick to restore the Windows Installer features so that you can install software which has a Microsoft installer: under Advanced Components simply activate Windows Installer.

Restoring the network functionality was not much more complicated. The network setup wizard was available and so it was easy to add the test computer to the Lan, but the elementary 'Show workgroup computers' function is not available. Our testers went to the Advanced Components/MS Networking Services category and turned on the entry Computer Browser. The notification that further components would be needed was confirmed with Yes. This restored the 'Show workgroup computers' functionality.

At the end of the process, the operating system takes up 449MB and only eight of the original 154 XP components are still in use – and the system still fulfils its intended purpose. You will have to do without some ease of use and more advanced features, but in practice you can use this slimmed-down version of XP as a basis for your own experiments and to build your very own optimised XP configuration in a step-by-step process. **PCW**




**The living dead: not even deleting all 162 components in XPLite can prevent Windows XP from starting**

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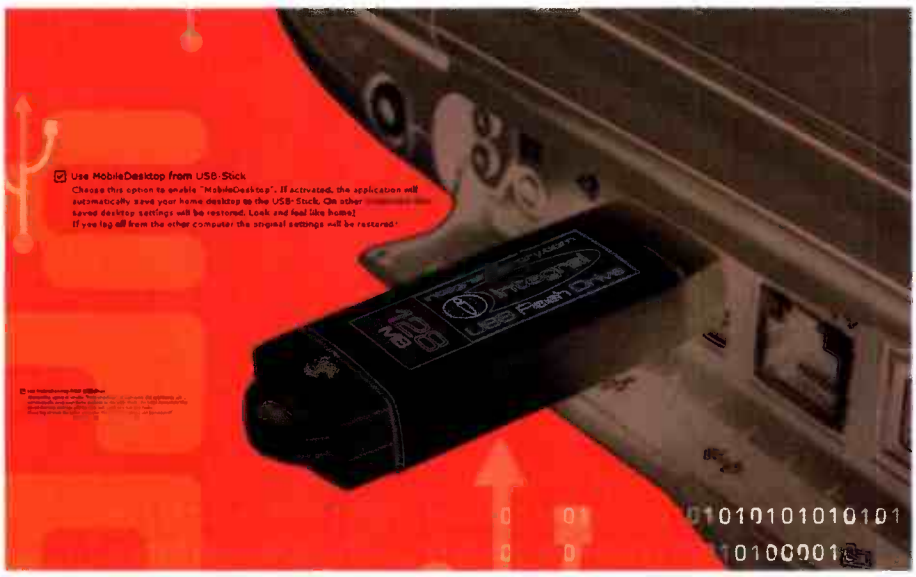
# Pocket office

*USB Flash drives have evolved from being simple high-capacity storage media to economical all-purpose tools. Manuel Masiero explains how they can be put to use as mobile applications and even bootable operating systems for both Windows and Linux*




According to the U3 consortium (www.u3.com), around 80 million USB Flash drives (UFDs) were sold worldwide during 2005. Their popularity is due not just to their small size and relatively high capacity, but also the range of gadgets and gizmos that can use them: Wifi adapters, Flash card readers, audio players and fingerprint readers to name just a few. Their versatility is demonstrated by their use in a wide range of hardware, and the software that can be installed on them.

### Your office on a key ring

UFDs now have enough capacity to transport a veritable mobile office. Whether it's an office suite, graphics program, web browser, email client or virus scanner, all kinds of applications will run straight from a UFD, on any computer. There is no need to carry installation CDs around any more. This doesn't just apply to programs, but extends to your personal working environment: desktop settings, Internet bookmarks and folders such as My Documents can all be copied to the Flash storage device and used on any convenient PC as if you were working on your own machine.

Performance isn't bad, either; top-of-the-range models such as the Buffalo Firestix can read data at 31Mbytes/sec, as fast as a 2.5in hard disk.

### Emergency operating systems

One of the great advantages of a UFD is the the ability to load a complete operating system onto one device. In the event of a system crash or virus infection with no recovery tools to hand, this kind of emergency boot device can be a lifesaver. With Windows or Linux on the UFD, you can run the utilities from an easy-to-use graphical front end, which is very handy if you want to make backups or rescue important data. Also, almost every PC has a spare USB port, but not all have a disk drive for an emergency boot floppy. See our feature on page 104 for more information.

## OFFICE IN YOUR POCKET

It is possible to install numerous applications, such as web browsers (see screen 1), office tools and multimedia programs, straight to a UFD without installing on the hard disk first. This is practical and saves time. Software on your UFD can give you access to your favourite programs, anywhere, at any time.

### Potential hurdles

You may be able to install any piece of software on a UFD, but starting isn't always so straightforward. Lots of software, such as Microsoft Office, stores its settings in the Windows Registry. This is not a problem as long as the software is being run from the hard disk or a local UFD. But if you plug the UFD into a different PC, the program will search in vain for the missing Registry entries.

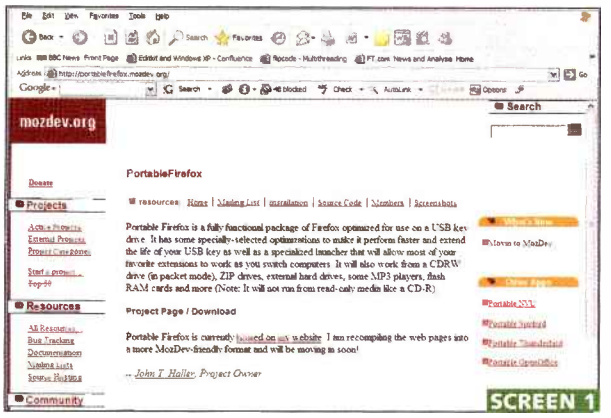
The solution is that, for a program to work correctly from a UFD on any computer, it has to store all its settings in its home directory on the UFD. An example of a program that does this is Open Office (www.openoffice.org).

Another hurdle concerns privacy. When they start, some programs create temporary files that they need while running. When you remove the UFD, these files often get left behind on the host PC. For example, if you are running an instant messaging application from a UFD in an Internet café, you probably don't want the next user to be able to read your conversation in a log file. Play safe by using the freeware instant messaging client Miranda (www.miranda-im.org), which can store all its temporary files on the UFD.

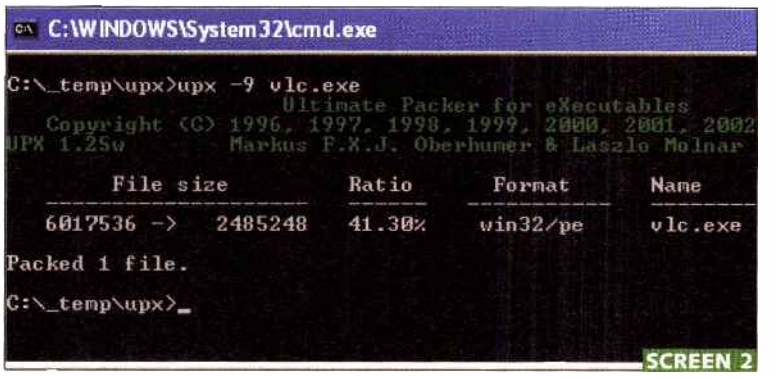
Stumbling blocks such as Registry entries and temporary files are a thing of the past, with the arrival of UFDs with U3 tools (see our review of the Kingston U3 Data Traveler in the March issue of *PCW* and at www.pcw.co.uk/2148970). Sandisk (www.sandisk.com) and M-Systems (www.m-sys.com), worldwide leaders in Flash product manufacture, have jointly initiated U3 to create a universal platform for UFD programs. Until it becomes more established, though, choose software for your UFD with care. We've selected and tested the best programs to use: see the table on page 117.

### Saving space with compression

Some applications need lots of space and may not fit on smaller UFDs. However, UPX




The customised version of the Firefox browser runs from a UFD




The command-line tool UPX compresses executable files (here, the VLC Media Player) and helps save space on smaller UFDs

(http://upx.sourceforge.net) noticeably shrinks exe and DLL files; for example, when compressed with UPX, Open Office requires 75MB of storage instead of 125MB on the UFD (see screen 2). As the file extensions remain the same, the program files are still executable. A powerful algorithm ensures files compressed with UPX run almost as fast as the originals. In use the difference in speed is barely noticeable.

### Get your desktop on any PC

Having your favourite programs on a UFD is only a partial mobile office. Only if you can use your own desktop settings on any PC can you really claim to have a tool that makes every desktop your own.

Cheap shareware tools such as Mobile Assistant ($20/£13.71 to register, free version available, www.mobileassistant.de) help with this task and save your desktop configuration options – such as background colour, wallpaper and fonts – with a single keystroke. As well as desktop settings (see screen 3), Mobile Assistant can copy Internet Explorer bookmarks and system directories, such as My Documents, to the UFD, to be used instead of the corresponding local files and folders. The only problem we found is that the English version still includes lots of untranslated German menu text.

A companion program that offers other functions is the shareware USB Toolbox 2 (€15/£10.28, www.koma-code.de), which features 17 useful applications and utilities that will run from your UFD, including a word processor, email client, calendar, browser, file encryption and lots more.

At a push, you can also use one of Windows' own tools to permanently transfer personal settings to a PC from the UFD. Start the Files and Settings Transfer Wizard using Start/Programs/Accessories/System Tools. After selecting the transfer method, in this case the UFD, the tool transfers files, settings or both to the UFD. Unfortunately, to use these settings, you need to run the wizard on every PC you plug the UFD into, in order to import your files and/or settings. This is only practical for a one-time use, as the PC's settings are permanently changed even when you remove the UFD.

## 'UFDs now have enough capacity to transport a veritable mobile office'

### Hiding partitions

If you lend other people a UFD that contains important data, to ensure no unauthorised third party can gain access to the files, use a utility that places data in a hidden and encrypted partition on the UFD. Most UFDs come with software that lets you divide the UFD into private and public partitions. When the UFD is connected to a PC, only the public partition is visible. Windows only allocates a drive letter to this partition. The private area becomes visible after entering a password, and only then is it allocated a drive letter.

If your UFD comes without a secure partition or other security software, you can use separate encryption software to help keep your data safe. A good program for this is Safeguard Private Crypto (www.utimaco.com), which is free for private use. This utility can be run straight from the UFD and provides a rapid, secure encryption using the 256bit AES algorithm.

## BOOTING FROM A UFD

In this section we'll show you how to make a UFD bootable and how to run Dos, Linux and Windows from a UFD. Mac users are out of luck: you can't start a Mac from USB media as a reset is carried out on the USB bus during OS startup. Windows also does this, but there's a workaround available.

### Check that it boots on your PC

Not all UFDs can be booted from all PC motherboards. The problem could lie with the UFD, the board, or both. There is no rule that says UFDs must be bootable, but it's possible the computer's Bios does not support booting from UFDs. There isn't a single USB boot standard yet, so it is up to each motherboard manufacturer what kind of USB boot support they put in the Bios. To be safe, install the most recent Bios version. According to the Bios type – Award/Phoenix or AMI – you might have to adjust various settings.

The box on page 114 gives more information on Bios settings. The rest of this section describes in more detail the procedures for using Dos, Windows and Linux on a UFD; for Windows we'd recommend at least a 256MB UFD. If one of the operating systems doesn't work for your hardware combination, one of the others will usually be successful.

### Booting Dos from a UFD

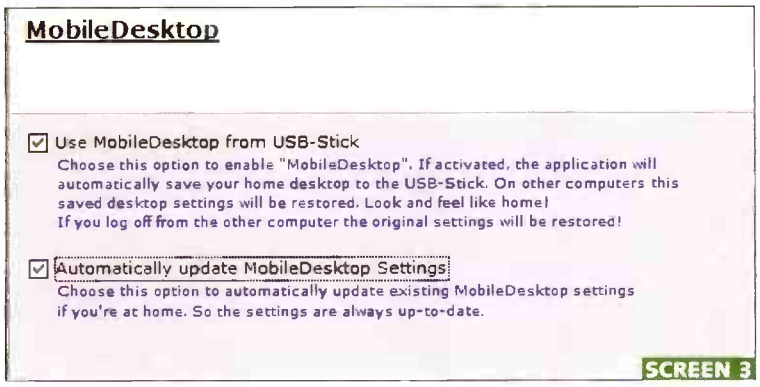
The easiest way to get Dos to start from a UFD is to use a Windows tool such as the HP USB storage format tool (http://tinyurl.com/6zheh).

## How to create a UFD hard drive in Linux

Linux offers the possibility of formatting a UFD, not just as a superfloppy but also as a hard disk. To do this, open the shell and delete the first physical sector of the UFD using the command:

```
dd if=/dev/zero of= /dev/uba bs=512 count=1
```

After this, start fdisk by typing `fdisk /dev/uba` and enter `n,p,1` to create a new primary partition, marked with 1 as active. Specify the Fat16 file system for the USB stick by entering the command `t,6`. Use `w` to write all the settings to the stick. Finally, use the shell command `install-mbr /dev/uba- -force` to write the master boot record.




Mobile Assistant copies your personal desktop settings to the UFD

It can make almost any UFD bootable by writing a boot sector and, optionally, copying Dos system files across from a bootable MS-Dos disk. If you don't have a Dos startup disk, download one from www.bootdisk.com.

You can avoid this route altogether by creating a master boot record (MBR) using the MBR Tool (www.marlow.dk/tech/src/mbrtool.zip). This comes with Dos system files already included, but it can have trouble with some UFDs larger than 256MB.

Another way of making a bootable Dos UFD is to use the command-line tool Mkbt (Make Bootable, www.nu2.nu/mkbt). Before using it, format the UFD to use the Fat file system. You can do this in Windows Explorer by right-clicking on the UFD's drive letter and choosing Format from the context menu. Then open a command prompt (Start/Run 'cmd') and use the command:

```
mkbt -c a: [drive:/directory ↙
name]\bootsect.bin
```

(Key: ↙ code string continues)

to extract the boot sector from an MS-Dos boot floppy to a directory on your C: drive. Next, install this on your UFD drive (E: in this example) using:

```
mkbt [drive:/directory ↙
name/]bootsect.bin e:
```

The last thing to do to create a bootable Dos UFD onto which you can copy recovery tools is to copy over all the system files, including the hidden ones, from the Dos startup disk.

### Hard disk or superfloppy

If none of the attempts above bear fruit, then the motherboard can't cope with the UFD format. The reason is there are two methods of formatting Flash memory.

The first method is as a hard disk, using an MBR, partition table and partition, which can be accomplished using Windows' own tools.

The second is a superfloppy. In this case the media is treated like a floppy disk and doesn't have a partition table. As far as the user is concerned, there's no difference between these two methods. Both hard disk and superfloppy UFDs are classified as removable media under Windows and can be inserted or removed as usual. But the difference is important for the Bios. Not every Bios can use either type of disk as boot media. In some cases you can explicitly specify whether the UFD should emulate a hard disk or a superfloppy; in others, you can't choose, or a particular type is expected.

### Create a superfloppy with Knoppix

To convert a UFD into a superfloppy you need more than Windows' own built-in tools, which is where Linux comes in. You don't need to install Linux; a free Live version such as Knoppix (www.knopper.net/knoppix), which runs Linux directly off a CD, is enough. Once you've booted the system from the CD, switch to the shell (command line). In Knoppix, you do this by clicking on the monitor symbol at the left of the Taskbar. You can insert the UFD after the system has started; Linux also has hardware recognition built in these days. In the shell enter the commands:

```
install-mbr/dev/uba- -force
mk-dosfs -I /dev/uba1
```

to assign an MBR to the UFD and format it as a superfloppy. Take care as the UFD might be mounted under a name other than /dev/uba; find out what it is by typing ldisk-l. This command lists all integrated partitions. USB devices are normally listed as /dev/sda but can, as is the case with Knoppix, show up as /dev/uba. After formatting, you can use Windows to transfer Dos system files and recovery tools or, as shown below, an emergency Windows system to the UFD.

### Windows XP on a UFD

A bootable Dos UFD is useful if your PC's operating system won't start. However, some of the features you take for granted under Windows are missing, including access to NTFS partitions, network support, Internet access and support for creating data backups.

These functions can be regained using Bart's PE Builder (www.nu2.nu/pebuilder), which can put a tiny installation of Windows XP (150MB) onto a UFD (see screen 4). When it starts, it builds up a graphical user interface (GUI) that has all the kernel, network and device drivers of Windows XP. You can use plug-ins to incorporate any programs you want into your emergency Windows. Find examples and instructions for creating plug-ins at www.nu2.nu/pebuilder/#plugins. ↘

## Bios settings

To enable the UFD to boot, USB media must be configured as bootable drives in the Bios. According to the Bios type and version, this is specified under Bios Features Setup, Advanced Bios Features, Advanced Cmos Setup or simply under Boot. If you can't select a USB storage device as the primary boot device then you should check for an option such as Boot From Other Device. To use the UFD as a boot medium, it is also essential to activate USB Legacy Support from the Bios Features Setup (or equivalent) menu entry.

### Pick the right UFD format

If a USB stick won't boot in spite of being configured correctly, the Bios is expecting a different stick format. USB Flash storage can be configured either as hard disk or superfloppy, and only a few Bios versions can cope with both. If you can specify the emulation type – for example Floppy, Forced HDD, Hard Disk or CD-Rom – in the Bios you'll have a better chance of booting from the UFD. Mostly, however, only one particular format will be recognised.

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### Using Bart PE

As well as PE Builder, you need an original Windows XP Home or Professional setup CD with Service Pack 1 (SP1) or, preferably, Service Pack 2 (SP2). If you only have an original setup CD, you can quickly make a slipstreamed version. See our feature on page 104 for full instructions on how to do this.

To install Bart PE, follow these steps. First, use the HP USB Storage Format Tool to format the UFD but don't use the Quick Format option. Then start PE Builder, entering the path to your Windows CD and the output directory (this can be anywhere on your hard disk) and collect any software plug-ins you want to integrate using the Plugins button. Don't select the Build ISO Image option, as the files generated with PE Builder will later be copied straight to the UFD. Clicking 'Build' creates your mini-Windows in the specified output directory. Simply copy all the files from this directory to the UFD.

Now you need the files setupldr.bin and nt-detect.com from the i386 directory on the Windows CD. Copy these to the UFD's root folder – for example to G:\ – and rename setupldr.bin to ntldr. Finally rename the i386 directory on the UFD to mini-nt and Windows XP should boot from the UFD.

### XP variants using a Ram disk

On startup, if you get a blue screen with Error Code 7B (Inaccessible_Boot_Device) instead of the Windows desktop, then the USB driver loaded by Windows has triggered a bus reset. You can get round this with a trick, but it means downloading the 350MB SP1 for Windows Server 2003 (http://tinyurl.com/4fzhy). This includes the file setupldr.bin, which enables PE Builder to start Windows using a Ramdisk loader rather than a USB driver, thus avoiding the blue screen problem. SP1 for Windows Server 2003 is extracted from the command line using the syntax [Servicepackname] –r. Copy the files setupldr.bin and ramdisk.sy_ from the Service Pack's i386 directory to the PE Builder /srsp1 directory, created previously. The file ramdisk.sy_ is a compressed file: use the command-line command expand -r ramdisk.sy_ to decompress it to ramdisk.sys.

The rest of the procedure is similar to the method described previously: format the UFD, start PE Builder and configure the plug-ins. This time, enable the Build ISO Image option and let PE Builder create the image. To get the files onto the UFD, download the utility Pe2usb (http://tinyurl.com/afpcl) and unzip it to the PE Builder directory. Pe2usb makes the UFD bootable and transfers the image file created with PE Builder. This is done with the command-line command Pe2usb -f drivename. The -f switch formats the Flash memory and drivename specifies the path to the UFD.

### Booting Linux

While you have to use various tricks to make a special mini-Windows which will start from a UFD, there are numerous Linux derivatives that are specially designed for booting from a UFD. Two of these customised Linux operating systems are Damn Small Linux (www.damnsmalllinux.org) and Puppy Linux (www.goosee.com/puppy). Both are only 60MB in size, but are complete operating systems including network support, a file manager and GUI.

**'There are numerous Linux derivatives designed for booting from a UFD'**

### Making a UFD bootable for Linux

To get Linux on the UFD and make it bootable, use the command-line tool Syslinux (http://syslinux.zytor.com) and enter Syslinux [driveletter]. Unpack the ISO file containing the Linux system to the UFD using a tool such as Winrar (www.winrar.com). With Puppy Linux the file isolinux.bin in the root directory is deleted and isolinux.cfg renamed to syslinux.cfg. If you're using Damn Small Linux these files are located in the boot\iso-linux subdirectory and have to be copied to the root directory and renamed. After this procedure Linux should boot from the UFD.

A very easy method of transferring Puppy Linux to the UFD is built in to the OS: burn the ISO image to CD and start it from there. As it boots, Puppy Linux automatically recognises any UFDs that are plugged in, and you can then use Start, Setup, Install Puppy USB Card to transfer the Linux OS to the UFD. **PCW**

**Bart's PE Builder can create a mini version of Windows XP that you use on a UFD**

## UFD software

| CATEGORY | PROGRAM | SPACE REQUIRED | DESCRIPTION | URL |
|---|---|---|---|---|
| Anti-virus program | Stinger | 1MB (compressed) | A standalone scanner from McAfee | http://vil.nai.com/vil/stinger |
| Image editing | Irfanview | 1.2MB (compressed) | Picture viewer with simple editing functions | http://irfanview.com |
| Email client | Portablethunderbird | 9.1MB (compressed) | Portable version of the popular email client | http://portablethunderbird.mozdev.org |
| Instant messaging | Miranda | 1.8MB/1.6MB (compressed) | The popular instant messaging software with multiprotocol support for the USB stick | http://miranda-im.org |
| Multimedia | Video Lan Client | 17.1MB/10MB (compressed) | This Media Player will run from a stick, using the parameters -no-plugins-cache and -config="vlcrc" if the vlrc file has been copied to the VLC directory | http://videolan.org |
| Office suite | Open Office.org | 125MB/75MB (compressed) | Contains a word processor, spreadsheet and presentation program | http://openoffice.org |
| Encryption utility | Safeguard Private Crypto | 10MB/2.9MB (compressed) | You can use Safeguard Private Crypto to encrypt important data with a 256bit algorithm | http://utimaco.com |
| Web browser | Portable Firefox | 6.5MB (compressed) | Portable version of the cult browser | http://portablefirefox.mozdev.org |

# PVR tips and tricks revealed

*You can use personal video recorders for more than just recording TV programmes. Nigel Whitfield explains how and our workshop shows you how to upgrade your Sky+ box*

We looked at media centre software and hardware in *PCW* January 2006, including Showshifter, MythTV and PCs running Microsoft's own XP Media Center, and for some people, the flexibility of a PC-based entertainment system can't be beaten.

But what if you don't want a PC in your living room? You want something that's designed from first principles to be a reliable TV recording device? Well, personal video recorders (PVRs) aren't new – Tivo has been around for years – but the latest models are cheaper than ever and work directly with today's digital satellite and terrestrial broadcasts. And if you thought a PVR simply meant a Sky+ box and an accompanying monthly subscription, think again.

Some of the latest PVRs are potentially much more than a closed box of consumer electronics. You can easily add larger hard drives for more storage, transfer mp3s from your PC for playback in the living room, and even develop your own software to run on them to change the look and feel of the interface, or link them to the rest of your home network. When you consider that you can do all that for less than £300, they start to look like an interesting alternative to a full-blown media centre PC.

We're going to take a look at what sort of PVRs are available in the UK, how computer-friendly they are and how easily you can enhance and tweak them, from upgrading hard drives, to networking and even remotely setting TV recordings via your mobile phone.

For many people in the UK, a PVR means Sky+, a box designed to work with BSkyB's satellite service Sky, and which allows you to record two channels at the same time, directly onto a hard drive. For some, Tivo – no longer sold new in the UK – is the only 'true' PVR, with its intelligent searching and ability to recommend programmes it thinks you might like.

Over the past couple of years, however, the PVR market has changed substantially, with the increasing popularity of Freeview, the digital terrestrial TV service. There are now more and more PVRs that work with Freeview, ranging from £100 models that can only record the thing you're tuned to – in effect, simple digital video recorders – to sophisticated twin-tuner models that can let you record two things while viewing a third, with the ability to search for programmes by genre, play back music files and link up to a PC. And there are satellite options too – less popular in the UK, where to most people satellite and Sky are synonymous – which will let you receive free-to-air satellite broadcasts.

This new breed of recorders has certain things in common; first, they all record the digital broadcast directly to the hard drive, giving you the same quality on playback as on live broadcasting – unlike Tivo, for example, which digitises an analogue video input. They also rely on broadcast programme data for their built-in Electronic Programme Guide (EPG). This means that – with the exception of Sky+ – there's no real metadata; the extra information that tells you a programme is episode six of series three, or that it stars Harrison Ford. With Sky+ and Tivo subscriptions, it's really the metadata you're paying for; that's what allows a box to record every episode of a series, for example, no matter if one week's show is two hours late because of the football. Without this, and an unmodified box, you're restricted to basic repeating timers, or having to check the EPG manually to make sure you don't miss a changed timeslot.

**Sky+ is the most widely known PVR – but you can get similar features, and more, without paying a monthly subscription**

## Storage space

While the latest PVRs may be sold as consumer electronics items, they're not just something you plug in and leave under the TV. Built around a hard drive, one of the most obvious things you can do is to upgrade the amount of storage – if you're frustrated by a mere 40 hours or so of disk space, just whip out and replace the hard drive.

On most units, as you can see in the workshop on page 122, it's a simple matter of changing the drive and picking the Format option from the menus; the system software is stored in flash memory, so you don't need to worry about copying anything from the old drive. It's important, though, to make sure that you pick a drive with similar power consumption – there may not be as much spare capacity on a PVR's power supply as a PC's, and heat can be an issue too.

If lack of storage space is an issue, upgrading the hard drive isn't the only way to do it; some PVRs – such as Humax's integrated digital LCD TV with PVR, have a USB socket and act as USB hosts; that means you can plug an external hard drive into them, and copy programmes from the internal drive to the external one. Plug the drive into your PC, and you'll have access to the video files.

That, of course, is a long way round. And – perhaps surprisingly, given the worries about copying music digitally – many PVRs now come with ways to link them directly to your computer.

## Programme transfer

Tivo, of course, has long had the option of a network card on newer US models, but UK users have had to fit one themselves. For

those looking to buy new equipment, the Dreambox satellite PVRs have an Ethernet connection, allowing you to link them directly to your home network and offload programmes, which you can then convert for DVD authoring.

If you're thinking of doing that with Sky Movies, though, think again; while satellite PVRs have slots for subscription modules, there's no such module available for channels carried by Sky; if you want to record its channels digitally, you need its box. Look out, though, for a proposed free satellite service from the BBC (Freesat), which will be broadly equivalent to Freeview, give or take a few channels.

The Dreambox isn't the only way to access material from such channels via your computer; there are other satellite PVRs, notably from Humax and Topfield, that offer USB connectors for transfer of files to and from your PC. As well as transferring recordings to the PC when the PVR's disk is almost full, you can copy mp3s in the other direction, to play back through your TV or home cinema system.

For an increasing number of people, digital terrestrial television – the DVB-T Freeview service – is becoming the best way to get a PVR, without having to pay monthly fees. With the likes of Aldi selling Freeview PVR boxes for under £100, replacing your video recorder and getting extra channels into the bargain is a great way to go digital. But don't expect to find sophisticated features on the cheapest models.

When it comes to linking up to your PC, there are really two main products on the market right now – the Humax 9200T and the Topfield TF5800. Both have twin tuners, allowing you to record two channels simultaneously, and even watch a third in some circumstances. They have a Common Interface slot, allowing upgrades to work with pay television, such as Top Up TV (www.topuptv.com) and, more importantly for *PCW* readers, they both have a USB port and software to link them to your PC for transferring files back and forth.

Both, then, allow you to copy recorded programmes to your PC and convert them to DVD – provided you're prepared to spend the time; though both boxes boast USB2 ports, the fastest transfer speed you're likely to see is around three times real time, or 20 minutes to copy a one-hour programme to your PC. For faster transfers, Topfield users can pop the hard drive in their PC and use a program called TopFHDRW to read the hard drive directly. A similar tool, called Syphon, can read the hard drive format used by some Thomson and Fusion PVRs, thus overcoming their lack of a USB port – though obviously removing the hard drive to copy files is going to invalidate your warranty and can be fiddly.

Bear in mind that the exemptions from copyright in the UK do not cover making an archive of programmes for repeated viewing; just as is the case with video recording, all you're legally allowed to do is timeshift, that is, to record content for watching at a more convenient time.

## DVD creation

If you want to create a DVD from a programme recording, perhaps to watch in a more convenient place, you'll find that both Humax and Topfield boxes – together with

The Humax 9200T is one of a small number of Freeview PVRs that boast USB connectivity

Whatever PVR you use, Project X is an essential tool for converting broadcast mpeg streams into a format suitable for DVDs

their satellite counterparts and the output from tools such as Syphon – give you an mpeg Transport Stream; that's slightly different to the Program Streams used on DVDs, but a wide range of tools can convert them. One of the most flexible is a Java application called Project X, which will also process the header that Topfield PVRs put at the start of the video file.

Then, all you need to do is load the mpeg file into a DVD creation tool such as those from Cyberlink, Nero or Roxio on the PC, or Toast on the Mac, and you can burn a disc without having to re-encode the programme. If you're feeling adventurous, you can also edit it, to chop out adverts, or even extract the subtitles from the broadcast video and convert them for DVD, but be warned – when you start doing more complicated things like that, you can spend hours getting the right results, and making sure sound and vision stay synchronised. When you consider the low bit rates on many Freeview channels, the lack of surround sound, and the time you'd have to spend to create a

## The missing link: how to network your PVR

While domestic PVRs such as the Humax and Topfield models have USB ports, they don't come with Ethernet – though expect to see a wireless Topfield model for UK digital terrestrial TV late in 2006, which may even include a built-in web server. In the meantime though, how do you network a box that has no network connection?

The answer lies in small devices such as the Linksys NSLU2 – affectionately known as a Slug – designed to share USB hard drives over a network, or an increasing number of wireless routers that have USB built in too. Flashing the firmware on these devices with alternatives such as Unslung (www.nslu2-linux.org) or OpenWRT (www.openwrt.org) turns them into general-purpose Linux boxes with network and USB connectivity, onto which you can install tools to communicate with your PVR via USB. Some, such as Puppy, simply provide a command-line tool to copy files to and fro, while others let you present the PVR's disk to the rest of your Lan as an FTP server. At the moment, the only tools for models we've looked at here are aimed at the Topfield, but it probably won't be long before enterprising coders work out the USB commands for the Humax models.

It's not just file access, either – many of the tools we've talked about, such as EPG harvesters, can run on these small Linux devices. With PHP and Perl, you can script backups of programmes onto your PC, and you can even run media server apps such as Twonkyvision (www.twonkyvision.de) on them, so with a little scripting, they could make selected content from your PVR available to streaming media players around the home.

DVD with subtitles, it may just be easier to bite the bullet and buy the retail DVD boxed set.

In fact, as well as converting a stream to a format suitable for using in DVD authoring tools, Project X works the other way round – so you could take your wedding DVD, convert it to a Transport Stream and upload the resulting file to your PVR, to have accessible whenever you want.

## Going further

While both the Humax and Topfield models allow file transfer and playback of mp3s – they're both built on a very similar hardware platform, NEC's EMMA2 – for those who want to get a little more into tweaks, hacks and enhancements, there's little doubt that, short of going for a full media centre computer, whether Windows or Linux based, the Topfield PVRs are currently the most flexible.

That's because, uniquely for consumer electronics products like this, they're designed to allow additional software to be run on them; unlike devices such as the Linksys NSLU2 (see the missing link box, on page 119), you don't have to replace the firmware – there's a built-in mechanism to launch additional applications, a published API for programmers, and an open-source tool chain based on the GCC compiler, so you can write your own code to run on the box.

And – perhaps partly because of that – the box has attracted attention from non-Windows users, with the result that there are tools such as mpeg Streamclip for the Mac and Puppy for Linux/Unix systems, to provide the same file transfer features that the manufacturer supports under Windows.

## Running Taps

Topfield's system for add-ons is called Taps – Topfield Applications. A Tap typically works like the old TSR (terminate and stay-resident) applications on a Dos PC; it can be started manually or automatically by putting it in the ProgramFiles/Auto Start folder on

**Top left: The Topfield's standard list of scheduled recordings is OK...**

**...but why not make it even better, with an add-on Tap? (bottom left)**

**Topfield's PVRs are designed to allow users to add their own software, enhancing and improving the box**

the PVR, and then it receives notification of events – channel changes, key presses on the remote, and so on – until it sees an event that it's programmed to handle.

That's typically a press of a remote key, which signals the Tap to do its stuff; before you get too carried away, the API is somewhat limited and since the core operating system isn't built in Linux, you're a little limited – though some of the more enterprising coders have found ways to hook directly into the firmware, changing the front panel display, for example. The Topfield API provides for control of playback, recordings, management of timers and the EPG, on-screen displays, file functions, and communication via USB and serial ports. It may not sound a lot, but even within those constraints, it's amazing what some programmers have achieved – there are even versions of Sudoku, Doom and Lords of Midnight that run on the box.

But what of enhancing the PVR itself? Not happy with the look of the built-in timer list, or the fact that it takes several key presses to reach it? Load up the UK Timers Tap, for one-button access to a much easier to use, more colourful version – which can also import a list of recordings to create from the Digiguide desktop TV scheduling application.

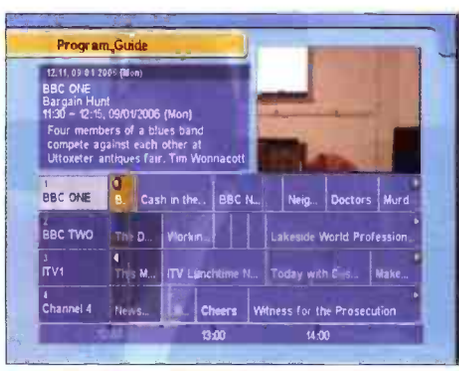
Or if you find the built-in EPG frustrating, there's a wide range of alternatives, giving you a Sky+ style grid view, or a more compact view with more channels shown. And since some Freeview broadcasters seem to find it hard to maintain a reliable EPG, tools such as the popular Jag's EPG can be configured to save received data to the hard drive. Even more useful, it can search the data too, and automatically set recordings – so even if *Bleak House* appears at a different time each day it's broadcast, you'll still be sure of catching it, and you can miss out the repeats too.

And while the Topfield's built-in mp3 playback is adequate, it's not a patch on the mp3 jukebox Tap, that can display album artwork and make use of the information tags in your music files.

## Reaching out

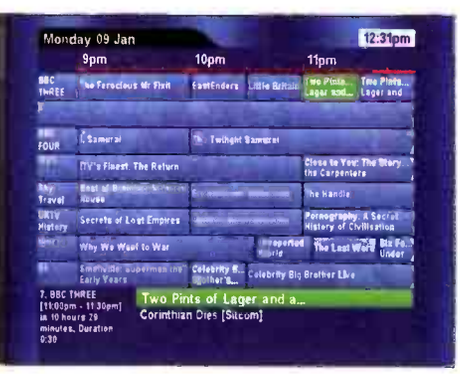
These, of course, are mostly just enhancements to a box that sits under your TV. But the USB connection makes things much more flexible; potentially, you could use the serial port to link your Topfield to a

**If you don't like the look of the standard electronic programme guide...**




**...how about EPG Navigator, with support for detailed descriptions from Radio Times.com**

**...or the more colourful IP Guide. The choice is yours as there are loads of alternatives around**



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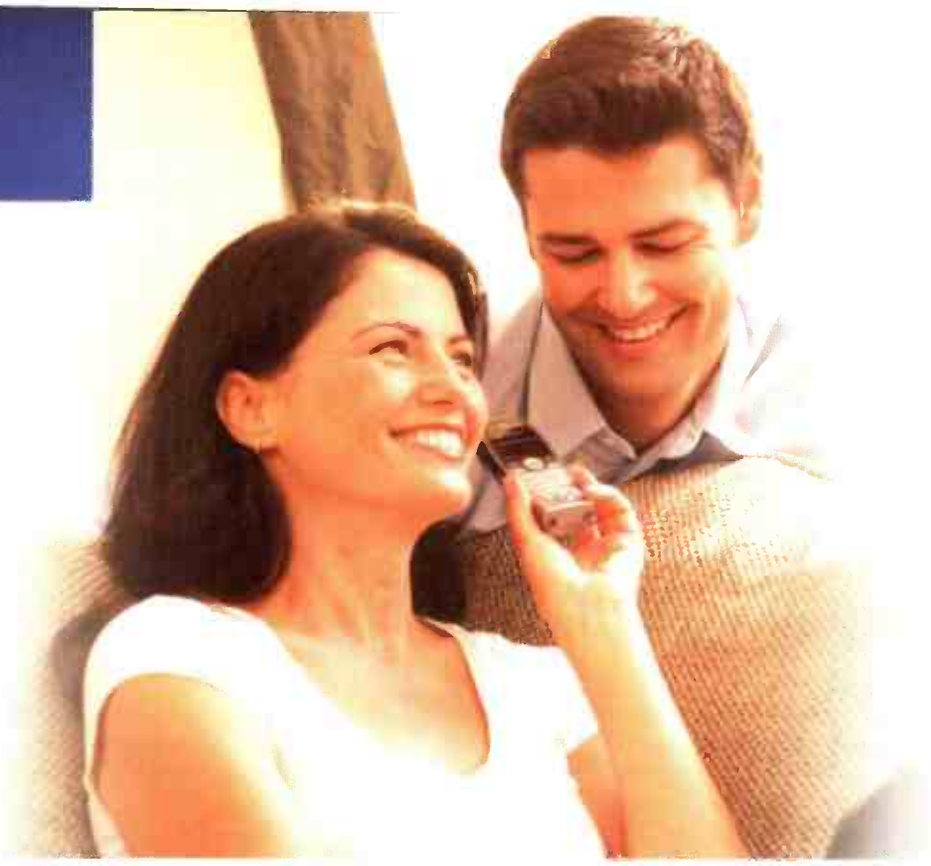

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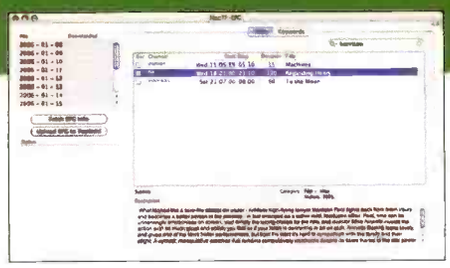
home automation system, for example, sending messages to turn lights on and off with the TV remote. Other users have experimented with on-screen notifications of email received on their PC. And the USB connection can be a source of EPG material too; the *Radio Times* website makes its data freely available for personal use, and it's widely used by the XMLTV project, providing listings for lots of open-source PVR projects too.

It's also key to some of the add-ons for the Topfield, such as Mystuff Extended info, which uses *Radio Times* data to replace the broadcast Freeview listings, enabling tricks like searching by genre, or displaying ratings for films – as well as more detailed episode information.

There's even a Mac application, called MacTF-EPG that will let you search the listings on your desktop, creating timers which can then be transferred to the PVR to schedule recording.



**Even Mac users are catered for, with a tool to download TV listings and schedule recordings from their computers**

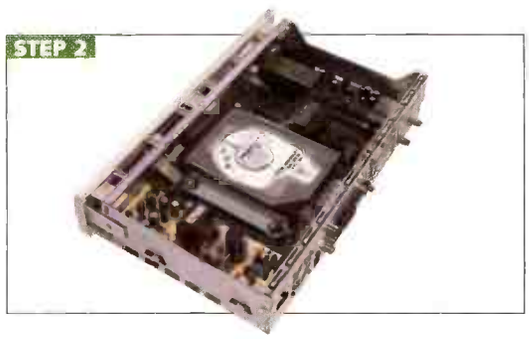
# Upgrading your Sky+ hard disk

Sky+ boxes are incredibly user friendly but, as many people have found, the biggest drawback to all but the most recent Sky+ 160 boxes is the standard 40GB hard disk size. This holds about 20 hours of TV and for many, especially families, this simply isn't enough.

Although not recommended or endorsed by Sky, you can install a bigger hard disk, and the following workshop shows you how to upgrade a second-generation Pace unit. It also looks at some of the problems we encountered during the upgrade. There are plenty of sites online with guidelines on this upgrade, and we read through a few before starting – including www.morlocks.co.uk/disc-change-v2.htm. Before you begin, though you need to decide how big a disk you want to install. A very rough guide is that a 160GB disk will record around 80 hours of TV, and an 80GB will record around 40 hours.

Hard disks can be pretty noisy, so it's also important to buy one with a reputation for silent or near silent running, and as we discovered with our first attempt, a faster spin speed may create more noise (see box below).

Finally, attempting this upgrade will invalidate your warranty, and *PCW* can't be held responsible for any problems you encounter.




1 We used a 160GB Seagate U Series 9 ST3160022ACE (£55.21 from www.insight.com/uk), which is optimised for consumer electronics products. Good alternatives include the Seagate Barracuda range and Maxtor's disks, which have reputations of being quiet. Our Seagate disk will hold about 80 hours of programmes, and the final size you choose really depends on how much space you think you need. Make sure you buy a Parallel ATA (Pata) drive and not a Serial ATA (Sata) drive, as this won't fit in the box. You also need Torx T10 screwdriver, which can be bought from hardware stores, and a Philips screwdriver. Finally, before you start, make note of any programmes you've set to be recorded.

2 Before you disconnect the cables and open the box you need to turn off Instant Rewind. To do this go to Sky Services> Sky+ Set up> Instant Rewind and select Off. Save your settings and exit. Turn off the box and while it's cooling note which cable goes into which connection to save time later.

Using the Philips screwdriver, unscrew the lid and slide it back and off – it will probably need a little gentle persuasion.

## Troubleshooting

Initially we used a Hitachi Deskstar 160GB drive, which costs £53. Although it claims to be a quiet disk, it was definitely noisier than the 40GB Maxtor that it replaced. However, the noise was not so loud as to be annoying. But we found this disk did not work properly in the box. Recordings suffered from frequent pixellation and freezing, and the box turned itself off several times. Also, the fan continually spun because the disk required more cooling than the Maxtor it replaced. The original drive had a spin speed of 5,400rpm, while the Hitachi's spin speed was 7,200rpm.

A search online found various forums talking about similar problems, with some suggested attempts to fix them, but none worked in our case. So for this upgrade, we'd recommend you try the Seagate U Series 9 we've used, because it is optimised for such devices. It's still slightly noisier than the Maxtor, but with a 5,400rpm spin speed, the fan isn't spinning continuously and pretty much the only time we hear it is when the TV is switched off but the Sky+ box is still on.

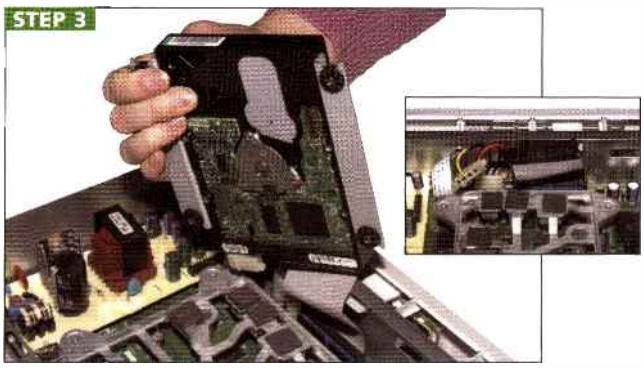
A good source to research if you want more information or hit a problem is the Digital Spy forum at http://forum.digitalspy.co.uk/board/showthread.php?t=319953.

With a little work, in fact, you can even set recordings remotely; with three different Taps able to read a file and create timers from commands in it, all you need to do is create a file via a web interface and copy it to your PVR.

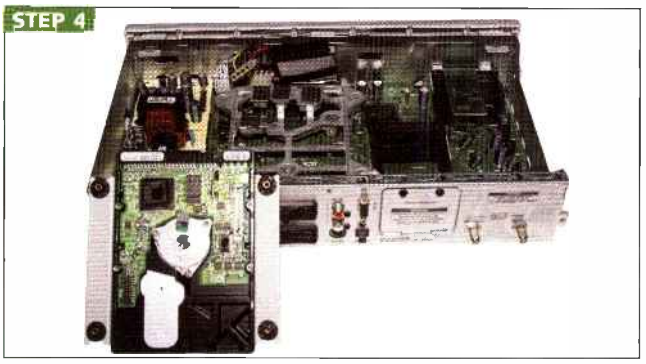
So, while media centre PCs get most of the attention, take a look at the current crop of PVRs – you may be surprised just how much you can make some of them do. **PCW**

## Resources

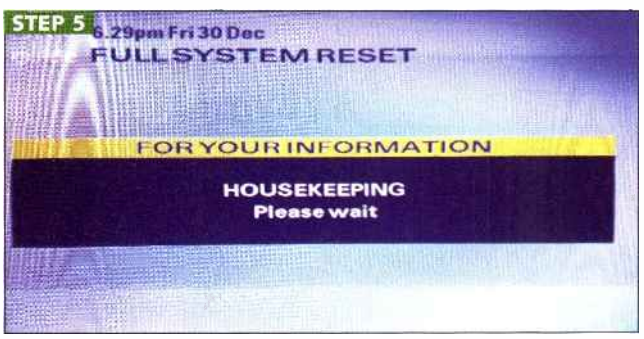
**Digiguide** www.digiguide.com
**MacTF EPG** www.noates.com
**MPEG Streamclip** www.alfanet.it/squared5/mpegstreamclip.html
**Project X** www.oozoon.de/main_en.html
**Puppy** http://puppy.sf.net
**PVR World** www.pvrworld.co.uk
**Syphon** www.eccleson.org/Syphon
**TAP development tools** http://tap.berlios.de
**Topfield discussions board** www.toppy.org.uk (run by the author)
**XMLTV** http://membled.com/work/apps/xmltv



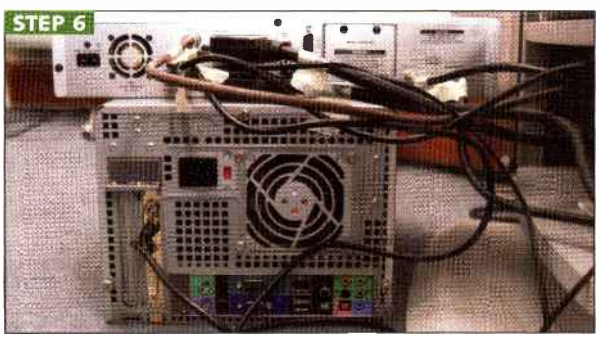

**3** Use the Torx T10 to unscrew the hard disk and lift it out carefully. There will probably be a slight resistance as you lift it off its rubber mounts. Disconnect the IDE and power cables – at this point it is much like disconnecting a hard disk from your PC. The four thermal pads (inset) should remain in place in the unit after the disk is removed.




**4** The disk is housed in two L shaped rails – use the Philips screwdriver to unscrew each and fix them to the new disk. The rails can be removed without sliding out the four shock pads. Check the jumper on the old drive, and copy its setting for the new one. Once in its mountings, it's simply a case of reversing the above process to fix it in the Sky+ box. Be careful not to over-tighten the screws. Once done, put the the lid back on, reconnect the cables and power up the unit. Give it time to turn itself on and get a signal.




**5** At this point you won't be able to record any programmes and need to perform a Full System Setup. This is not obvious on the Sky menu system so follow these instructions carefully. Press the Services button on your remote, and then select System Setup. Once in this menu, ignore the options on the screen and instead type '01' on your remote's keypad and then hit Select. You'll now be in the Installer Setup menu screen; select Full System Setup which takes you into Housekeeping and leave it to fully restore your box. With our 160GB disk this took eight minutes, but the time will vary depending on the size of disk you have installed. Once this has completed, press Services> Sky+ Setup> Instant Rewind, and select the number of minutes you want it to be able to rewind. With such a large hard disk fitted, we chose the maximum hour that it allows. Restore your programmes and any series links that you plan to record, and marvel at how much disk space is still available.




**6** Although the Sky+ box is an isolated unit, it can be connected via an analogue connection to your PC. We connected ours to a self-built Shuttle that uses an ATI X800GT All-in-Wonder card. This gives us both terrestrial and digital TV, plus by connecting the antenna cable from the TV to the PC's All-in-Wonder card, we can pick up Sky+ on the PC. By using a TV Link, we can control Sky+ from the room the PC sits in, and transfer a previously recorded programme onto our PC. *Rob Jones*

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# Practical advice from the industry's experts

EDITED BY KELVYN TAYLOR
ktaylor@vnu.co.uk

HANDS ON

## USER-FRIENDLY LINUX

Ubuntu Linux is rapidly gaining a name for itself as one of the most user-friendly distributions. It's even recently launched Edubuntu (www.edubuntu.org), a version specifically aimed at children, which has to be commended and is included on the cover disc with the DVD edition of *PCW*. Our Linux guru, Barry Shilliday, continues his tour through the standard Ubuntu distribution this month, showing you how to add DVD and Windows video playback functions, plus how to get to grips with Firefox 1.5 and use the groupware features of Novell's Evolution email client.

For those of you into making music, Niall Magennis shows you a few tricks you can use to create great rhythm tracks using the sound samples included with many music creation packages. He's used the excellent Reason from Propellerhead Software for his example, but the principles can be applied in most other well-known applications. I haven't heard Niall's final result, but knowing his tastes in music I'm sure it won't be in 3/4 waltz time.

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- WORKSHOPS
- HARDWARE SOLUTIONS
- SOFTWARE SOLUTIONS
- Q&A

# Advice from our experts

Solutions to readers' problems and answers to some tricky questions

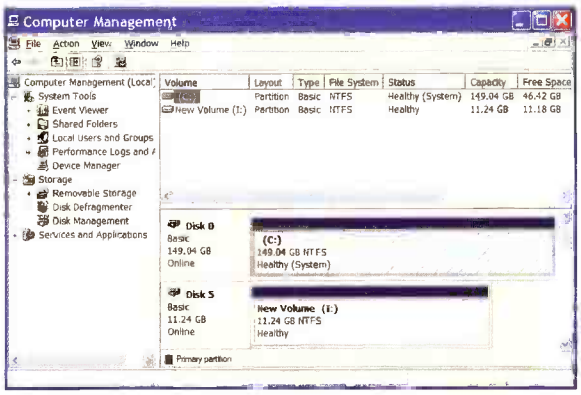
HARDWARE

## Where's my hard drive?

**Q** I recently had to replace my laptop following an accident. I have now purchased a new laptop and would like to use the old hard drive as extra storage. I bought a USB enclosure and fitted the drive into it.

The drive appears fine in Device Manager on the new laptop, but not as a drive in Windows Explorer. I believe I may need to reformat it. Both drives have Windows XP installed with SP2.

*Colin Ruxton*




XP's Disk Management function will help you format new hard disks

**A** To reformat a disk in Windows XP, run the Computer Management console by entering compmgmt.msc in the Run option on the Start menu. Click Disk Management under the storage section on the left, and the right-hand window panes will reveal which disks are currently installed in your system.

The lower right-hand pane should show the main C partition of your new laptop's disk, followed by any additional partitions along with other physical disks. If your old disk isn't being recognised by Windows Explorer, chances are it'll need to be repartitioned and reformatted. To do so, right-click on the graphical representation of your old disk – it'll be the one without a drive letter and a bar probably labelled as 'unallocated'.

If there are multiple partitions on it, right-click and delete each one until the entire space is unallocated. Then right-click in this area, choose New Partition, then follow the instructions to create a new Primary partition, formatting it with the NTFS file system – this could take several minutes to complete. This process will erase all the data from your old hard disk.

WORD PROCESSING

## The right accents

**Q** Is there a way of importing documents created in Wordperfect to Word 2000? I've been trying to do this and find that many accented characters and symbols don't display properly in Word.

*Anthony Hebden*

**A** For most non-standard characters Word uses Unicode fonts, which contain many more accented letters, symbols and non-Roman characters than the 255-character Ansi set used by Wordperfect. To get round this, Wordperfect ships with a variety of special fonts such as WP Multinational and WP Math. If these fonts are not installed on the PC running Word, then the latter may not be able to make a substitution. One way around this is to embed the fonts in Wordperfect by ticking the appropriate box in the Save as... dialogue, but we haven't found this to be totally reliable. If you copy the WP font files to the Word PC, then install them in the fonts folder (normally this is C:\Windows\Fonts), the documents should display correctly.

WORD PROCESSING

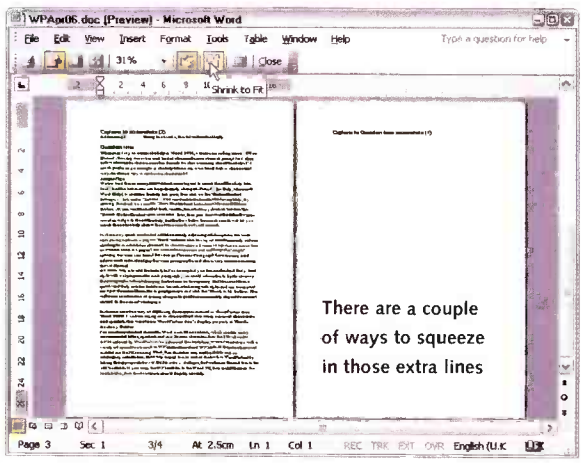
## Shrinking solutions

**Q** Is there a quick method of simultaneously adjusting all the spaces between text paragraphs on a page in Word without also having to simultaneously reduce the height available for the text? At the moment if I want to squeeze an extra line or two onto an A4 page of maximum line content and still keep the 'single' spacing between text lines, I have to go Format/Paragraph/Line spacing and adjust each individual gap between paragraphs and this is very time consuming.

*David Boswell*

**A** An easier way is to edit the text style. For example, if you have a standard Body Text style with a 12pt space after each paragraph, you could reduce this to 6pt to close up the paragraphs without changing the text size or line spacing.

But Microsoft has a quick-and-dirty solution that doesn't involve tinkering with styles and can be applied on a per-document basis. Go to print preview and click the 'Shrink to fit' button. This will use a combination of spacing changes to produce a reasonably elegant document shrunk to the nearest whole page.



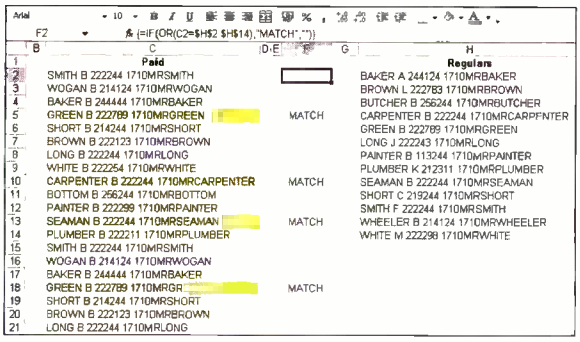
SPREADSHEETS

# Match point

Q Every week, we receive a spreadsheet from the bank which lists standing orders that have been paid to our charity. The key data that identifies the contributor is loaded into column C of our own Excel worksheet.

A typical example is SMITH B 222244 1710MRSMITH. Other columns contain the date, amount paid and so on. In column H we maintain a list of the reference numbers of regular contributors. At present we manually search for these references in column C using the Find command. I am trying to automate this process. Is there an array formula I could use in column F that would look at both lists, find the matches and display MATCH when one is found?
*Vivian Dunn*

A In cell F2 enter
`=IF(OR(C2=$H$2:$H$14),↙`
`"MATCH","")`
(Key: ↙ code string continues)




and use Ctrl & Shift & Enter instead of just Enter. Excel will acknowledge that you have entered an array formula by adding curly brackets at each end. Drag this formula down the column.

If you don't want to devote a column to just holding the word MATCH, when applicable you could use conditional formatting. It will highlight the matched entry in column C as shown in the screen above. Choose cell C2 then Conditional formatting on the Format menu. Make Condition 1
`Formula Is, ↙`
`=IF(OR(C2=$H$2:$H$14),1,0)`
and pick a background colour. Use the Format Painter tool to copy this format down column C.

**Conditional formatting will highlight entries in two lists that match**

SPREADSHEETS

# Macro help

Q Can I automatically copy a title in a cell of an Excel worksheet to its tab?
*Colin Barrett*

A You can use a macro. Enter your title in cell A1. Press Alt & F11 to open the VBA editor. On the Insert menu choose Module. In the right-hand panel enter

```
Sub TabName()
ActiveSheet.Name = ↙
Range("A1").Value
End Sub
```

(Key: ↙ code string continues)

Close the VBA editor. Press Alt & F8 to list your macros. Highlight TabName and click the Options button. Give your macro a shortcut, such as Shift & Ctrl & T. When you click on the worksheet and press this shortcut, the title in A1 will be copied onto the tab.

SPREADSHEETS

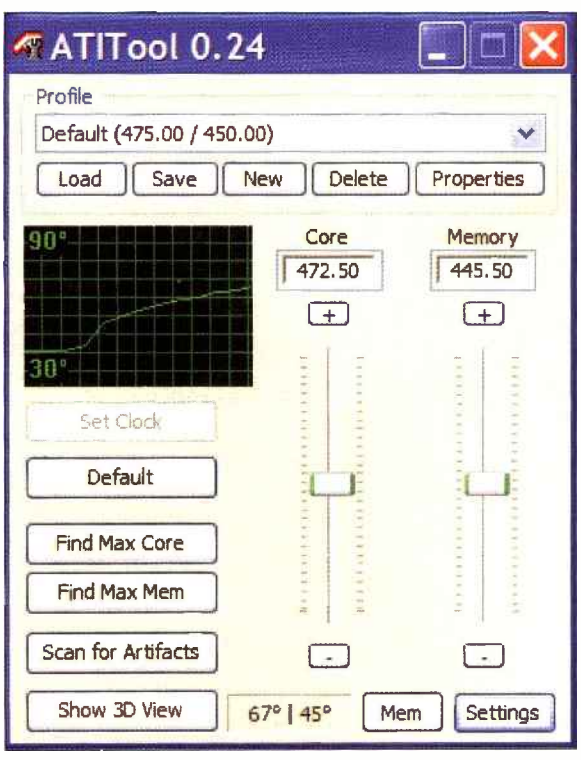
# Changing years

Q When I move an Excel 97 file from Windows 98 to XP, the date display is changed from mmm d, yy to mmm d, yyyy, even though, when creating the file (in Excel 97 running on Windows 98), I had formatted the display for mmm d, yy. The months and days are not changed, but the years are. How do I ensure that an Excel 97 file in which I intend the year to be displayed in two digits isn't changed when I load it onto XP?
*Susan Trowbridge*

A In Windows XP, the Regional Options in Control Panel control how Excel displays dates by default. It is best practice with any version of Excel to enter four-digit years even if you format to only display two-digit years. In recent versions if you enter a two-digit year value as 30 through 99 Excel will assume you mean 1930 through 1999. When you enter a two-digit year value as 00 through 29 Excel interprets the year as 2000 through 2029. Every version of Excel stores an underlying date number (counting days from 1900 or 1904). Local formatting controls whether a worksheet displays the year as yy or yyyy. ↘

HARDWARE

# Take the heat out of the graphics card




**Graphics cards need decent cooling to ensure they don't get too hot, and Ati Tool can help by logging temperatures**

Q I'm concerned that my ATI X800 graphics card might be getting too hot in my PC's case. Is there any easy way to measure its temperature during use?
*Steve Burton*

A The Overdrive section of the latest ATI graphics drivers can indicate temperature, but it's not always easy to check the crucial higher temperatures during intensive 3D gaming.

To do this, download a copy of the excellent Ati Tool from www.techpowerup.com/atitool, click on Settings, then choose Temperature Monitoring from the pulldown menu.

You can then tick the box to monitor temperatures and write them to a log file. Leave Ati Tool running while you play your game, then exit and examine the temperature graph in Ati Tool to see what was happening while it was under load. Graphics cards can run very hot and need adequate cooling and airflow within a case.

DATABASES

## A question of size

**Q** I have been trying to shrink the size of my Access database which has a large number of text fields. The default size of each text field is 50 characters so, if I have 20 text fields in a table, each record must be at least 1,000 characters long. I've tried cutting each one down to the minimum I think it needs, but that doesn't seem to make the Access database smaller.
*William Stephens*

**A** Your logic is impeccable for most database engines; but Access doesn't work that way. If you tell most database engines that a text field should be 50 characters, then it will assign those 50 characters of storage space for every record, even if they aren't used. Access stores only the characters that you type into the record. The 50-character default in Access simply means that users cannot type in more than 50 characters.

DIGITAL IMAGING & VIDEO

## Artifact dust-up

**Q** My wife and I had a long holiday in New Zealand and visited Lake Matheson, a very still lake in which the distant Mount Cook can be seen as a mirror image. Imagine my horror when, on looking at my jpg photos (taken with a Fuji Finepix S602), I noticed a mark on the water which was not there in reality. It appeared on all the photos of the mirror lake in slightly different places, but on none of the several hundreds of other photos I took. Could this be a result of the jpeg compression process. Is this a known problem and how can it be avoided?
*John Morley*

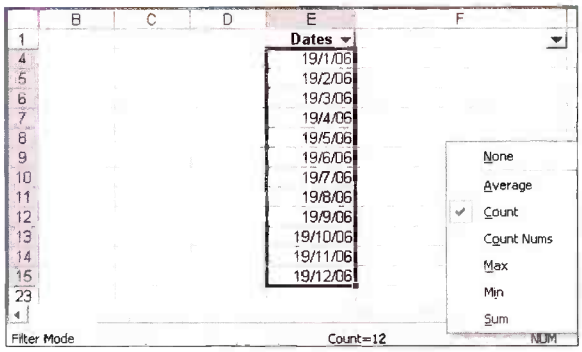
**A** Initially we thought this was dust on the camera's sensor. It's a more common problem on dSLRs, where the sensor can be exposed to atmospheric dust when changing lenses, rather than fixed-lens cameras like the S602. After further correspondence with Mr Morley we discovered that it was actually a small object in the water, but the comments about dust are still worth bearing in mind if you get odd artifacts on photos.

SPREADSHEETS

## Count the dates

**Q** I have a list of consecutive dates running from June 30, 2005 to June 30, 2007 entered in E2 to E100. How can I count the number of dates in 2006?
*Lisa Baggott*

**A** You could choose Autofilter on the Data menu, choose Custom from dropdown arrow, then show is greater than or equal to 1/1/2006 and is less than or equal to 31/12/2006. With only those dates for 2006 displaying you can highlight these, right-click on the Status Bar and choose Count.




One way of counting dates is by filtering them, then using the Count function

Alternatively use the formula `=SUM((E2:E100<=DATE(2006,12,↙ 31))*(E2:E100>=DATE↙ (2006,1,1)))`
(Key: ↙ code string continues)
This is an array formula so you enter it using Ctrl & Shift & Enter, not Enter. Excel will add curly brackets.

HARDWARE

## Giving two pins for a spin-up delay

**Q** I'm putting together a home Linux server with a couple of mirrored drives. The case has two extra HDD LEDs attached by cable to a two-pin female connector. These connectors fit on an anonymous two-pin male socket on the back of my Maxtor Diamondmax 10 200GB Sata (Serial ATA) drives, but the purpose of that two-pin connector eludes me.
*Chris Chaffey*

**A** According to a white paper on Maxtor's website, the two-pin connector forces a delayed spin-up. In some systems, powering up multiple hard disks simultaneously can be too much for a power supply to handle, so delaying the spin-up on selected disks can reduce the strain.

The Sata standard can implement a spin-up delay by sending a signal to pin 11 on the Sata data cable, but the jumper on the back of the Maxtor drives allows you to force a delayed spin-up. Maxtor advises this shouldn't be an issue for systems with one or two disks though.

The disk activity lights on your case should be connected to the two-pin header for the disk controller. If you're using an integrated or chipset-based hard disk controller, the header for the HDD case light will be with the group of headers for the power switch, reset button and other case lights in the corner of your motherboard. Markings on the board should identify it, but if not, full details are in your manual.

WORD PROCESSING

## How to default to offline help not online

**Q** When I try to access help in Word 2003, it takes me to Office Online. There is then another Search box for accessing offline help. I want to go straight to the help file on my hard disk.
*Jacqui Page*

**A** It does seem logical to search the offline help files first. To change the default, press F1 (or Help, Microsoft Word Help) to summon the help task pane, then click on the 'Online content settings...' link under 'See also'. You can disable online content by clearing the checkbox next to 'Show content and links from Microsoft Office Online'. If you want the best of both worlds, leave that box checked but clear 'Search online content when connected', to reverse the default – searches will go to the offline help, but the box below the search results will let you search the online help should the offline results not yield a result.

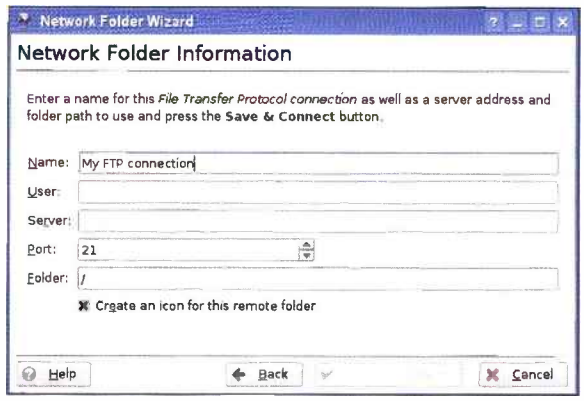
You can get help offline first rather than going to Office Online

LINUX/UNIX

# FTP for KDE

Q In KDE, is it possible to set up an FTP connection so I can access my files like on a normal hard drive? I've heard it is, but I can't figure out what to do.
*Julian Clarke*

A It is indeed. Launch an instance of Konqueror and select 'Network Folders' from the 'Go' menu. Click the 'Add a Network Folder' icon to get a wizard to help set up the connection. Leave the user name blank if you want to log in by anonymous FTP. In the Save dialogue for all KDE applications, select the FTP server, and you can access the server from any Konqueror window seamlessly. For one-off FTP connections, simply enter ftp:// followed by the server name in a Konqueror window.




**Konqueror can set up folders to be accessed via FTP**

LINUX/UNIX

# Page size irritation

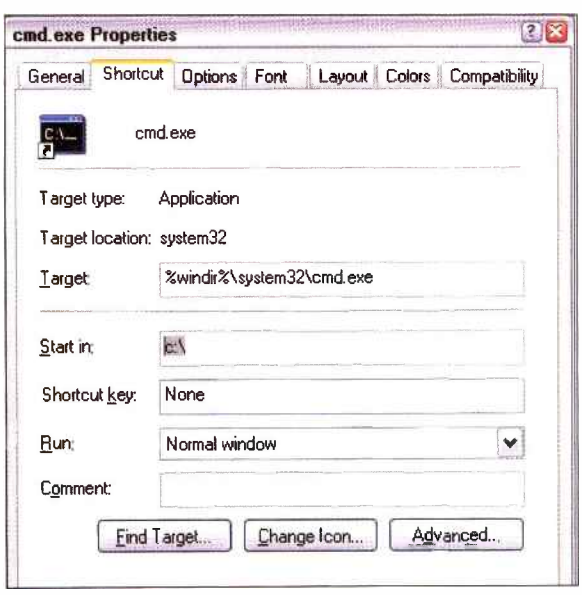
Q I'm using Open Office but every time I start a new document the page size is set to US letter instead of A4. How can I change it to start with A4?
*Simon Pinder*

A On older 1.x versions of Open Office run the printer admin utility (spadmin), select the printer and click Properties. In the next window select the paper tab and change the size to A4.

For current 2.x versions of Open Office, your language setting determines the default paper size. If it's a European language you'll start with A4. Check the login screen for language options and make sure the correct language is chosen. Or you can change the page size by selecting 'Page' from the Format menu.

WINDOWS

# Prompting the C:\ prompt to appear




**Starting a command prompt at the root of C: drive**

Q This is probably a silly question, but I am unable to get a plain C:\ prompt in Windows XP Professional Edition. When I click on the command prompt, what comes up is 'C:\Documents and Settings\Mr. J.C.L.Rimmer>'. I am sure there is something that I am missing, but it eludes me.
*Cranston Rimmer*

A Not a silly question – by default Windows opens the command prompt in the current user's profile directory – C:\Documents and Settings\Username. If you then type cd\ and press Enter, you'll be at C:\. For a more direct solution, create a shortcut to cmd.exe, then in the shortcut properties set the 'Start in' folder to C:\.

DIGITAL IMAGING & VIDEO

# Print file names

Q I want to automate the printing of the file name on digital images instead of adding it as text at the foot of each image in Photoshop Elements.
*Edwin Cowley*

A You can do this in Photoshop Elements 4. In the Organizer, select the image(s) you want to print and choose Print from the File menu. For individual prints click the More Options button and check the file Name box in the label section of the dialogue box.

WINDOWS

# Better PC lock-up

Q My PC at work is protected by a screensaver, which when 'woken up' returns to the XP welcome screen, so I need to select my username and type my password to return to my session. Can I run the screensaver on demand to protect my PC immediately?
*Steve Bunton*

A You can run a screensaver from a shortcut to the relevant .scr file, for example, C:\WINDOWS\system32\ssmypics.scr, but running the saver in this way doesn't return to the welcome screen. A better way is to lock the PC by pressing the Windows key & L. This goes straight to the welcome screen without invoking the screensaver.

**LET US HELP YOU**

All our experts welcome your queries. Please respond to the appropriate address below

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**Linux** linux@pcw.co.uk
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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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# Update XP Media Center

## Enhance your multimedia experience; and solve a puzzling coding problem

One year ago, in March and April 2005's Hardware columns, we explained how to build your own Media PC running Microsoft's Windows XP Media Center Edition 2005 software. MCE 2005, as we'll refer to it from here on, was never designed to be installed by end users, but if you bought the compatible hardware and followed our instructions, you could get it running at home.

I've been running my own home-made MCE 2005 system now for over a year, and so far it's behaved pretty well. Judging by the emails we've received at the Hardware HQ, many of you have also taken the plunge.

Over the past year since our two-part installation guide was published, MCE 2005 has received several official updates and patches. Some fix minor TV channel issues while others implement a whole batch of enhancements, so in this month's column I'll go over the best and most important ones so far, along with any specific issues related to each. I'll also reveal a neat cooling option for owners of Aopen's i915GMm-HFS Pentium M motherboard.

### Official updates

During the summer of 2005, Channel 4 switched E4 from being a subscription channel to one which any terrestrial digital TV owner could enjoy free of charge. But while a quick rescan subsequently revealed E4 to almost any Freeview set-top box, MCE 2005 systems just refused to see it.

The reason MCE 2005 systems refused to list E4 even after its change of status was because Microsoft had previously excluded it in a Registry entry – so even when Channel 4 made it free-to-air, MCE 2005 wouldn't show it. Luckily a quick edit of the appropriate Registry entry will sort it out.

SCREEN 1

Open the Registry Editor by typing regedit in the Run menu, then navigate to My Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Media Center\Service\GLID. Next double-click on the ExclusionList value, delete E4 from the Value Data area then click OK. Before you get too carried away though, deleting the references to the other channels listed won't allow MCE to view them – unless they also become free-to-view in the future.

After restarting the system you'll need to rescan for services in the Setup TV Signal section of MCE's Settings, before then adding E4 to the channel line-up in the Edit Channels section of the Guide settings. This process is fully documented in article 902761 at http://support.microsoft.com.

Another small but handy update concerns MCE 2005's ability to create standard video DVDs of TV recordings. This feature first requires the Sonicencoders.msi file to be installed on the system. This comes on the third disc of the MCE OEM triple-pack, and is normally installed by most system integrators as standard. If it has been installed, you'll see the option to Create Video DVD in MCE.

**Digital radio has long been broadcast on the Freeview digital TV service, but it's only with the Rollup-2 update that owners of Media Center 2005 PCs can receive and record it**

Sadly if you've installed MCE 2005 yourself, you'll probably have used the two-disc OEM pack supplied by companies such as Ebuyer. This does not come with the required Sonicencoders.msi file, thereby preventing MCE from making standard video DVDs of TV recordings – the best it can do is simply copy the dvr-ms file onto a data DVD for playback on other PCs only.

If your system does have the Sonicencoders.msi file installed though, you may have found the process of creating a video DVD either took forever, or didn't work at all. Microsoft offers a patch that greatly improves the process, especially on UK Pal systems, although it has to be said, it's still far from perfect. To download the patch, visit www.microsoft.com/downloads/details.aspx?FamilyID=327035e8-5494-4a26-ba8a-24c1296d70bb&DisplayLang=en.

If you want to create video DVDs but don't have (or can't find) the Sonicencoders.msi file, all is not lost. You can create video DVDs of recorded TV shows using Sonic's MyDVD Studio Deluxe package (outside the 10-foot MCE interface); see www.sonic.com.

### Rollup-2

The most significant update for MCE 2005 is Rollup-2, through Windows Update on your Start menu. This fixes

**Aopen's i915GMm-HFS is supplied with a modest heatsink designed to keep a Pentium M processor cool**

many issues with MCE 2005 systems, along with adding several new features.

Probably the best addition is for UK owners of MCE systems with digital TV tuners. The Freeview DVB-T digital TV service in the UK has long broadcast digital radio alongside conventional TV stations, but annoyingly MCE systems have been unable to receive these programmes (see screen 1).

Now with Rollup-2, MCE 2005 can receive and record digital radio stations, along with showing two-week advance listings for them in the Guide. Due to the way Microsoft has implemented the service though, you'll have to access recordings through the My TV menu, as My Radio is still only for use with compatible FM radio tuners.

Along with support for DVB-T radio stations, Rollup-2 also includes improved DVD video creation and support for the Xbox 360 as a Media Center Extender device. Users in the US can also now enjoy a second ATSC digital TV tuner card. Rollup-2 additionally implements further DRM (Digital Rights Management), although this has yet to have any impact on UK users – as far as I can tell anyway.

Installing Rollup-2 isn't quite as simple as just selecting it from Windows Update and sitting back as it downloads and executes though. It first requires Microsoft's .Net Framework 1.1 and .Net Framework 1.1 SP1 to be installed, and Windows Update can do this for you automatically if required before kicking off the Rollup-2 installation.

Before doing any of the above though you must first check to see if you have a specific previous update to .Net already installed on your system. So go to your Add/Remove Programs Control Panel, check the box to Show Updates and have a look to see if you already have update 886904 installed.

If you do, you must uninstall it before starting the Rollup-2 process, as it will otherwise prevent the .Net Framework SP1 from installing. My own MCE system had existing .Net updates with numbers close to the offending item, but not the actual one Microsoft warns of, so I was safe to proceed.

Once you're sure update 886904 isn't on your system, you can safely visit Windows Update whereupon you can choose Rollup-2 as an optional update; the required .Net Frameworks should automatically install first.

**The Aopen i915GMm-HFS motherboard, pictured with a Zalman CNPS7000B-Cu heatsink. This heatsink isn't designed for the Pentium M, but with alternative mounting studs can keep it cool without the need for a fan**

Before you relax, however, after Rollup-2 has been installed and your system restarted, revisit Windows Update and check the optional updates again – you may need to install a patch for Rollup-2 itself. Rollup-2 and its installation process is fully documented in article 900325 at http://support.microsoft.com.

## Quiet Pentium M cooling

Regular readers of the Hardware column will know I'm a big fan of the Aopen i915GMm-HFS motherboard for media PCs. Along with excellent connectivity, this board supports the Pentium M processor, which runs cooler and on less power than traditional desktop processors.

Aopen supplies a small heatsink and fan for use with this motherboard which works adequately, but you can't help but wonder how a larger, more efficient heatsink might work better.

Annoyingly though, you can't just swap the Aopen heatsink for a standard model, as the mounting holes are in different locations and the height of the processor package itself is shorter.

**Terratec's Cinergy 2400i DT is the first dual digital tuner TV card we've seen. Great news if you've only got one PCI Express slot spare**

I'd just about given up on the idea when Paul Lee of Quiet PC got in touch following a tip he'd received from a customer. Apparently the holes on the bar which runs through many Zalman heatsinks lines up with the holes in the Aopen motherboard when positioned diagonally. Paul confirmed this with the Zalman CNPS7000B-Cu heatsink (pictured left), so I decided to check it out for myself.

Normally the bar running through the centre of the CNPS7000B-Cu heatsink screws into mounting brackets running parallel with conventional desktop processors. By sitting it on top of the Pentium M processor and turning it through 45°, the holes in the bar line up with those on opposite diagonal corners on the Aopen board.

To keep the heatsink at the correct height for the Pentium M's surface, I used two studs measuring 7mm high and bolted them into the holes at diagonally opposite corners of the processor socket. I then put a small amount of thermal paste on the processor die, carefully sat the CNPS7000B-Cu on top and screwed its mounting bar into the studs.

The tiny heatsink supplied by Aopen generally has to power-up its fan every few minutes to keep the CPU temperature below 70°C even when idle. In contrast, the Zalman CNPS7000B-Cu heatsink kept my 2.13GHz Pentium M Model 770 at a steady 56°C when idle, or at 64°C when under 100 per cent load with a DivX encode.

I then tried it with the fan running at a minimum speed of 1,054rpm using the Aopen utility. Now the idle and load temperatures dropped to 32°C and 44°C respectively, while the fan remained quieter than the hard disk; it also of course improved airflow around nearby components. The CNPS7000B-Cu is a great option for owners of the Aopen board, and costs £32.90 from www.quietpc.com.

Before closing this month's column, builders of new media PCs may be interested to learn that the first dual digital TV tuner card has been launched by Terratec. The Cinergy 2400i DT card (pictured left) looks like a good option for those who want two digital tuners, but only have one PCI Express slot free; there's also a version designed for use with MCE 2005 which costs £74.99. I'll try it out in a future column. **PCW**

**Gordon Laing** has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

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# House-train your PC

## Get your system to behave in a more civilised fashion with these quiet cooling tips

Modern PCs are capable of generating a shocking amount of noise, and I'm not referring to any audio or loudspeaker capabilities. It's the combination of cooling fans and high-speed drives which can cause a racket and become a greater issue than performance.

The only reason a PC makes a lot of noise is because it's been fitted with the cheapest solutions to keep it cool. By upgrading these to better designed solutions, you can keep your PC as cool without generating as much noise.

We regularly review quiet cooling products in *PCW*, but this month we thought we'd go over the basics of getting your PC to run in a more civilised fashion. You may find it more worthwhile than a faster processor.

### Quiet cooling: the theory

Modern PC components generate a lot of heat and demand adequate cooling to keep them running. For processors and graphics chipsets, this traditionally means a heatsink to act like a radiator and a fan to blow or suck the heat away.

Quiet cooling solutions tackle noise in two ways. The first involves using a more efficient heatsink to better dissipate heat. The second is to use a quieter fan. While superior bearings can greatly reduce fan noise, the greatest difference involves running the fan at a slower speed. To compensate for reduced airflow at lower speeds, physically larger fans are used.

So that's the simple theory behind quiet cooling: a more efficient heatsink with a larger fan, spinning slowly on top. All the cooling solutions we'll mention here are available from the Quiet PC website at www.quietpc.com.

### Processor

The first step to building a quiet PC is to upgrade the heatsink and fan that cools the main processor. The heatsinks supplied as standard are often the cheapest solutions available, with little or no consideration for noise levels.

**The first step to building a quiet PC is upgrading the heatsink and fan that cools your processor. Zalman's huge CNPS9500-LED currently represents the state of the art, but smaller models will be adequate for older CPUs**

Zalman is one of the best-known manufacturers of quiet heatsinks, and its CNPS7000 series is a great choice for cooling most processors; it costs from £28 and we've used it in this month's Hardware column. If you're after the ultimate air-cooling solution, Zalman's CNPS9500, pictured above, can outperform many water-cooling systems; it costs £46.

### Graphics

Once your processor is being cooled quietly, you'll immediately notice the noise generated by your other components. Some of the worst culprits are graphics cards, which are normally cooled by tiny, but fast, fans.

Believe it or not, it may be possible to cool a graphics card by a larger heatsink alone. Cards based on chipsets up to the ATI X700 and Nvidia Geforce 6600 can be silently cooled by Zalman's ZM80D-HP heatsink (£27), which fits on both sides of the card.

Anything faster will need a fan of some description, although larger units, often fitted from above, can be used instead of tiny whining models. The Quiet PC website has several solutions.

### Power supply

The third major generator of noise in a PC is the power supply. Since these involve mains electricity, it's not safe to open them up and change fans. Instead you're looking at removing your existing power supply and swapping it for a quieter model.

Most quiet power supplies use larger fans, spinning more slowly to generate less noise. Some can spin them up and down, depending on the requirements. Elan's Vital Greenerger is a good choice at £93 for the 400w model.

### Drives

With the fans taken care of, the noisiest components will be the drives. Noisy hard disks can be fitted into noise-absorbing enclosures, but you may wish upgrade to an inherently quieter model. In our tests we've found Seagate's 7200.8 Barracuda range runs very quietly see our group test on page 98).

Finally, just when you thought your PC was running as peacefully as could be, you insert a CD or DVD and your optical drive sounds like a plane preparing for take-off. While there's no solution for quietening a drive spinning at full whack, it's possible to use software tools to slow it down and greatly reduce the noise.

Nero Drivespeed, which comes with Nero Burning Rom, can set your drive to run at any speed, and it's amazing the difference it can make. While you'd still want it at top speed for the fastest ripping or application installations, it's great to reduce the speed for playing CDs or DVDs, and is therefore ideal for media PCs; see www.nero.com. **PCW**

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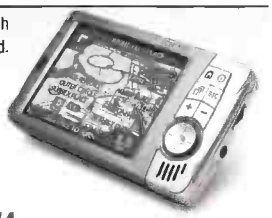

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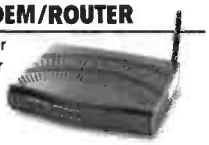

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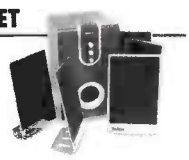

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**Tim Nott** is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

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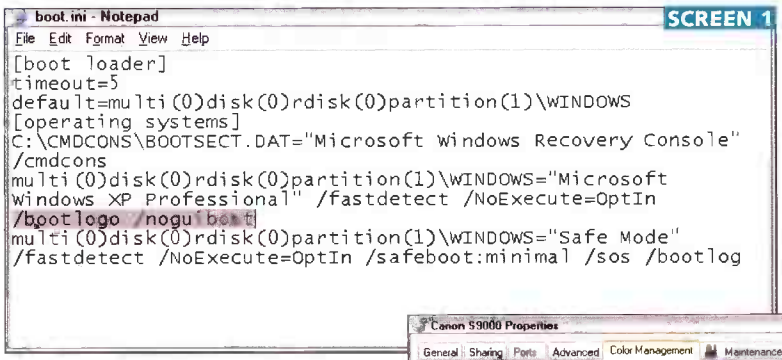
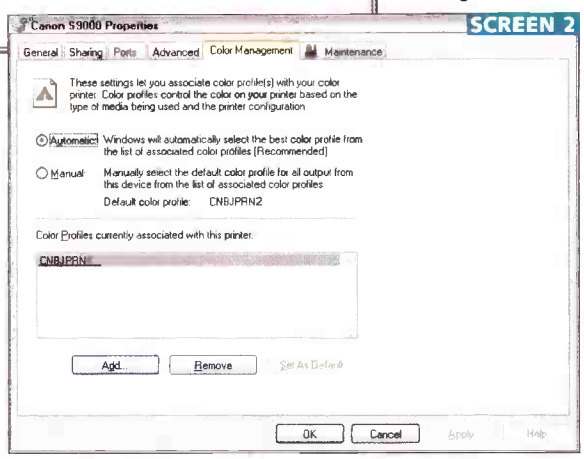
# Making a splash

## Changing the default Windows XP startup screen; plus colour management investigated

SCREEN 1




SCREEN 2




**Left:** Customise the XP boot screen

**Below:** You can change a colour profile in the Colour Management tab

It has been a tradition in this column since the days of Windows 3 to change the Windows startup (or splash) screen, by which I mean the first still or animated graphic Windows screen you get on starting the PC. You may also get a Bios splash screen when your PC boots up, but that's not what we are talking about. Under Windows 3, the trick was to create a suitable RLE (run-length encoded) graphics file (16 colours and less than 55KB), then recompile the Windows loader – win.com – to incorporate the new graphic.

In Windows 95 – and subsequently 98 and ME – it became somewhat easier. You created a 256-colour bitmap (bmp) file, 320pixels wide by 400 high (it stretched to 640pixels wide when displayed) and saved this to the root of the boot drive as logo.sys. Those of you with very long memories may recall that we also discussed a way of enabling the colour-cycled 'animation' back in April 1997, using an image processor with palette-editing capabilities, a hex editor and a sturdy anorak.

XP does things differently. The good news is that you can use a 640 x 480 bmp file, but the bad news is you are limited to 16 colours. However, if you just want to replace the screen with a still image, you don't have to mess with the ntoskrnl.exe file – the core of the XP operating system. First create your bitmap. You'll need something a little more sophisticated than Windows Paint or the Picture and Fax viewer – we've used Paint Shop Pro (any version) or the freeware Irfanview. Whatever you use, you will need to resize the image to 640 x 480pixels, and reduce the colour depth to 16 colours. Save the file in the Windows folder as boot.bmp and close the imaging program.

Now is a good time to create a system restore point. Having done that, you need to edit the boot.ini file to enable your new screen. The easiest way is to go to System Properties, either through Control Panel or by right-clicking on 'My Computer' on the Desktop and choosing 'Properties' or, if you want to be ultra cool – and have the necessary keys – pressing the Windows key and Pause/Break. Turn to the Advanced tab and click the Settings button in the Startup and Recovery section. In the following dialogue, make a note of the 'Default operating system', then click on the Edit button. Boot.ini will then load into Notepad. Identify the default OS (if there is a choice) – this will be of the form:

```
multi(0)disk(0)rdisk(0)↙
partition(1)\WINDOWS="↙
Microsoft Windows XP ↙
Professional" /fastdetect ↙
/NoExecute=OptIn
```

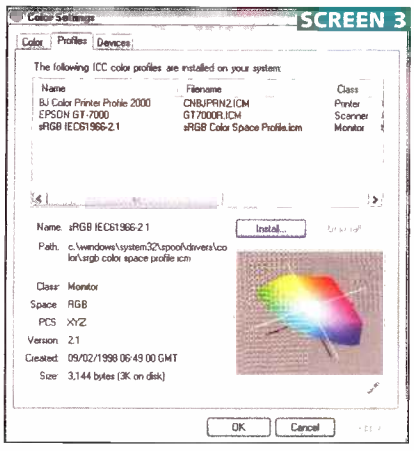
(Key: ↙ code string continues)

where the text after WINDOWS= is what you saw in the default OS box in the previous dialogue. Now add /bootlogo /noguiboot to the end of the line; watch out for the Notepad word-wrap (see screen 1). Save the file and exit Notepad. Restart, and you should see the new boot screen. You won't get the animated 'progress bar', but this is just an illusion designed to reassure you that something is happening; if you really need this then you'll need a utility such as Xplash, but be warned that this does use an alternate kernel file.

Finally, should something go wrong and you have trouble booting, reboot and press F8 so you can choose to start XP in safe mode. Here you can go back to the system restore point you made or continue in safe mode to remove your additions to the boot.ini file.

### Colours and calculations

This month I came across a couple of new freebies from Microsoft. We are nearly all digital photographers these days and photo-quality printers have never been cheaper. Once you get the image-tweaking bug and progress from the automatic fixes to tweaking histograms and colour balance, you'll probably come across the problem that the colours you see on the screen are not what you get from the printer. This issue cannot be solved completely, as the range of colours (known as a



gamut) visible on-screen is usually greater than what can be reproduced by the printer. However, good colour management can make the best of what is possible. I won't go into great detail here, but every device you use – such as monitor, scanner or printer – should have a colour profile stored in an ICM or ICC file. These usually come with the device driver files, but image professionals use special hardware/software utilities to create their own. If you dig deeply enough into the properties of your display or printer, you should find a 'Colour Management' tab that shows which profile is associated with the device, and lets you change it (see screen 2).

The new Microsoft Colour Control Panel Applet gathers all this for one-stop control of the various devices (see screen 3). It also adds a few goodies, such as a 3D colour model of each device's gamut. This lets you compare two devices to see what colours can be faithfully reproduced between the two (see screen 4). Although the applet is free, downloading and installing it is rather long-winded. First you need to be running XP SP2. Next you need to download and run the 'Genuine Windows Validation' tool. If your installation passes this, then you can download the applet. If you don't have the .Net Framework installed, this will be downloaded automatically when you install the applet; another 10MB or so. Finally, I found Windows Update kicked in with a Hotfix for the .Net Framework.

**Left: The Colour Control Panel Applet provides a single area from which to manage colours**

**Right: You can view the gamut in 3D**

The other new gadget is Calculator Plus, which is not the same as the XP Powertoy Calculator that has been around for a while and offers graphical plots of functions (see screen 5). Calculator Plus is based on the standard Windows Calculator, but offers several extras. First it has a new view, with oval buttons and a garish blue shaded background, but you can, thankfully, switch to the 'Classic' calculator view in the Windows system colours. One improvement is that the symbols on the keys are larger, so it is much easier to tell the difference between the decimal point and the minus sign. But the big plus is the conversion feature, also available from the view menu, alongside the standard and scientific view. Select a category – weights, areas, temperature, pressure and many more – choose the 'from' and 'to' units, enter a number in the calculator and hit the 'convert' button. You will find practically every unit you can think of, and many more you've probably never heard of.

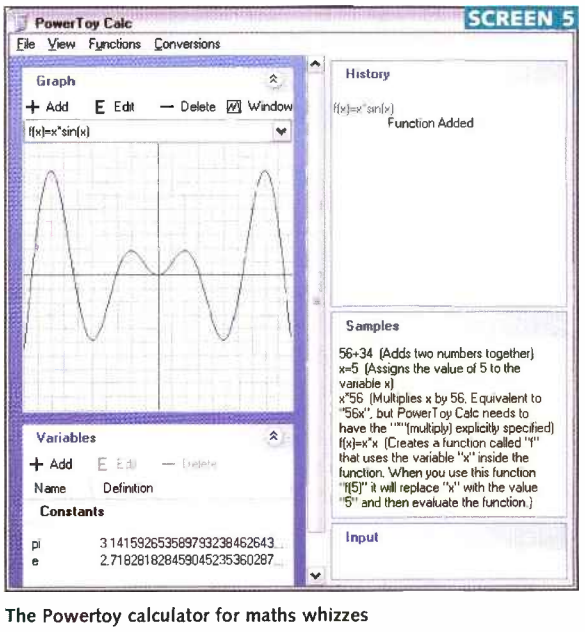
It's interesting to note that there's a 20 per cent difference between the Chinese and Taiwanese jin weights, but this pales into insignificance when you compare the UK and US volume measurements. A UK gallon is around 20 per cent bigger than a US liquid gallon, but 24 per cent bigger than a US dry gallon. A US fluid ounce is slightly bigger than a UK fluid ounce, but they only have 16 of them to the pint; unless, of course, it's a dry pint, which has 18.6.

The calculator also has a currency converter. At first sight this is less than impressive, as it only lets you convert between euro and the former currencies of the euro-equipped nations – rates that were set in stone in January 1999. But if you take a look at the Edit menu, you'll find you can import the current exchange rates of the European Central Bank online. Unfortunately, this still will only let you convert from euro to the target currencies. So if you want to find out, say, how many US dollars you'll get for a pound, you'll have to get the euro-pound rate, then the euro-dollar rate and work it out from there. You can find the Colour Control and both calculators at www.microsoft.com/windowsxp/downloads/. **PCW**

# Googling abroad

While in an international mood, one thing that's been bugging me for a while is the way www.google.com redirects itself to the national site – for example, www.google.co.uk for Google UK. It does this by monitoring the Internet address of your ISP and, although it's 'only trying to be helpful', there are times when you really want the .com site. As I spend most of the time in France, I'd much rather it wouldn't help in this way – after all, I can always go to the French or any other country-specific Google site by typing the relevant URL or from a specific bookmark. Fortunately, as I've just found out, there's a very easy way around this. Go to the home page of wherever Google sends you, then click on the 'Go to Google.com' link at the bottom right. This will set a cookie indicating that you don't want to be redirected in future.

If you don't want to use cookies or they are disabled on your computer, then you can achieve the same result by bookmarking (or adding to Favourites) www.google.com/webhp, which won't get redirected to a national site.




**The Powertoy calculator for maths whizzes**

**Barry Shilliday** has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time he prefers to travel the world – and snap it with his camera.

→ Comments welcome on the Linux/Unix column.
Email linux@pcw.co.uk
*Please do not send unsolicited file attachments.*

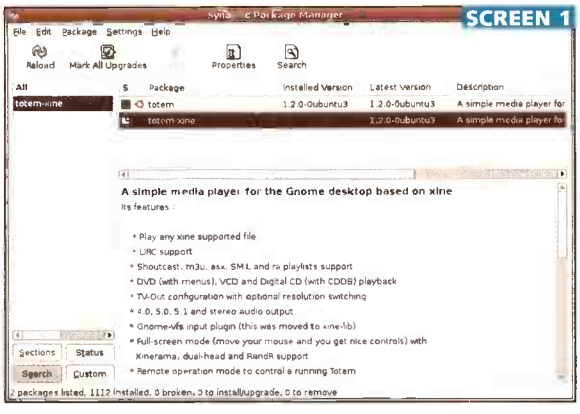
# Watch DVDs with Ubuntu

## Add movie playback, delve into Firefox 1.5, and explore Evolution's groupware features

Over the past couple of months we've been concentrating on the Ubuntu Linux distribution (www.ubuntulinux.org). In the first part of our series, I explained how to install a fresh copy of Ubuntu and apply the latest updates. Last month I examined the software management system and added a couple of extra repositories to gain access to thousands of packages. I then showed you how to install some multimedia codecs to enable the playback of the most popular formats.

This month we'll start by setting up DVD and video playback. In order for this to work you will need the additional repositories as described last month; those being the Universe and Multiverse sets. If you don't have access to last month's issue, check the online FAQ in Ubuntu's documentation for more details.

The video player Ubuntu comes with is Totem (www.gnome.org/projects/totem). This is really just the front-end GUI: the controls and menus for playing back video or audio files. It requires a back-end 'engine' to decode these files for playback. The standard version supplied is the gstreamer engine. This is fine for most forms of audio, but fairly useless when it comes to video. The simplest and most effective way to make Totem work well with video is to switch to the Xine engine. If you're a regular reader, you will have seen Xine (http://xinehq.de) mentioned previously. The Xine library is capable of decoding almost all multimedia codecs and formats and can even make use of Windows codec DLLs for those not natively supported (see box below).



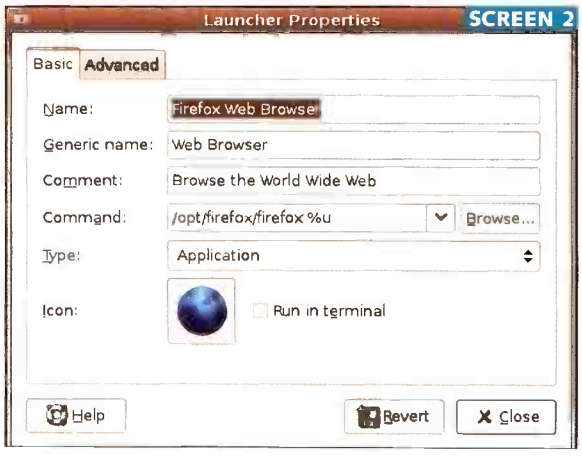

Use Synaptic to install the Xine engine with the Totem player

### Replacing Totem with Xine

Replacing Totem's gstreamer engine with Xine is quick and easy to do. Load up Synaptic, the graphical package manager. Search for totem-xine and mark it for installation (see screen 1). Synaptic will tell you that it must remove the gstreamer package and will do this automatically. It may also require some dependencies to be installed. Thanks to the software management, all this is taken care of for you.

Once done, Totem will now use the new engine. Try opening a selection of audio and video files; you're likely to have no problems with files, including mpeg4 video (such as DivX) or wmv video. If you try to access a DVD, however, this still won't work. One more library is required for this step and unfortunately it's not part of any of the standard Ubuntu repositories. The library in question is libdvdcss. Rather than set up a repository for this one package, it's easier to download and install it manually it manually. You can get hold of it at http://developers.videolan.org/libdvdcss. Click on the 'releases' link

Set the launch icon for Firefox to use the newly installed version




## Using Windows video codecs

Although the Xine library can play back almost all forms of video natively, there are a few types it doesn't support directly. The Xine library can use Windows codecs to support these formats without any performance penalty. You can download a set of these from the Mplayer home page (http://www.mplayerhq.hu). Click the download link from that page and download the 'essential codecs package'. Its name will be something like 'essential-20050412.tar.bz'.

Now open up a terminal and run the following:

```
$ cd /usr/lib
$ sudo tar xfvj ↙
/tmp/codecs.tar.bz
$ sudo mv codecs win32
```

(Key: ↙ code string continues)

Replace 'codecs' with the actual name of the downloaded package, and replace /tmp with whichever directory they are stored in (such as ~/Desktop). You should end up with a directory called /usr/lib/win32 with various DLL files inside. Xine is now ready to use these codecs if necessary.

to be taken to the latest version (1.2.9 at the time of writing), and descend into the 'deb' directory. Download the binary file libdvdcss2-version-i386.deb. Download the development version too, if you intend to compile any applications with libdvdcss. Next, open up a terminal and install the package (replace the name with the actual filename):

```
$ sudo dpkg -i libdvdcss2-↙
version-i386.deb
```

(Key: ↙ code string continues)

Nothing else needs to be done. The Xine library will dynamically find the new library when you next try to play a DVD. What's more, Xine will allow you to play any region DVD, regardless of what the drive is set to. Note that at the time of writing a small bug exists in that an audio CD must be inserted into the drive before a video DVD is recognised by the desktop correctly. This only needs to be done once.

If you want more advanced control over video and DVD playback, consider installing the standard Xine front end, xine-ui. You can install it from Synaptic as normal. Xine-ui uses the Xine library just as Totem does, but the front end isn't as integrated into the desktop and doesn't look quite as pretty, though extra skins are available to improve its look.

## Using Firefox 1.5

Version 1.5 of Firefox was recently released, but came too late to be included in Hoary, the latest version of Ubuntu. The new version provides much faster forward and back browsing and tab switching, numerous security and bug fixes, faster rendering, and a redesigned preferences GUI. This new version will be included in the next release of Ubuntu, Dapper Drake, to be released in April 2006. In the meantime the easiest way to start using the new version is to download the binary release from the Firefox website. Head to www.mozilla.com/firefox to download the new version. If you're not doing it from Linux, or want a localised version (such as the British English version), go instead to www.mozilla.com/firefox/all.html and download it from there.

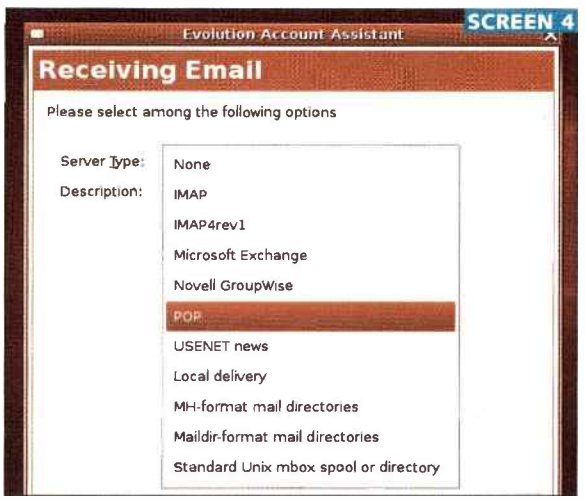
Now open a terminal window and extract the archive into the /opt directory:

```
$ cd /opt
$ sudo tar xfvz /tmp/firefox-↙
1.5.tar.gz
```

This binary version of Firefox uses an old version of the C++ library that is not installed by default in Ubuntu. Install it with this command:

```
$ apt-get install libstdc++5
```

Make sure the old version of Firefox is closed completely and you can run Firefox 1.5 from the new directory. However, if you try to run it by clicking on the top menu icon you'll still get the old version. To fix this right-click on the Firefox icon and select Properties. Now edit the Command box and insert /opt/firefox/ before the firefox command itself (see screen 2). Clicking the icon now will load the new version.




**Top: The main window in Novell's Evolution**

**Bottom: Evolution can access many types of servers**

## Setting up Evolution

Owned and developed by Novell, Evolution is used by most as just a regular email program, but it can be a lot more – it's a free, open-source groupware client, enabling access to Microsoft Exchange and Novell Groupwise in addition to the usual email protocols such as Pop and Imap. Users of Microsoft Outlook will find its layout familiar (see screen 3), with tabs for email, contacts, calendars and tasks accessible from the left. A full description of Evolution can be found at Novell's website, under the Novell Linux Desktop section.

Setting up Evolution for straightforward Pop access is helped along by an assistant that pops up on its first run. Let's take an example by setting it up for Gmail, Google's free email service. First enter your name and email address, then decide on the type of connection (see screen 4). Gmail allows you to download email via Pop, so select that option. The window will expand to present you with the relevant options for Pop delivery, such as the server name and your user name. Enter the details requested. Next, the server for sending email must be configured for the account; enter the details shown in the next step of the wizard. Note that both the receiving and sending servers must be set as secure connections, via the relevant checkboxes. That's all there is to it.

You can have as many email accounts as you like in Evolution; enter the preferences and click to add a new account to reload the setup assistant. **PCW**

## Enabling DMA access

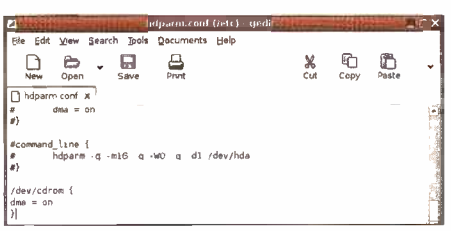
It's advisable to switch on DMA access to your DVD drive. By default Ubuntu leaves this off. Without DMA access, DVD playback can sometimes be choppy, and the drive may underperform. To switch on DMA access, run the following command:

```
$ sudo hdparm -d1 /dev/dvd
```

To enable DMA access automatically every time you boot, run the following command and enter the text shown in the screen on the right to the end of the file.

```
$ sudo gedit /etc/hdparm.conf
```

Changes to this file only affect the system on subsequent start-ups. Run the hdparm command above to set DMA on in the meantime. If you have more than one DVD drive, you'll need to set each drive.




**Set DMA access for your DVD drive to improve the drive's performance**

**Ken McMahon** is a freelance journalist and graphic designer. His involvement with digital cameras began with a Commodore 64. He graduated to Macs and now works mostly with PCs.

→ Comments welcome on the Digital imaging & video column. Email digitalimaging@pcw.co.uk *Please do not send unsolicited file attachments.*

# The Flickr phenomenon

## If you haven't discovered it yet, find out why this online photo site is causing waves

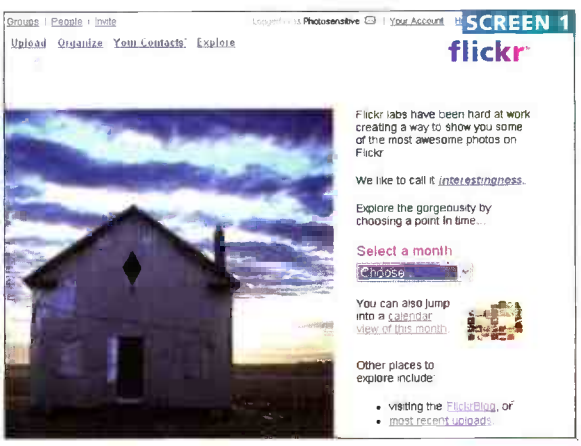
This month I was going to delve deeper into adding metatags to digital photos. The email response since February's column suggests that a lot of readers are interested in knowing more about this. But while trying to discover more about IPTC metatags, I came across a website that was so absorbing, I decided they would have to wait.

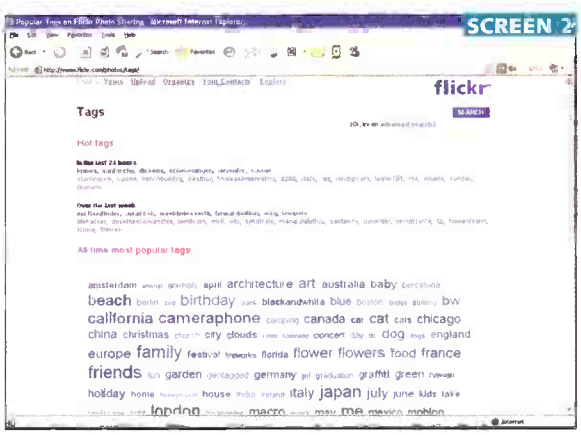
Flickr (http://flickr.com) seems to be such a phenomenon that not having discovered it before causes me a degree of professional embarrassment. Most of us are familiar with popular photo-sharing sites such as Ofoto and Shutterfly, whether or not we make use of them. If you have access to your own website it's often easier to upload a web contact sheet or slideshow rather than subject yourself to the constraints imposed by many of these sites.

What makes Flickr different is that it relies heavily on user-defined tags as a means of organising, displaying and searching for images uploaded to the site. You can assign tags to your own and other people's images. From the point of view of the casual browser, those seeking specific themes and those who have an interest in how images are classified, Flickr provides interesting insights into how our way of accessing photographic images is changing.

You can use Flickr to carry out tag-based keyword searches in the same way as you would using photo-album software. The tags page that lists the most popular tags on the site provides an insight into current photographic preoccupations. At the time of writing the top three tags for the week were 'buncefield' 'hemelhempstead' and 'oildepot'. All-time most popular tags, including 'amsterdam', 'clouds' and 'snow', are more inscrutable.

A recent introduction, clustering, provides links to pages of images with the specified tag and other, related tags.




**Top: You can take a leisurely browse through Flickr...**

**Bottom: ...or do a tag-based search**

For example, London clusters include 'england, uk, bigben', 'thames, bridge, river', and 'tube, underground, train'. Clusters can contain a dozen or more tags in decreasing order of relevance and each is a link to pages of images containing that tag. You can click on individual tags within a cluster to view, say, pictures of the Thames (11,151 in total), or view only those images that contain all the tags in the cluster.

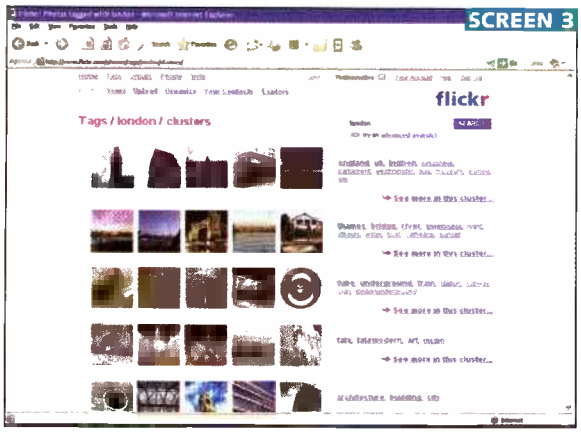
As part of Yahoo, it's no surprise that a great deal of what happens on Flickr is group-based. Like all Yahoo groups, these consist of thread-based discussions plus, of course, lots of photos. Some of the more popular include Flickrcentral (181,626 images), B&W (133,932), Flowers (70,861) and Bloggers (31,756). Its support for RSS and Atom feeds makes Flickr a popular image repository for bloggers.

Like other online photo services, Flickr allows you to restrict access to photos to selected groups. You can, for example, upload photos to an area that only friends or family can access. All uploaded photos inherit the default privacy level set on your account page, initially set up so all photos can be viewed by the public who can comment on them. This can be changed easily, as can the setting for individual photo sets. Limiting access requires a degree of organisation – setting up contacts and arranging them into groups. People can belong to one of two groups – 'friends' and 'family' – or to both.

One positive aspect of Flickr is the number of people prepared to comment on submissions. If you're an aspiring photographer who wants honest criticism, this can be very useful, but be prepared for people to be blunt. If the level of criticism gets beyond what you'd consider constructive and friendly you can block interaction with the individual concerned and even change the access settings to make images private, but this will break any external links to them.

You can sign up for a Flickr account for free; if you have a Yahoo account, simply register a Flickr username. The account lets you upload up to 20MB of images a month, but only the 200 most recent are displayed; older images are archived, so if you've blogged an image the link will not break.

For $24.95 (approx £14.35) a year you can upgrade to a Pro account, which raises the upload limit to 2GB per month and provides unlimited storage and permanent archiving of original images (free account images are recompressed and downsampled to a 75 x 75pixel thumbnail and four




Tag clusters help locate related images

other sizes, measuring 120, 240, 500 and 1,024pixels on the longest edge). Given the bandwidth limit on the free account it makes sense to downsample your photos to 1,024pixels on the longest edge prior to uploading, as this is the maximum size they'll be used.

Another thing that differentiates Flickr from many online photo-sharing sites is that it offers a variety of applications and utilities which not only enrich the viewing experience, but also make the job of uploading and organising images much easier.

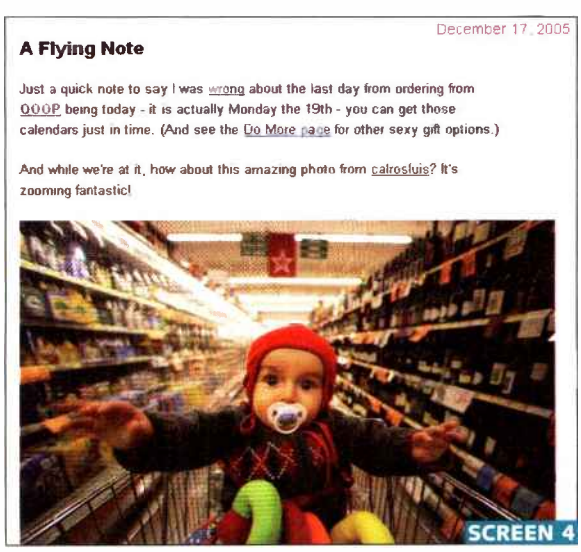
The most ubiquitous of these is Slideshow, a simple but well-designed app that can be run in its own window, has a pop-up browser, can be played forwards or in reverse and has an adjustable delay timer. Then there's the Organizr, which arranges your photos in date order in a calendar format in much the same way as album software such as Adobe Photoshop Elements 4.

The Flickr API (application programming interface) is available for use by third-party developers, and this has led to a raft of utilities and viewer applets, each of which provides either a more convenient way of uploading and organising photos or a unique viewing perspective. Mappr, by Stamen Design, is a search engine that maps photos to their geographic location. The current beta is US only, but there are plans to expand it to include Europe, Asia and the rest of the world. In the meantime, if you're interested in other parts of the world, there's Flickrmap, for which the developer charges a $5 (approx £2.90) annual subscription.

Jim Bumgardner's Color Fields Experimental Colr Pickr can be seen as either a whimsical diversion or an innovative new tool for designers. It selects Flickr images on the basis of colour rather than content.

Associatr builds on Flickr's potential for providing new and interesting ways to browse related images. Entering a tag in the search field displays a thumbnail image based on that tag and a further three thumbnails based on related tags. For each of these three a further three related thumbnails are also displayed. All of these float around the screen and although, as the author admits, 'there is no good reason for that', it looks cool and isn't nearly as distracting as you'd expect. You can make any of the related thumbnails the focus of a new relationship tree and in this way thread a conceptual path through a trail of loosely related images. Like a lot of these applications, it's fun and gives you the feeling you could be participating in something groundbreaking; or possibly just pleasantly wasting five minutes looking at some interesting photos.

There are Flickr groups and the site has its own blog




Flickr's user-generated tagging has its problems. Unlike a tightly defined top-down system in which standard terms and definitions are agreed upon (the IPTC is developing such a system), it can be idiosyncratic, with the same term used for different meanings and vice versa.

Despite this, or perhaps because of it, there is a growing school of thought that such 'folksonomies', as they've come to be known, are an effective and useful way to classify the vast amount of data available on the web. We'll have to wait and see, but in the meantime, Flickr is providing one of the web's best photo communities. And it looks like I ended up talking tags after all. **PCW**

# Get feedback on images

As well as equipment reviews and tutorials, online photo sites let you upload images to a gallery area where they can be seen and commented on by other photographers. The standard is generally quite high and, if you're looking for opinions on the quality of your work, this is a great way to get them. These sites don't provide online services such as photo-editing tools, printing and personalised gifts. If that's what you're after take a look at *PCW*'s online photo services group test in the September 2005 issue.

### DPreview

**www.dpreview.com**

DPreview is one of, if not the biggest digital photo site on the web. This may be due to the fact that it provides some of the best and most in-depth reviews of digital camera equipment on the web. While DPreview doesn't provide a photo-sharing service *per se*, you can upload images to one of the many camera-specific forums that are populated by like-minded individuals who are only too happy to pass comment and provide advice.

### Photo.net

**www.photo.net**

Photo.net offers a free service that allows you to upload photos for sharing, critique and rating with other members. There are also well-populated forums as well as tutorials and equipment reviews. Members are mainly enthusiastic amateurs, but the standard is very high and membership includes a significant number of semi-pro and professional photographers. There's also a classifieds section, but as the site is primarily US-based, this is of limited use.

### Ephotozine

**www.ephotozine.com**

Good UK-based all-round digital photography site with equipment reviews, forums, tutorials and reader and professional portfolios. Uploads are limited to one a day, though, making this a better option for the occasional photo that you think deserves recognition and comment, rather than the entire contents of a 1GB card. This also means the overall standard is quite high.

**Tim Nott** is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

→ Comments welcome on the Word processing column.
Email wp@pcw.co.uk
*Please do not send unsolicited file attachments.*

# The right sort

## How to organise groups of paragraphs; plus more on headers and footers

Although the Sort command appears in Microsoft Word's Table menu, its use is not confined to tables. If you have created a list of addresses, or a glossary, by appending entries over time and you want to get this into alphabetical order, going to Table, Sort, will automatically select the whole document. If you only want part of the document sorted, select this before going to Table, Sort. In the 'Sort text' dialogue, choose 'Paragraphs' to sort by, 'Text' as the type and 'Ascending' as the order. Hit the OK button and one of two things will happen. If each entry consists of a single paragraph, for instance:

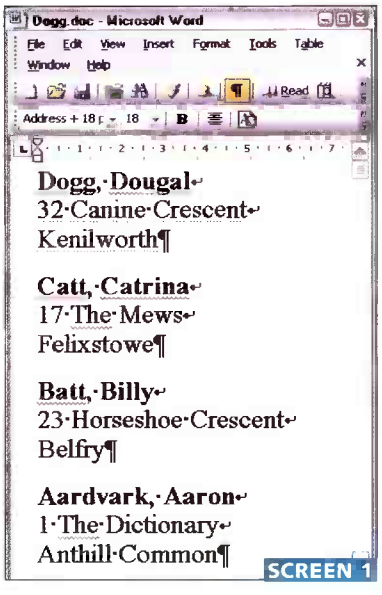
> 'Dog: Hairy quadruped that can be kept as a pet or trained for work such as guard duty or herding sheep'

then your list should be sorted correctly by the first word – Aardvark, Bat, Cat, Dog and so on. But if each entry consists of more than one paragraph, such as:

> Dogg, Dougal
> 32 Canine Crescent
> Kenilworth

the addresses will get jumbled – all the lines beginning with numbers will be placed at the top, followed by an alphabetic list of all the names, towns and so on mixed in together.

You can Edit, Undo a sort, but a better way it is to use manual line breaks (Shift & Enter) rather than paragraph marks (Enter) within the body of each entry. Although (depending on paragraph spacing) the effect looks the same, if you turn on the view of formatting marks (Tools, Options, View) you'll find paragraphs are terminated with the backwards-P symbol (¶), and line breaks show as a bent arrow (see screen 1). If you've already made your entries using paragraph marks, then this isn't too hard to put right, and draws on our recent sorties into Search and Replace.




Using line breaks, this list will sort correctly

First make sure each address or entry is separated from the next by a blank paragraph; that is, you have pressed Enter twice after each one. Search and replace all occurrences of two paragraph marks (you can type ^p^p in the 'Find what' box or click the 'More' button and choose 'Paragraph mark' twice from the 'Special' list). In the 'Replace with' box, type any character combination that doesn't appear in the document, for example @@@ – this is just a temporary marker. Replace all. Now replace all single paragraph marks with 'Manual line break' from the 'Special' list (or type ^l). Finally, replace all your temporary markers with single paragraph marks.

Things can get a little trickier if you really need to use paragraphs within each entry. For example, you might have a heading for each entry, followed by one or more paragraphs, such as:

> Dog (*Canis lupus familiaris*)
> The dog is a canine mammal of the order Carnivora etc...
> Dogs have been kept as pets for many thousand years etc...
> Working dogs can be trained to herd sheep etc...

In this case you need to impose some style discipline. Give every heading an appropriate style, such as Heading 2 (and check that the style has a corresponding outline level), and the following content for each entry is given a style such as Normal or Body Text. Now switch to Outline view, and you'll see each entry heading has a plus sign beside it and the entry body paragraphs are indented below this. Select all the entries and perform the sort, and the headings and body stay together.

### Footer feedback

January's foray into footers and headers in Word produced this observation from David Buley. Create a new document, type a few paragraphs, then create a new, distinctive style called, say, Headfoot. Format two, non-consecutive paragraphs in the new style. Now go to View, Headers and Footers, and in the header insert a StyleRef field and choose 'Headfoot' from the list of styles. When fields are updated (F9), the first occurrence of a paragraph in that style will appear in the header. If you then switch to the footer and repeat the process, but add the 'Search from bottom of page to top', the text in the last Headfoot paragraph will appear there. It seems to work with character styles too, and you can have different header/footers on each page.

Peter Bates did a neat about-turn on our tip for getting a footer to appear only on the last page, using an IF field. He wanted to do the opposite – have a footer reading 'Continued...' on every page except the last. So he modified our field code to read:

```
{IF{PAGE}<>{NUMPAGES} ↙
"Continued..."}
```

(Key: ↙ code string continues)

where the '<>' symbols denote 'not equal to', which did the trick. **PCW**

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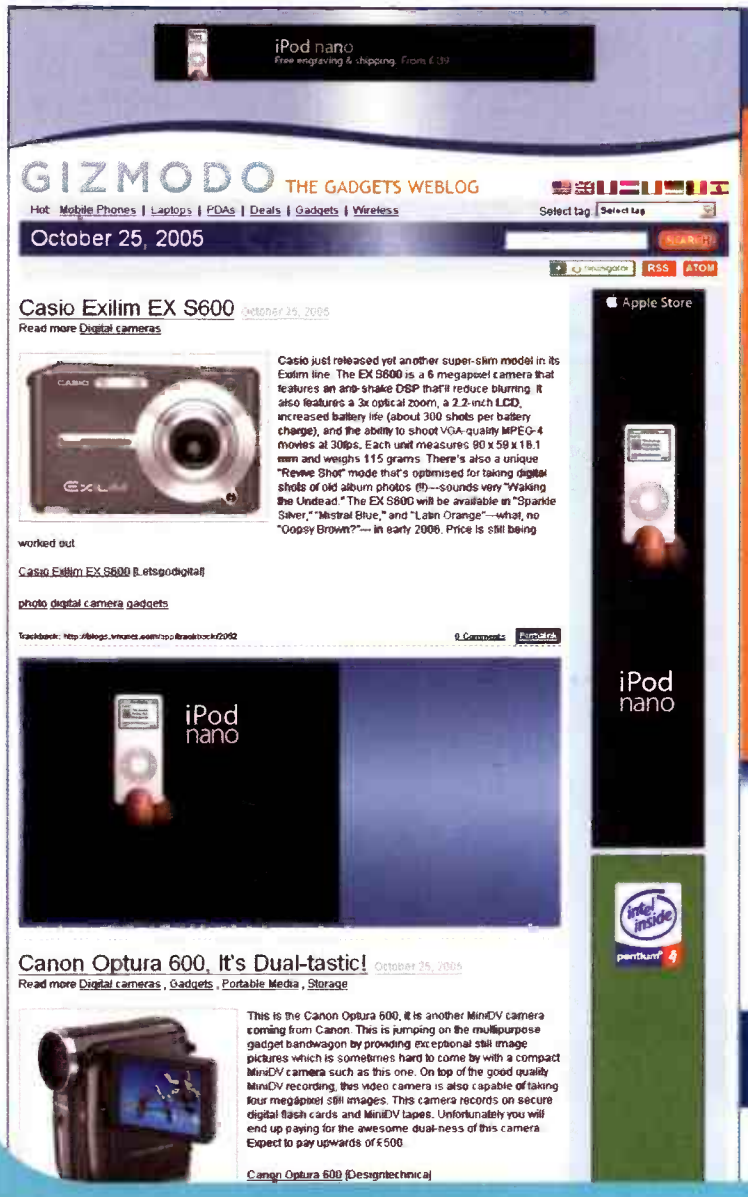


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**Stephen Wells** is a freelance journalist and a regular contributor to computer magazines. He's been writing PCW's Spreadsheets column for over 10 years.

→ Comments welcome on the Spreadsheets column.
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# Tricky balancing act

## Find out if you can profit by reducing prices; and use Outlines for better presentation

If a business wants to increase sales by reducing prices it can only do it profitably if costs are reduced. A reader has asked how to plot this relationship using Excel. The analysis of price sensitivity can be a complex subject but I can show a simple example.

Screen 1 shows a fictitious retailer's income statement for the previous year. First choose Options on the Tools menu and then the Calculation tab and check the box 'Accept labels in formulas'.

Screen 2 shows the calculations needed to prepare a price sensitivity analysis chart. In cell B39 enter:

```
=Operating Expenses+Operating ↙
Income
```

(Key: ↙ code string continues)

and Excel will enter the values from the income statement above. Similarly, if you recreate this example, in cell B40 you can enter:

```
=Cost of Goods Sold/Net Sales
```

In cell B44 enter 2.5 and in C44 enter 5. In D44 enter:

```
=C44+$B$44
```

and drag this along to I44 so that each cell along the row increases by 2.5. In B41 enter:

```
=(100-B44)/100-$B$40
```

| | A | B | C | D |
|---|---|---|---|---|
| 22 | | (000) | | |
| 23 | **Net Sales** | £7,233 | | |
| 24 | Beginning Stock | 919 | | |
| 25 | Purchases | 4,995 | | |
| 26 | Total Goods for Sale | 5,914 | | |
| 27 | Ending Stock | 1,234 | | |
| 28 | Cost of Goods Sold | 4,680 | | |
| 29 | **Gross Profit** | £2,553 | | |
| 30 | Operating Expenses | 2,153 | | |
| 31 | Operating Income | 400 | | |
| 32 | Interest Expense | 20 | | |
| 33 | Income taxes | 144 | | |
| 34 | **Net Income** | £236 | | |
| 35 | | | | |

SCREEN 1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 38 | **Break-Even Curve based on latest year** | | | | | | | | |
| 39 | Operating Expenses + Operating Income | £2,553 | | | | | | | |
| 40 | Cost of Sales in pence | 0.6471 | | | | | | | |
| 41 | Price Sensitivity Analysis | 0.33 | 0.30 | 0.28 | 0.25 | 0.23 | 0.20 | 0.18 | 0.15 |
| 42 | | 1.08 | 1.17 | 1.27 | 1.40 | 1.55 | 1.74 | 1.98 | 2.31 |
| 43 | Sales Increase % | 7.62 | 16.51 | 26.99 | 39.54 | 54.85 | 73.92 | 98.36 | 130.80 |
| 44 | Price Reduction % | 2.5 | 5.0 | 7.5 | 10.0 | 12.5 | 15.0 | 17.5 | 20.0 |
| 45 | | | | | | | | | |

SCREEN 2

and drag this to I41. In B42 enter:

```
=$B$39/B41/$B$23
```

and drag this along to I42. In B43 enter:

```
=(B42-1)*100
```

and drag this along to I43. Save the file.

Highlight the range B43 to I43, click the Chart tool and choose the first Area Chart sub-type. Next, put B44:I44 as the category X axis labels. Then give the chart the title, Price Sensitivity Analysis. The category X axis title is: Price decrease % and the value Y axis title is: Sales increase %.

**Top: Start with a retailer's Income Statement...**

**...to help calculate price sensitivity (bottom)**

Now choose 'As new sheet'. Give the tab a name such as Price Chart. Click Finish and, apart from a little colour formatting, you'll have a chart like that shown in screen 3. This is the current Breakeven curve for the company. Price and sales data that sits above the curve mean the company is in profit; below the curve means the company would make a loss.

In this initial version you'll see that to compensate for an average 10 per cent reduction in prices, with no loss of profit, this company would have to achieve a 40 per cent increase in sales.

Spreadsheets are ideal for modelling anticipated results of future events. These can be anything from alternative management strategies such as this, to emergency plans for fire or flood. One way of doing this is to prepare separate worksheets for each anticipated eventuality. But if your assumptions have a ripple effect on other entries then, in Excel at least, you can take advantage of the Scenarios feature. Scenarios are a good choice when the changing assumptions include many related factors.

We'll model an alternative scenario, but first let's record this one.

Click on the cell holding the value for stock purchases, B25 in this example. Hold down the Ctrl key and click on the cell holding the value for operating expenses, B30. Both cells are now highlighted. On the Tools menu choose Scenarios and click the Add button. In the 'Add scenario' dialogue box give this Scenario a name, such as Last year. In the Comment box you can enter a description such as: 'The do nothing option'.

## Top tip to make Scenarios work for you

Open the Scenario manager and click the Summary button. This will add a new worksheet with an adjustable summary of the values resulting from each Scenario.

| Scenario Summary | Current Values: | Last Year | Economy scenario |
|---|---|---|---|
| **Changing Cells:** | | | |
| **Purchases** | 4,995 | 4,995 | 3,000 |
| **Expenses** | 2,156 | 2,156 | 1,600 |
| **Result Cells:** | | | |
| **Sales increase %** | 39.54 | 39.54 | 18.91 |
| **Price decrease %** | 10.0 | 10.0 | 10.0 |

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

Click OK and you are next presented with a 'Changing cells' box. You'll see that your highlighted cells, B25 and B30, are already entered, and you are offered the chance to change the values in those cells. But as this worksheet is complex it's best to close this box and start again.

Back on your worksheet, highlight cells B25 and B30. Return to the Tools menu. Choose Scenarios and click the Add button. In the Comment box you can enter something like 'Reducing stock purchases and operating expenses'. Give this second Scenario a name, such as 'Economy scenario', and retain the check in the 'Prevent changes' box and leave the Hide box unchecked again. Click OK.

The 'Scenario values' dialogue box appears and you can try out what would happen if the company applied better buying policies, inventory was more carefully managed and overheads more tightly controlled. Reduce the Purchases value to 3,000 and the value of the Operating expenses to 1,600. Click OK. Back in the 'Scenario manager' box choose the Economy scenario and click the Show button to transfer those values to the worksheet. Click the Close button to close the Scenario manager.

If you follow this example and click the tab to display the chart again, you will find that the retailer now needs only a 19 per cent increase in sales to recover from an average 10 per cent reduction in prices. As net income has risen from £233,000 to £2,784,000 the company is in a much better position to offer its customers better deals.

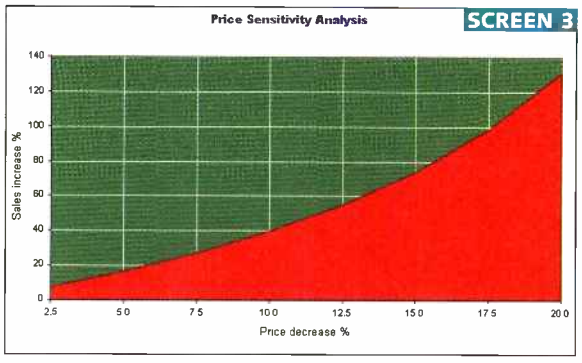
Choose Scenarios now on the Tools menu and you are offered a choice between the scenario based on last year's figures and the Economy scenario which gives management a goal to shoot for. Just click on the name of the scenario you wish to see. Click Show to change the values on the worksheet and click the Close button to close the Scenario manager. You can, of course, make other projections and add further Scenarios to record them (see also box on previous page).

## Styles in Outlines

If you Group and Outline an Excel list the subheads are shown in bold but the actual totals and subtotals have the same formatting as all the other values in a column. Mayo Marriott asked if there was a quick way of formatting those numbers. I suggested choosing the row number and clicking the Bold tool. However, every now and then a reader who unearths a better idea than mine will share it with us. Mayo was kind enough to pass along a tip, undocumented by Microsoft.

Let's start with a simple list. Before outlining a list it's important to put it in order. So click on cell A2 and choose Sort, Date, Ascending on the Data menu. Now the order of the records won't confuse the outlining feature (see screen 4).

Although Excel has a subtotalling facility on the Data menu it only recognises a change of day in a date column, not a change of month. So we'll insert rows for those subtotals. In the new row 4 insert:




SCREEN 3

Top: Results that sit above the curve are profitable on this breakeven graph

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | Date | Product 1 | Product 2 | Product 3 | |
| 2 | 7/5/05 | 22 | 21 | 21 | |
| 3 | 8/5/05 | 23 | 24 | 33 | |
| 4 | 7/6/05 | 22 | 21 | 55 | |
| 5 | 8/6/05 | 23 | 24 | 24 | |
| 6 | 7/7/05 | 22 | 21 | 45 | |
| 7 | 8/7/05 | 23 | 24 | 27 | |
| 8 | 2/8/05 | 24 | 25 | 33 | |
| 9 | 5/8/05 | 25 | 26 | 36 | |
| 10 | 9/11/05 | 23 | 26 | 36 | |
| 11 | 10/11/05 | 23 | 27 | 39 | |
| 12 | 13/12/05 | 23 | 28 | 13 | |
| 13 | 14/12/05 | 23 | 32 | 39 | |

SCREEN 4

Bottom: The Group and Outline function can help present this data better

| | | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 1 2 3 4 | 1 | Date | Product 1 | Product 2 | Product 3 | |
| | 2 | 7/5/05 | 22 | 21 | 21 | |
| | 3 | 8/5/05 | 23 | 24 | 33 | |
| | 4 | May | 45 | 45 | 54 | |
| | 5 | 7/6/05 | 22 | 21 | 55 | |
| | 6 | 8/6/05 | 23 | 24 | 24 | |
| | 7 | June | 45 | 45 | 79 | |
| | 8 | 2nd Qtr | 90 | 90 | 133 | |
| | 9 | 7/7/05 | 22 | 21 | 45 | |
| | 10 | 8/7/05 | 23 | 24 | 27 | |
| | 11 | July | 45 | 45 | 72 | |
| | 12 | 2/8/05 | 24 | 25 | 33 | |
| | 13 | 5/8/05 | 25 | 26 | 36 | |
| | 14 | Aug | 49 | 51 | 69 | |
| | 15 | 3rd Qtr | 94 | 96 | 141 | |
| | 16 | 9/11/05 | 23 | 26 | 36 | |
| | 17 | 10/11/05 | 23 | 27 | 39 | |
| | 18 | Nov | 46 | 53 | 75 | |
| | 19 | 13/12/05 | 23 | 28 | 13 | |
| | 20 | 14/12/05 | 23 | 32 | 39 | |
| | 21 | Dec | 46 | 60 | 52 | |
| | 22 | 4th Qtr | 92 | 113 | 127 | |
| | 23 | 2005 | 276 | 299 | 401 | |
| | 24 | | | | | |

SCREEN 5

The grouped and outlined list is automatically styled

## Copying styles

Once you have created new styles you can easily copy them to other workbooks. Open the workbook containing the styles you wish to copy. Then open a file you want to copy the styles to. Choose Style, Merge on this workbook's Format menu. In the Merge styles box, choose the name of the other workbook and click OK. All the styles in the first workbook will be added to the styles in the second workbook.

`=SUBTOTAL(9,B2:B3)`

in cell B4 and drag it along to D4. The 9 in the first argument means the subtotal will use SUM. There are 11 options here. In other circumstances you could use in this argument 2 for COUNT or 4 for MAXIMUM.

After the June subtotalling row you can add a row for totalling the 2nd Qtr. All you have to do here is click the Autosum tool and it will total the subtotals above and ignore other values in the column.

Once you have the months and quarters totalled you can add another row at the bottom for totalling the quarters and produce grand totals for each product for the year.

Now we can use Mayo's tip. On the Format menu choose Style. In the Style Name box enter a new one called RowLevel_1 and assign it the alignment, font, font colour and so on of your choice. This will apply to the largest outline, the year in our example. Also create RowLevel_2. This format will apply to the quarters. RowLevel_3 will format the months row.

Now you can click anywhere in the list and choose Group and Outline, Auto Outline on the Data menu and your outline and formatting are complete (see screen 5). Thanks to using the specially named styles, in one fell swoop you have not only emphasised the totals, but you have also differentiated by colour between the various layers of the outline.

Above the outlining symbols on the left of the screen are the numbers 1, 2, 3 and 4. 1 just displays the year totals; 2 shows the year and the quarters; 3 presents the totals for the year, quarters and months; 4 reveals the complete list. **PCW**

**Niall Magennis** has been dabbling in Midi and digital audio since the days of the Atari ST. He writes for a number of music magazines and lives in London in a flat overrun with music equipment.

→ Comments welcome on the Sound column. It returns in the June issue. Email sound@pcw.co.uk *Please do not send unsolicited file attachments.*

# Rhythm and Reason

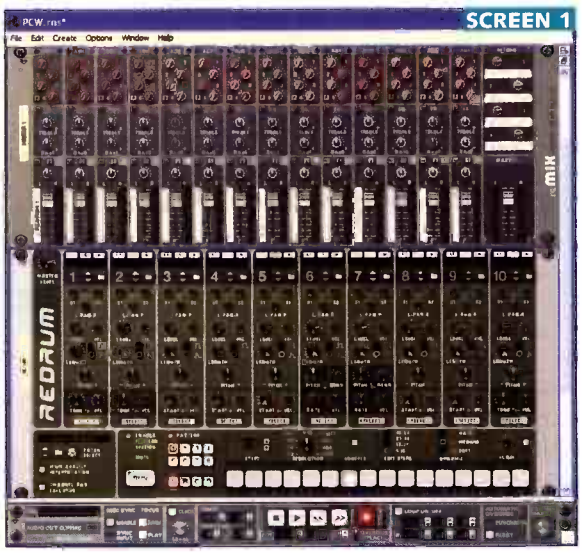
## Tune in to some tricks to create more interesting beats for your compositions

You don't have to be a drummer to realise that rhythm is extremely important to modern music. No matter whether your taste falls on the side of rock, jazz, indie, hip hop, electronica or grime, the beat is what drives the music along. After all, you can't dance or thrash about to a track unless there's a groove being laid down by the drum track – well, perhaps not unless you're an ageing hippy who's into 1970s ambient music.

But if you're not really accustomed to the art of playing drums, you may struggle to come up with interesting-sounding rhythms. Lots of the latest dance tunes use quite complicated layers of beats to keep the music driving forward. This month we're going to look at some of the tricks and techniques dance music producers use to build up and break down these rhythms. But don't worry if you're not into dance tracks, as many of the techniques we'll cover can be used in other forms of music.

We'll be using Reason V3 from Propellerhead Software to create the beats, because it contains everything you need to get going, including modules for drum machines, samplers and effects units. If you don't have Reason you'll still be able to follow most of the steps we take using the software synthesisers built into sequencers such as Cubase, Live and Sonar.

We're going to start with quite a simple beat that we'll program into the drum machine in Reason and use as the foundation for our rhythm. We'll then take this stripped-down beat and gradually add extra elements to it to give it the type of break-beat feel you hear on many dance tracks today. We'll do this by layering drum patterns with sampled breaks. Once we have our break-beat, we'll start processing some of the drums with filter effects and distortion to give the beat a more electro feel. You should be able to take the techniques we show you and adapt them to suit whatever style of music you make.




To get started, load up Reason V3. We want to begin with an empty rack so click on the File menu and select Open. In Locations select the Reason folder and then choose Template documents. Now select the Empty rack template and click on Open to load it in. Because of the way audio routing works in Reason, first we need to add in a mixer module. By starting with a mixer module, any extra modules we add later will automatically be wired up to the mixer (see screen 1). Right-click on the rack and from the menu that appears select Mixer 14:2.

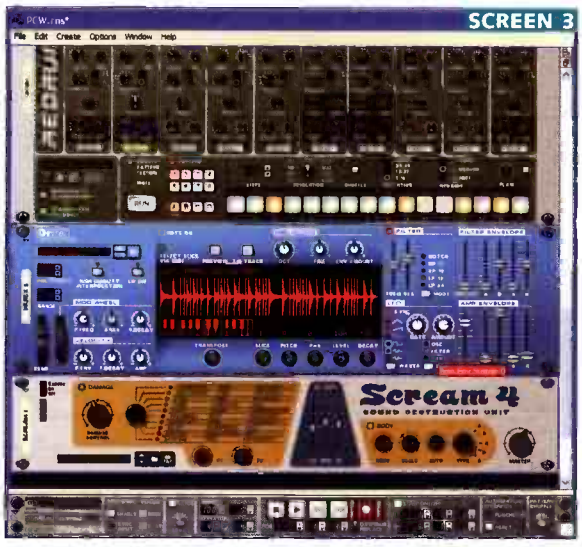
Once you have the mixer in your rack you can start adding extra modules. Right-click on a blank area in the rack and select Redrum Drum Computer from the menu. To load in some drum sounds click on the folder button next to the Patch Select text in the Redrum interface. Select the Reason Factory Soundbank in the Locations box and choose Electronic kit 2 from the Electronic Kits sub-folder in the Redrum drum kits folder. Click Select on the first drum channel and program in hits on pads 1 and 12. Click Select on channel 3 and program in hits on pads 3, 6, 9, 13 and 15. Now click on Run to listen to the basic drumbeat you've just created.

**As long as you first add a mixer to your rack, all later modules will automatically be routed to the mixer**

The beat is quite simple, so we need to add extra elements. Right-click on a blank area of the rack and select Dr:Rex loop player from the menu that pops up. We want to add in some hi-hats, so click on the Folder button on the Dr:Rex interface, select the Reason sound bank and click on the Dr:Rex drum loops folder. Now open the RnB Hiphop folder and select RnB11_LaidBack_090_eLab beat.

If you click on Preview in the Dr:Rex interface you'll be able to hear that the loop contains kicks as well as a hi-hat pattern. However, we can cut out this bass kick using the Dr:Rex filters. Make sure the light for the filter is on and then click on the button to

**Use the high-pass filter in the Dr:Rex module to remove unwanted bass sounds**




## The benefits of extra outputs

Don't forget that many of the instruments in Reason offer multiple outputs. Redrum is a good example of this. Each of the 10 different drum sounds can be routed to a separate output. The advantage of this is that it allows you to send individual drum sounds to individual effects processors or mixer channels. So you could, for example, run the snare drum through a long reverb, while running the hi-hats through a delay. It also means you can individually EQ each of the sounds. This can be especially useful when trying to fatten up a bass kick.

**Redrum offers multiple outputs, so you can send different sounds to different mixer channels or effects unit**

switch the filter to HP12 mode. This sets to filter to work as a high-pass filter that only lets through higher frequencies of the loop (see screen 2). Click the Freq control down to 73 and then set the Res to 26. Click on the Preview button again to listen to the changes you have made. Now hit the 'To track' button to add the track to the Reason sequencer.

If you click on the main Reason play button, the two different elements of the drum beat will play back in unison, so you can hear how they sound when overlaid on each other. Try dropping the tempo to around the 100 mark to slow down the beat.

The beat still sounds quite simple, so it's time to add in another element. We're going to add another programmed beat over the top. Right-click in an empty space in the rack and select Redrum again to add another drum module. From the Redrum kits folder, load in Chemical kit 02. Change the sound on the first drum channel to Bd_xfile1.wav. Make sure the Select button for channel 1 in Redrum is lit and click on pads 1, 3, 4, 7 and 11 to program in the hits. Next, hit the Select button on channel 2 and program in hits on pads 3, 10, 13 and 15. If you click on the main Reason Play button again, you'll hear that the beat is now starting to sound much more like a normal break-beat you'd hear on a dance record. However, we're going to continue adding more elements.

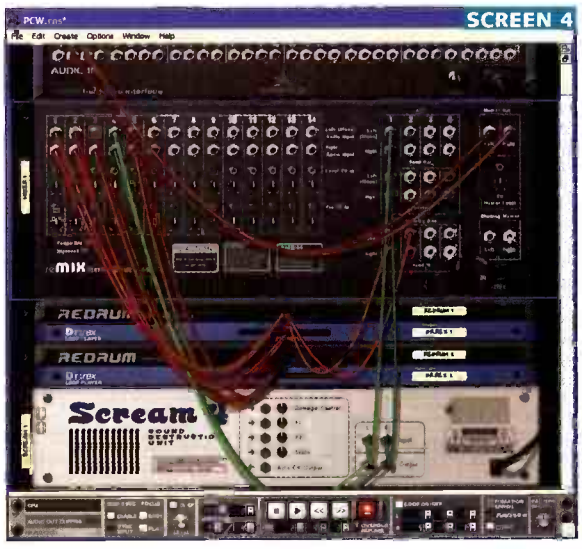
Right-click on an empty space in the rack and add in another Dr:Rex module. Click on the folder button and select the Reason factory sound bank. Go to the Dr:Rex drum loops section and load in Drb21_Dillinja_160_eLab.rex from the Drum and bass folder. Hit the To track button to add the loop to the Reason sequencer.

**Once you've added the Scream 4 into your rack you'll be able to send some of your beats to it to add distortion**

If you hit the Play button, you'll find the new beat is a little overpowering and doesn't fully sit with the rest of the drumbeat we've created. However, by using filters, we can give it an electro sound and make it fit in better. Click on the button for BP2 in the filter section of the Dr:Rex module and slide the Freq control to 60, then set the Res to 77. We want the filter to move rather than remain static, so we're going to use the Low-frequency oscillator (LFO) to open and close it automatically. Click the Sync button under the LFO to lock the speed of the filter to the master tempo set in Reason and then select the second waveform down. Click on the Dest button to change the destination of the LFO to the Filter and then set the rate to 2/4 and the Amount to 99.

Now it's time to get dirty by adding some distortion to our drum sounds. Right-click in the empty space under the Dr:Rex and add in a Scream 4 Distortion module (see screen 3).

**You'll need to delve around the back of the rack to adjust the routing of the audio signals to send them to the Scream 4**




Click on the Folder icon and load in the Kicktweaker patch. By default, Reason will have wired the Scream 4 module to the Dr:Rex module above it in the rack; however, we want to use a different routing. Hit the Tab key to rotate the virtual rack and then unplug the lead that runs from the Scream 4 to the Dr:Rex. Now connect a lead from Aux Send 1 on the mixer to the input on the Scream 4, then connect the output of the Scream 4 to Aux Return 1 on your mixer.

You're also going to need to run the bass drum sound from the second Redrum unit to the Scream 4. To set this up, run a lead from Channel out 1 on the Redrum 2 module to channel 5 input on the mixer. You also need to connect the second Dr:Rex module back to channel 4 on your mixer to replace the leads running from the Scream 4 (see screen 4).

It's time to start routing some of our drum sounds to the distortion effect, so hit the Tab key to rotate the rack back to the normal position. Thanks to the routing that we've just set up, we can now send individual sounds to the Scream 4 module. Scroll up to the mixer and set the return 1 control to 127, then set the Aux 1 control on channel 5 to 59. This will send the kick from Redrum 2 to the distortion module. On channel 4 change the Aux 1 send level to 79. This will also send our filtered break-beat to the distortion module. You also need to send a little bit of the snare drum on channel 3 to the distortion, so change the Aux 1 send level on channel 3 to 24.

In the mixer slide down the mixer control for channel 4 to a setting of 75 and push up the fader on channels 1 and 2 to 127. You've now finished constructing the beat. **PCW**

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**Alan Stevens** has implemented and supported networks for over 25 years, working for IT vendors, system integrators and customers. He now mostly researches and writes about networking matters.

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# Going public

## All you need to know about hosting public servers on a Nat-protected network

No matter what kind of Internet connection you have and regardless of whether you have a fixed or dynamically assigned public IP address, chances are you're using network address translation (Nat) somewhere in your setup.

I don't want to go into great detail about how it works but, normally implemented on the Internet router, gateway or firewall, Nat technology provides several benefits, including the ability to share a single public IP address between multiple users. This it does by altering outbound packets sent from Lan devices so they all appear to come from the one shared public IP address. Nat then routes the return traffic back to the appropriate local systems, doing away with the need to assign public addresses to each and every host on your Lan.

Nat also has the effect of 'hiding' local IP addresses, giving at least a basic level of security against would-be hackers. But it can also cause problems, especially when you want to host your own public email, web, VPN (virtual private network) and other servers.

So this month I'll explain how best to go about hosting public-facing servers on a Nat-protected network.

### The problem in a nutshell

The main problem with Nat stems from the fact that it hides local addresses. This is good in terms of security, but bad if you want to allow remote users to connect to a local web, email or VPN server: the local address simply won't work and the only publicly accessible address you're likely to have will be assigned to the Internet router.

To host your own servers, either you have to bypass Nat altogether or find a way of forwarding traffic destined for those systems onto the appropriate 'hidden' local addresses. Where more than one server application is involved, you may need a way of directing different types of traffic to the correct hosts – SMTP, Pop3 and Imap packets to the mail server; HTTP/HTTPS traffic to the web server, encrypted IPSec tunnels to the VPN server and so on.

**D-Link's firewall has a dedicated DMZ port, implemented on the Internet side of the Nat defences, to effectively sidestep the Nat-related issues**

Most Nat-enabled devices have this functionality built in. But how it's implemented, what the options involved are called and how you configure them can vary enormously.

### The hardware DMZ

Before we look at some examples, I must mention one alternative: to sidestep the issue of Nat altogether. That doesn't mean turning it off, but using hardware arranged to create a so-called demilitarised zone (DMZ) where local network ports are provided that are on the Internet side of the Nat defences.

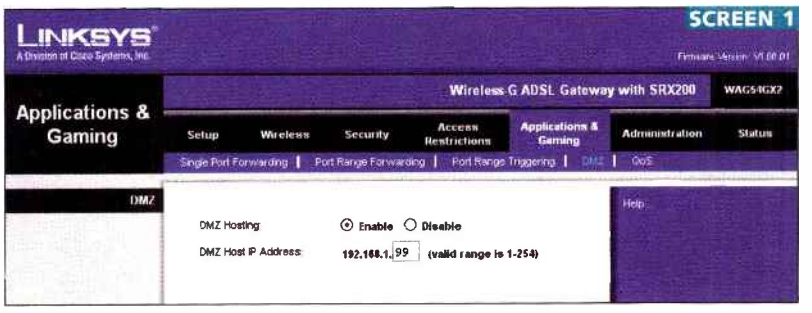
Because they fall outside the scope of the Nat technology, anything attached to these ports can be assigned public IP addresses of their own, doing away with the need for any special measures to overcome Nat problems; assuming you've been allocated a block of addresses by your ISP (see box on the next page for more details).

Dedicated firewalls often have DMZ ports for this purpose, with the added benefit, in most implementations, of firewall protection even for systems in the DMZ. But this kind of hardware solution can be expensive and you're unlikely to find many low-cost broadband routers with such hardwired DMZ ports. Plus, with most broadband services, you only get one public IP address, in which case a different solution is required, implemented in the router/gateway software.

### The software approach

There are no standards involved, so what you need will vary depending on the make and model of your router, gateway or firewall. In general, look for software DMZ, address forwarding or port forwarding options.

These options can usually be set up and managed via the router's user




**This Linksys router has been configured to forward all inbound traffic addressed to the public IP address to a local server at 192.168.1.99** ↘

# The right address

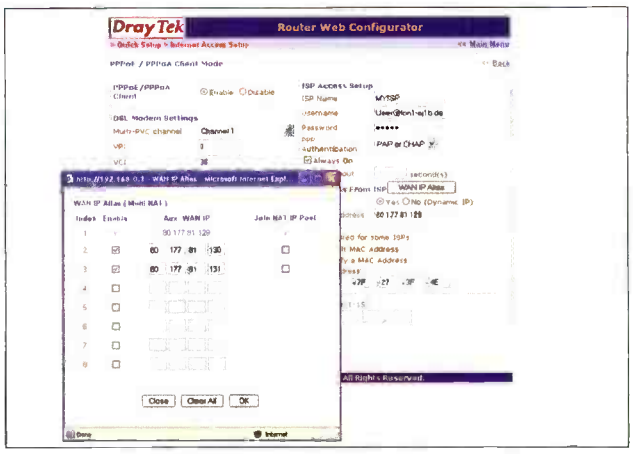
When you sign up for Internet access you may well be asked questions about your public IP address requirements. If not, it's usually because you've signed up for a standard home user account, designed for people who just want to surf the Internet, play games and so on. A single address is all that's needed, and most service providers will arrange to assign the address dynamically each time you connect rather than giving you a fixed address of your own.

When it comes to hosting your own servers, this shouldn't be a problem. Dynamic addressing can be handled via one of the many Dynamic DNS (DDNS) services now available to cross-reference DNS names (such as myserver.com) to whatever public IP address is assigned to your Internet connection by the ISP. Fixed addresses are a better bet, as they never change making them less problematic and more reliable. But will one public IP address be enough?

The answer for most home and small-business users is, yes – assuming you want to host only one or two public servers, which can be done using the single public address and port forwarding features provided by most Internet routers, gateways and firewalls. However, there is a security concern, as all your servers and online services are accessible through a single public address. If one system becomes compromised, so could all the others. Also, you may want to host lots of servers, in which case a block of public addresses would be a better bet.

Some ISPs let you have these at no extra cost and some charge. Whatever the case, you will need to make special arrangements to handle multiple addresses. Most low-cost routers, for example, will be aimed at home users and only let you assign a single public IP address to the Internet connection, although there are exceptions such as the Draytek Vigor products, where you can configure multiple public IP addresses that can then be forwarded across the integrated Nat firewall to specific servers on the local network (see screen above).

Another approach is to use a gateway/router with multiple DMZ ports or, lastly, to turn Nat off at the router and connect your public-facing servers directly, with a separate Nat firewall/gateway between the router and the rest of the local network.




**Most ADSL routers let you have only one public IP address, but on this Draytek Vigor you can configure and forward several different public IP address 'aliases'**

interface and will be grouped by themselves or listed under the Nat settings. However they're organised, they will be implementations of the same approach: the logical mapping of public IP addresses and ports to 'hidden' local equivalents on the protected Lan.

## Some mapping examples

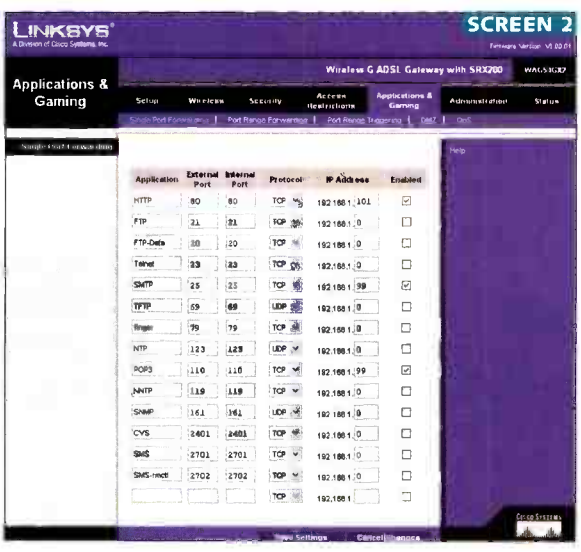
With a software DMZ (sometimes known as host forwarding), for example, you can direct all unsolicited inbound traffic received on the public IP address to a single local server (see screen 1 taken from a Linksys WAG54GX2 wireless ADSL router).

As you can see in the screen, all inbound traffic has been directed to an address of 192.168.1.99; useful if you have just one server hosting your email, FTP, web and any other public-facing servers. However, it doesn't discriminate in terms of what gets forwarded and is effectively opening the target server to all and sundry, which could be a security issue. Firewall and content filtering rules will still be applied but, on a low-cost router, these measures are unlikely to be foolproof. In this case you may want to be more selective about how traffic is forwarded (see screen 2, taken from the same Linksys wireless ADSL router showing what it calls its single port forwarding option).

In this screen, the Linksys router has been configured to inspect and pass traffic selectively according to the port involved. SMTP (port 25) and Pop3 (port 110) email traffic, for example, is being forwarded to an email server on 192.168.1.99, and general HTTP (port 80) traffic to a web server on 192.168.1.101. The built-in firewall is used in each case, but no other traffic will be allowed through except in response to requests made by a local user.

Other makes of router can usually be similarly configured, but you'll have to check the documentation for details.

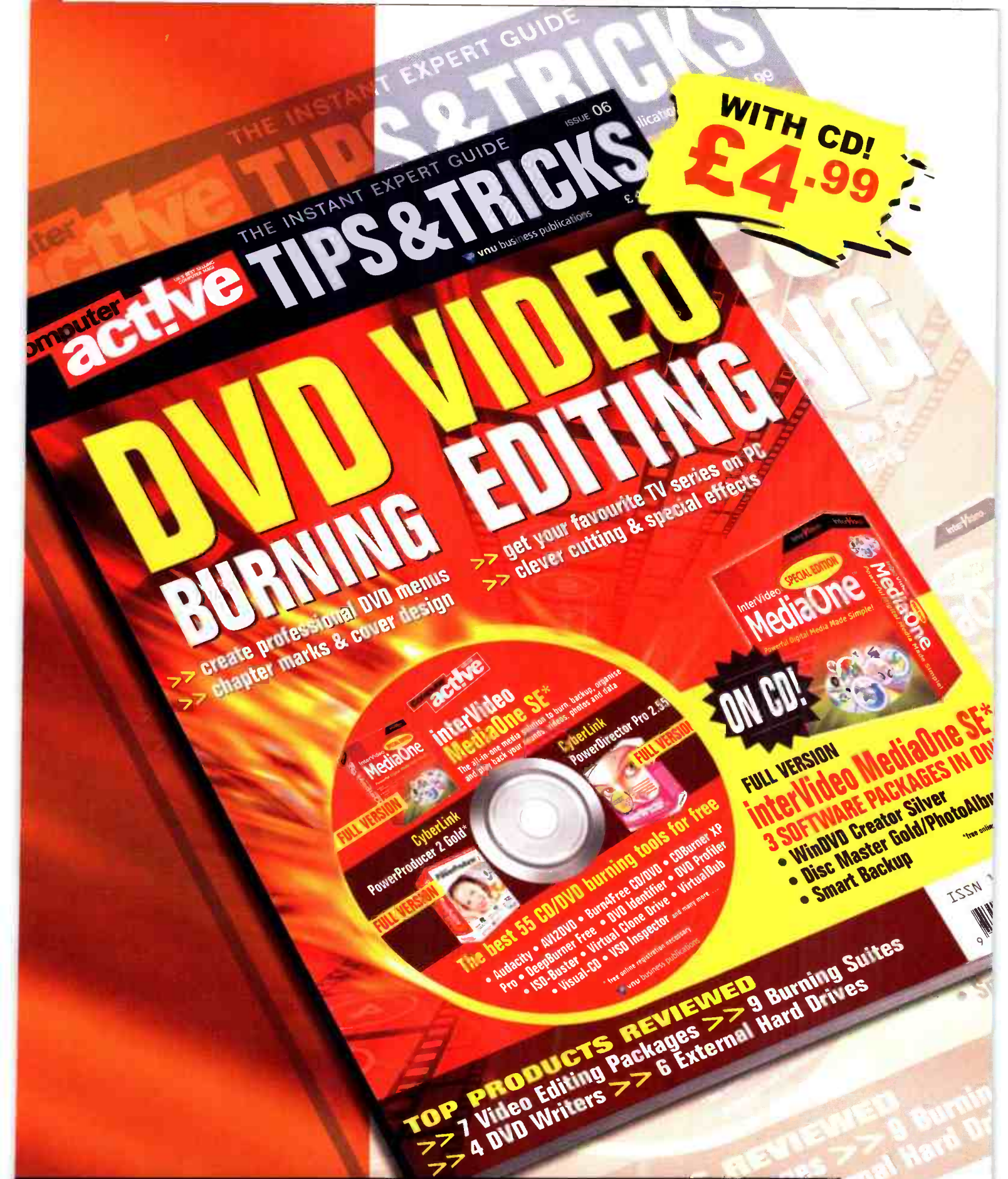
**You can configure a router to selectively forward SMTP, POP3 and HTTP traffic, but nothing else**




On some routers you can forward port ranges rather than specifying each port involved. On consumer-oriented routers such as those used to provide the screens, you'll often find port-triggering options. These allow the public IP address/port combinations to be mapped to specific internal addresses, but only for traffic streams solicited by users on the protected Lan.

Typically provided to support Internet gaming applications, port triggering requires the router to inspect outgoing data for specific port numbers. When traffic is detected on these outbound ports, it then records the local IP address of the computer that sent the data and 'triggers' the incoming port settings. Incoming traffic on the triggered port is then forwarded to the proper computer by way of IP address and port mapping rules.

You may have to change your firewall to allow access to locally hosted public servers. Where the address and port forwarding options are provided on the router, the rules to allow data through any built-in firewall should be configured automatically. But that's not always the case, and where you have separate firewall protection you must make the changes yourself. **PCW**

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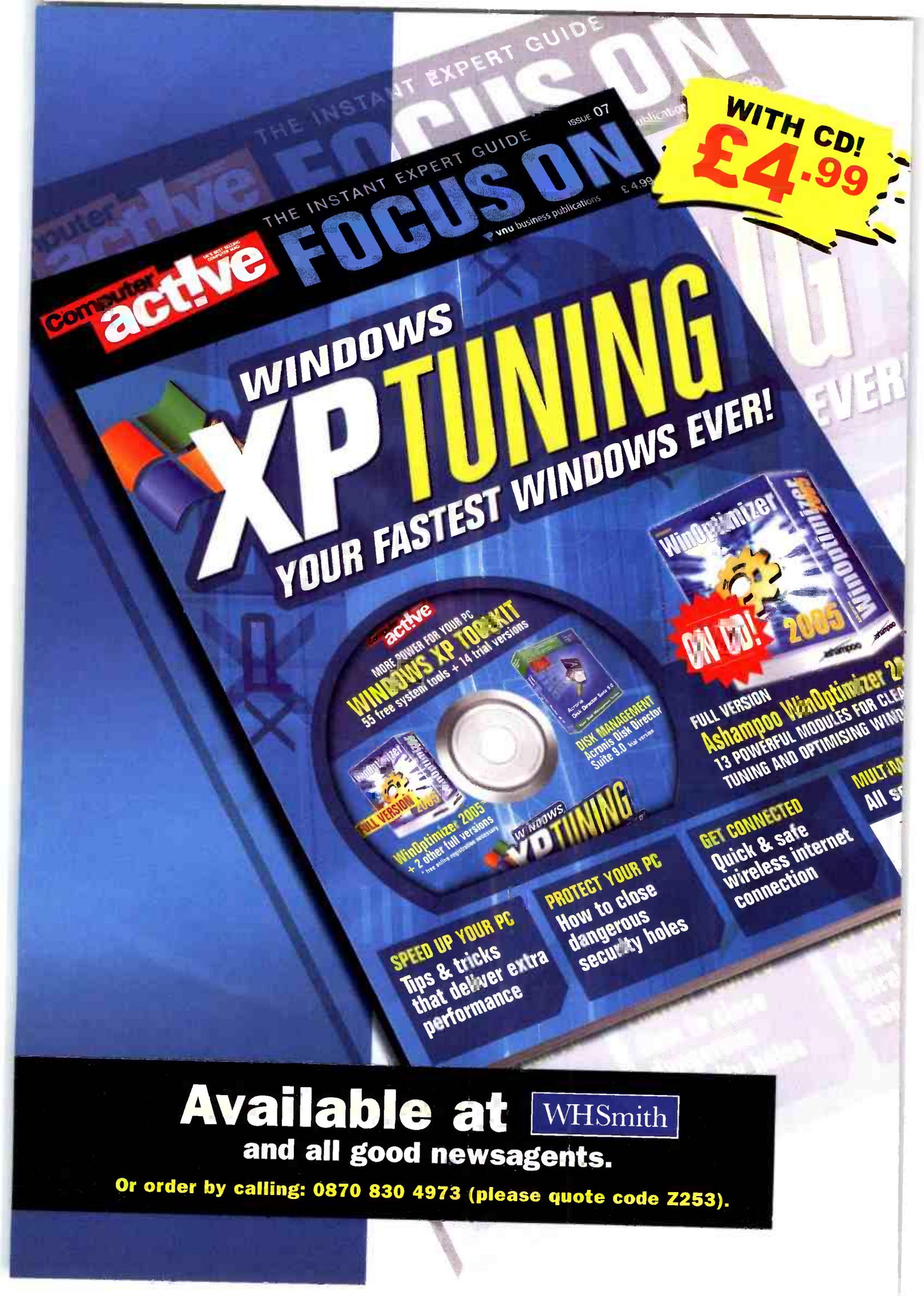
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**Mark Whitehorn** is one of those lost souls who actually likes databases. He splits his time between consultancy, writing, working for two universities and tinkering with old cars.

→ Comments welcome on the Databases column.
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# Quicker queries

## Make your queries run considerably faster by getting to grips with indexes

Last month I talked about indexes and the wondrous speed gains they can bring to a database. Indexes can make queries run, quite literally, thousands of times faster. Yes, I do mean three orders of magnitude faster. However, in order to use indexes efficiently, you have to understand them, so here's some of the 'more' I promised on the topic.

First of all, the practical bit: how do you apply an index to a field/column?

In Access you simply open up the table in design mode, select the field to be indexed and change the indexed property to 'Yes'. There are two 'Yes' options. One allows the field to have duplicate entries, the other doesn't. The one you choose will depend on the type of data you have in the field. Foreign keys, for example, normally do have duplicate entries (see screen 1).

Of course, all database engines have different interfaces. In SQL Server, for example, you right-click on the table name and select All Tasks, Manage Indexes. That opens up a dialogue box from which you can select New (see screen 2).

Whatever database you use, applying an index is easy.

**Applying an index in Access is simple**

### How does indexing work?

Indexing is a complex subject – as discussed last month, you can find entire books devoted to the subject, so anything I write here is bound to be a major simplification. On the other hand, understanding even the basic principles can be a significant help to anyone trying to speed up a database. So, there are two basic flavours of index: clustered and non-clustered.

A clustered index essentially sorts the records of the table on the disk itself. For example, if we had a table like that shown in screen 3 and applied a clustered index to the OrderID field, then the rows would be moved around on disk until they were in the order shown.

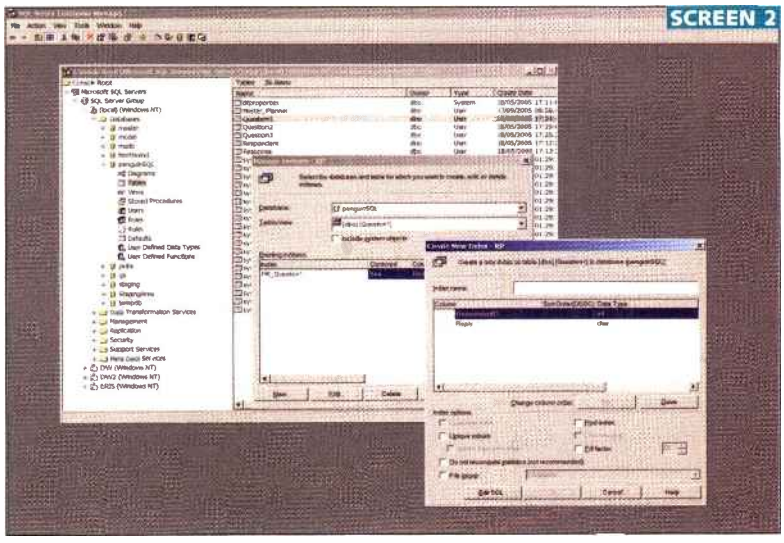
The database can now find, for example, OrderID number 7 very easily. It knows that the rows are in ascending order so it doesn't start at the top and look at every row. Instead it would jump about two-thirds of the way down the table and read a row. If that has the value 6 then it knows to look lower down the table. In other words, the database does exactly what you or I would do and jumps around in the sorted list until it finds the value it needs. Given eight rows there is no real gain; given 20 million rows, the index makes a huge difference.

However, there is a slight problem. If we now apply a cluster index to the Quantity field, the records would be re-ordered on the disk as shown in screen 4.

We can now find all the orders for, say, two items very easily. But, since a clustered index moves the records around on the disk, we have lost the ability to find specific orders rapidly. It is clearly impossible to have more than one clustered index per table.

Cluster indexes allow data to be found very rapidly, so the database engine will normally apply a cluster index to the primary key field of any table completely automatically.

Non-clustered indexes are the other main type of index. They don't move the records around on




**As different database engines, such as SQL Server, have different interfaces, the way you apply an index will vary**

| OrderID | CustomerID | Date | Item | Quantity |
|---|---|---|---|---|
| 1 | 2 | 12-Apr-06 | parcel tape | 6 |
| 2 | 4 | 12-Apr-06 | brown paper (6m roll) | 1 |
| 3 | 4 | 15-Apr-06 | parcel tape | 1 |
| 4 | 1 | 15-Apr-06 | corrugated paper (6m roll) | 2 |
| 5 | 2 | 16-Apr-06 | string (50m) | 1 |
| 6 | 1 | 20-Apr-06 | sealing wax (red) | 2 |
| 7 | 4 | 20-Apr-06 | sealing wax (red) | 1 |
| 8 | 3 | 21-Apr-06 | parcel tape | 3 |

SCREEN 3

| OrderID | CustomerID | Date | Item | Quantity |
|---|---|---|---|---|
| 7 | 4 | 20-Apr-06 | sealing wax (red) | 1 |
| 5 | 2 | 16-Apr-06 | string (50m) | 1 |
| 3 | 4 | 15-Apr-06 | parcel tape | 1 |
| 2 | 4 | 12-Apr-06 | brown paper (6m roll) | 1 |
| 6 | 1 | 20-Apr-06 | sealing wax (red) | 2 |
| 4 | 1 | 15-Apr-06 | corrugated paper (6m roll) | 2 |
| 8 | 3 | 21-Apr-06 | parcel tape | 3 |
| 1 | 2 | 12-Apr-06 | parcel tape | 3 |

SCREEN 4

**Far left: A table indexed on the OrderID field**

**Left: The table with a clustered index on the Quantity field**

the disk. They are not as fast as clustered indexes, but the good news is we can have as many of them on a table as we like.

### Which fields should you index?

Primary key fields are the most important fields to index, as I've said, but applying such indexes never appears on your to-do list because the database engine will do it for you. With that taken care of automatically, it is up to you to determine where other indexes should be applied in the remaining fields in your tables.

A simple and useful rule of thumb is to apply an index to any field you commonly use for querying. If you have a table holding Order data (see screen 5) and you frequently run a query in order to see a list of the orders placed by customers on a particular date, you'd index the Date field. If you also store a table of Customer data, like the lower one shown in screen 5, and you frequently search for customers by last name, you'd index the LastName field in that table.

So far, so straightforward, but let's expand that second query slightly: now you want to search for a customer by last name and find the items they have bought. You design the query and run it. (A sample of the output is shown for customer Jones in screen 6). What does the database engine do to find your answer?

The query looks for the name Jones in the LastName field. It then reads across the row to find her CustomerID, which is 1. Now it looks in the Order table at the foreign key field, also called CustomerID, in order to find any occurrence of 1. This foreign key column is not indexed, so the engine is looking at a column in which the values are completely unordered. It has no choice but to look at every row in the table in order to be sure that it finds all the orders placed by Jones. In this tiny sample table this isn't a problem but, if the table had 10 million rows, the database engine would have to look at all of them. That will be very slow.

Hopefully, it is now clear that indexing the CustomerID foreign key field in the Order table would improve the performance of this particular query enormously.

So, can we assume all queries that draw information from two joined tables will be speeded up by indexing the foreign key field? Of course not, that would be too simple. In the example above, the query found a name in the Customer table and looked up corresponding stuff in the Order table. But suppose we want to look for orders on a particular date and find out who placed them.

In that case our query would start in the Order table by finding the specified date (15 April, say) in the Date column. It would then read across to the CustomerID foreign key field, and find 1 and 4. Then it would inspect the CustomerID primary key field (which is automatically indexed) in the Customer table and read across for the corresponding customer names

Order : Table

| OrderID | CustomerID | Date | Item | Quantity |
|---|---|---|---|---|
| 1 | 2 | 12/04/2006 | parcel tape | 6 |
| 2 | 4 | 12/04/2006 | brown paper (6m roll) | 1 |
| 3 | 4 | 15/04/2006 | parcel tape | 1 |
| 4 | 1 | 15/04/2006 | corrugated paper (6m roll) | 2 |
| 5 | 2 | 16/04/2006 | string (50m) | 1 |
| 6 | 1 | 20/04/2006 | sealing wax (red) | 2 |
| 7 | 4 | 20/04/2006 | sealing wax (red) | 1 |
| 8 | 3 | 21/04/2006 | parcel tape | 3 |
| (AutoNumber) | | 0 | | 0 |

Record: 1 of 8

Customer : Table

| CustomerID | FirstName | LastName | Address |
|---|---|---|---|
| 1 | Stephanie | Jones | 12a London Road |
| 2 | Steven | Lee | 36 King Street |
| 3 | John | Little | 132 Smith Street |
| 4 | Janet | Harris | 7 Peartree Close |
| (AutoNumber) | | | |

Record: 1 of 4

SCREEN 5

WhatJonesBought : Select Query

| LastName | Item |
|---|---|
| Jones | corrugated paper (6m roll) |
| Jones | sealing wax (red) |

Record: 1 of 2

SCREEN 6

**Top: The Order and Customer tables – if you often query on dates and last names, you'd index these fields in the tables**

**Bottom: This is the result of the query to find what customer Jones has ordered**

**These are the customers who placed orders on 15 April**

Stephanie Jones and Janet Harris – to produce the answer that these two customers placed orders on 15 April. (see screen 7). This query would gain zero benefit from an index on the CustomerID foreign key field in the Order table, because that field is never searched. The only columns that are searched are the Date field in the Order table and the CustomerID field in the Customer table.

So some queries across two joined tables are speeded up by indexing the foreign key field, others clearly are not. Can we derive a rule about this so that we can decide easily when to index such a foreign key field? Yes we can.

The rule depends on the direction in which the query runs across a one-to-many relationship. The Customer and Order tables shown above form a classic example of tables with a one-to-many relationship: one customer can place many orders. If a query runs from the table on the one end of the relationship to the table at the many end, an index on the foreign key field will help performance. In our example, this is a query starting in the Customer table and moving to the Order table: 'Find the customer Jones and all the orders she's placed'. If, on the other hand, the query runs from the many end to the one end, indexing the foreign key field won't help. Our second example is of this type: it looks for a date in the Order table and finds corresponding customers in the Customer table.

### Table size

Always bear in mind that indexes only help if you have large tables. What constitutes a large table? Next month we'll do a bit of testing to find out. **PCW**

BoughtOn15April : Select Query

| Date | FirstName | LastName |
|---|---|---|
| 15/04/2006 | Janet | Harris |
| 15/04/2006 | Stephanie | Jones |

Record: 1 of 2

SCREEN 7

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**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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# Membership rules

## Find out how to add user registration to your website using ASP.Net 2

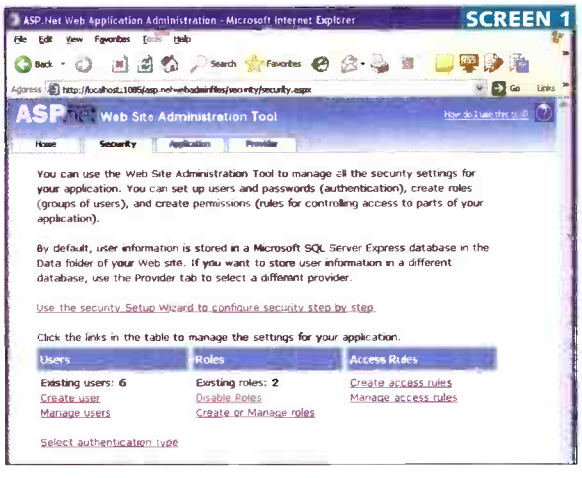
A key new feature in ASP.Net 2, Microsoft's web-application framework targeted by Visual Studio 2005, is built-in support for managing website users. This includes site registration and restricting access to different parts of the site depending on the identity of the user. Microsoft claims a huge reduction in the amount of code you need to write, but how effective is this in practice? The following shows how to use the membership features on your own site.

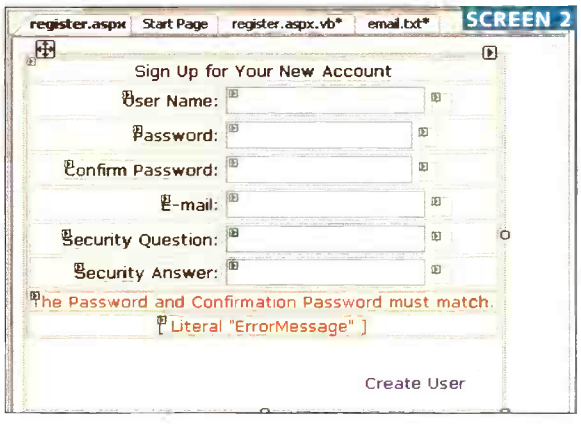
### What you need

To use the membership features you need ASP.Net 2 itself, and usually SQL Server or SQL Server Express. If you are working on an intranet, these requirements are easy, especially as Microsoft offers the Express versions for free, but this does not apply when it comes to web hosting. The first stumbling block is .Net 2, since many ISPs still run the old 1.1 version.

The other problem is SQL Server, for which ISPs tend to charge extra. Microsoft did have an option to use Access for the membership database, but this was removed in the final release. Given the limitations and poor performance of Access, that sounds reasonable, but it does make it harder to find a suitable ISP.

The design of ASP.Net 2 allows for databases other than SQL Server to be used. The basic requirement is a class derived from the abstract class MembershipProvider. This means anyone can write a membership provider, but Microsoft chose to support only SQL Server and Active Directory out of the box. That strikes me as shortsighted, but over time third parties and open-source developers will plug the gap. This means there are ways to use the membership feature even if you cannot use SQL Server.




### Getting started

Enabling membership features normally means creating a new website in Visual Studio or Visual Web Developer, then choosing ASP.Net Configuration from the Website menu. Click Security, and you should see options to manage users, roles, and access rights (see screen 1). Any problems here are usually to do with the provider and connection string settings. If the defaults do not work for you, you can add entries to the web.config file by creating and editing connection strings and membership elements. The account under which ASP.Net is running must have read/write access to the database.

**Top: This browser-based utility lets you set up membership features on a website**

**Bottom: CreateUserWizard is a control that allows users to create accounts on your ASP.Net website**

You can now configure the security. Click Authentication Type and choose 'From the Internet', unless you have a Windows intranet and want to use integrated authentication. Click Create or Manage Roles, and set up a couple of roles, such as admins and users. I created two folders, 'adminonly' and 'anyuser'. Then I set some access rules, which work by inheriting from the parent folder unless overridden.

The first match applies, so the order of the rules is critical. On adminonly I set the first rule to allow admins and the second rule to deny all. For the anyuser folder, I set Allow to Admins and Users, then set a third rule to deny all. The idea is nobody can progress to a sub-folder on the site without registration. These wizards edit the web.config file in each folder, and authentication 'From the Internet' is the same as Forms Authentication. Remember settings in ASP.Net are inherited. Defaults are set in machine.config and web.config in the CONFIG folder of the Framework system directory.

The next step is to configure a login page. Edit the root web.config for the website, and enter a login URL in the authentication element. A minimal entry looks like this:

```
<authentication mode="Forms">
<forms loginUrl="Login.aspx" />
</authentication>
```

You will probably want to specify other attributes for the forms element. For example, add requireSSL="true" to ensure passwords are sent over SSL. You will still need to configure an SSL certificate for the site. When you are done, add a new web form to the application, using the name you specified for the login page.

### Using login controls

You can now exploit the controls in the login section of the Visual Studio toolbox. These can save a lot of coding.

On the login page, add a login control. Next, create a new web form called register.aspx, and place on it a CreateUserWizard control (see screen 2). Go back to the login control and set its CreateUserText to something like 'Register on this site', and the CreateUserUrl to the registration page you have just created. You can test the site by trying to navigate to a protected page. This will present the login page, and you can create new users and log in. However, if you set up the site as suggested, you still won't have access to protected pages as the new users are not assigned to any roles. You can fix this manually in the ASP.Net Configuration wizard but it's better to do it programmatically. You could do so by handling the CreatedUser event:

```
Roles.AddUserToRole(CreateUser↙
Wizard1.UserName, "users")
```

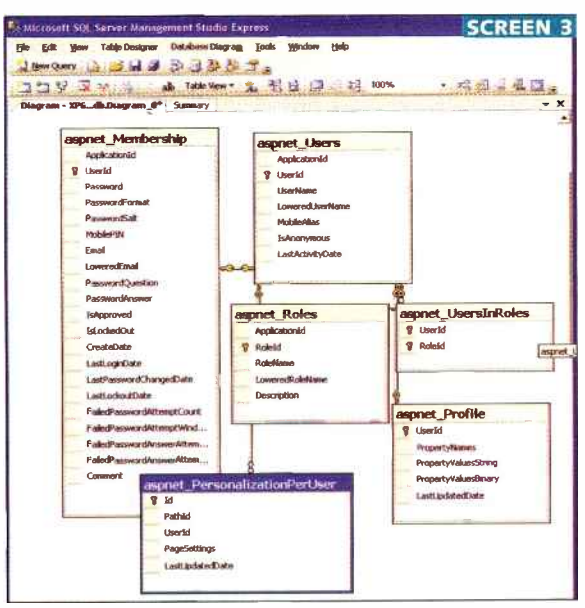
(Key: ↙ code string continues)

## Validating the user

A problem with this approach is that the user's email address has not been validated; it could even be someone else's. Many sites email new users to confirm receipt before allowing them full access to the site. Here is one way you could do this with ASP.Net 2.

The MailDefinition property of the CreateUserWizard lets you send an email to new users. For this to work, you need to configure an SMTP server in the ASP.Net Configuration Wizard. Then expand the MailDefinition property and enter values for the From email address and the subject. For the content of the email, add a new text file to the project, call it email.txt, and point the BodyFileName of the MailDefinition to this new file.

**Membership data is stored by default in a SQL Server Express database**




Now you can add content to the email. Write a welcome message with a URL to confirm registration. The URL needs to include the username and a unique identifier that can only be discovered by reading the email. The CreateUserWizard automatically substitutes <%UserName%> and <%Password%> with the correct values, but the password is no use as the identifier since it is already known to the user. A better idea is to use the ProviderUserKey, which is a GUID generated by SQL Server. For this you need to do your own substitution. In the email, include a URL like this: http://Yoursite/regconfirm.aspx?user=<%UserName%>&id=<%UserKey%>.

Next, handle the CreateUserWizard's SendingMail event, substituting the correct value for UserKey:

```
Dim mu As MembershipUser = ↙
Membership.GetUser↙
(CreateUserWizard1.UserName)
e.Message.Body = ↙
e.Message.Body.Replace↙
("<%UserKey%>", ↙
mu.ProviderUserKey.ToString)
```

Now add a new web form called regconfirm.aspx. In the Load event handler, get the URL parameters with Request.QueryString. Use Membership.GetUser(username) to get the matching MembershipUser object, then compare the ProviderUserKey with the second URL parameter. If you get a match, you know the user received your registration email, and you can call Roles.AddUserToRole to include the user in the users role.

## More membership features

Once you have enabled membership, further features come almost for free, including password recovery, logging out and listing users (see screen 3). The LoginView control lets you display different content to users according to their role. You can use the membership system alongside Profile objects that let you store your own custom data for each user with automatic persistence between sessions. **PCW**

## Delve into Delphi 2006

Delphi 2006 is an interesting alternative to Visual Studio for Windows developers. Like Delphi 2005, it includes native code and .Net development. Delphi 2006 sees the return of C++ Builder, which combines the C++ language with the Visual Component Library, enabling rapid construction of Windows applications.

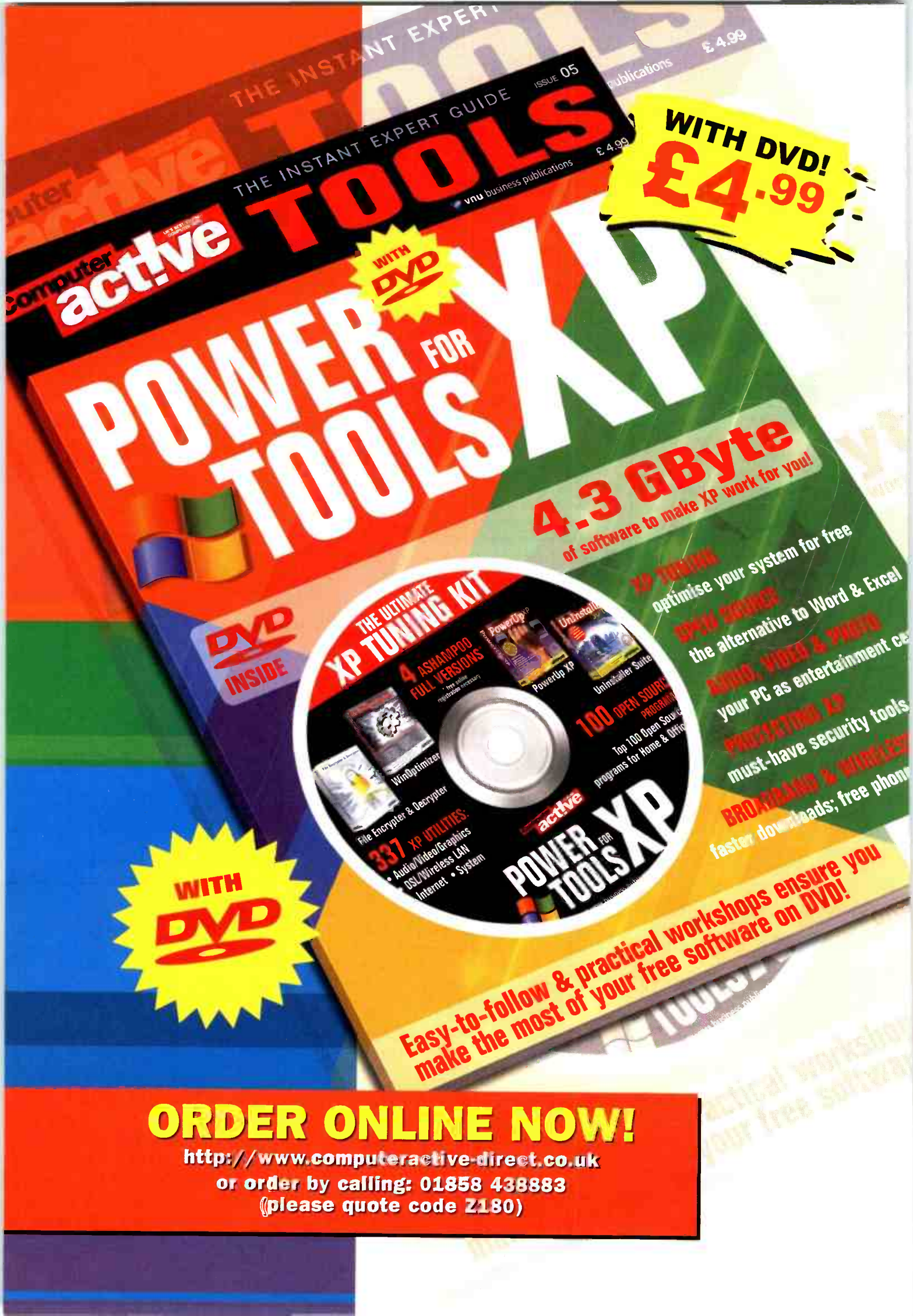
Borland's Delphi 2006 supports .Net 1.1 and has appeared at almost the same time as Visual Studio 2005 and .Net 2. This is unfortunate timing and, although Borland is promising a .Net 2 version of Delphi, it looks likely to be a paid-for upgrade. It may not matter; Delphi's primary attraction is its fast native code, especially now Microsoft has discontinued Visual Basic 6. Using Delphi, you can create applications that don't need the .Net Framework and typically use less memory and run faster than .Net equivalents. The .Net option also has its place, such as when you want access to the Framework class library or create ASP.Net web applications.

Delphi's main competition is itself. Delphi 7 was a strong release, and many users see no reason to switch. This version is more compelling than Delphi 8 or Delphi 2005. The Developer Studio IDE is maturing and seems faster and more stable. It has a lot to offer over Delphi 7, including local history, refactoring and auto-alignment in the forms editor. There is a new IDE feature called live templates, which is a great way to create re-usable code blocks with easy customisation. The Together modelling module has a rewritten engine that is much improved, and the Delphi language has new features, in native code and .Net versions, with the most significant being operator overloading. There is also a new, open-source memory manager called FastMM, written by Pierre le Riche, which delivers substantial performance improvement.

**Delphi 2006 has multiple personalities, including .Net and native code compilers**

## Resources

Visual Web Developer and SQL Server Express Edition are free downloads from: http://msdn.microsoft.com/vstudio/express/
More information on Delphi 2006 is at: www.borland.co.uk/delphi.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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.

BUYER'S GUIDE

145 PRODUCTS REVIEWED TO MAKE YOUR BUYING DECISION EASIER

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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, onboard sound or separate soundcard, size and type of hard disk, CD burner or DVD burner and so on.

Once your budget is set, the starting point is the CPU (central processing unit), because it is the brains of your PC.

Intel and AMD offer a bewildering number of processors. The differences between the CPUs are in technical details that don't necessarily mean much to end users. Pricing is also competitive, with AMD PCs generally cheaper than comparable Intel models.

Budget PCs come with Intel's Celeron or AMD's Sempron CPUs. These are aimed at undemanding users. If your needs are for word processing tasks and surfing the Internet with some low-end gaming or image editing, a PC running either of these processors is fine. You won't need a huge hard disk – 80GB will be plenty – coupled with between 256MB and 512MB of Ram and a low-end graphics card, or even onboard graphics for the truly undemanding. You'll be fine with onboard sound, and can expect to pay up to about £500, depending on your monitor.

In the mainstream desktop market it's Pentium 4 and Pentium D versus AMD's Athlon XP and Athlon 64. The chief difference is that older Pentium 4 and Athlon XP models are 32bit CPUs, while some newer Pentium 4s, the Pentium D and Athlon 64 are 64bit models. To take full advantage of this, you need a 64bit operating system and applications.

More memory can be supported by 64bit systems – 32bit Windows or Linux systems are limited to 4GB of Ram, whereas a 64bit Windows or Linux system can support 128GB. Data is also moved in larger chunks, allowing a theoretical speed advantage.

AMD and Intel offer high-end processors with the Pentium Extreme Edition and Athlon FX ranges, both aimed at the hardcore gaming market. They also have dual-core CPUs. These processors effectively act as two CPUs in one and offer superior performance.

If you're choosing a PC running the above CPUs, other considerations come down to your needs. If you store lots of music, video or photos, go for a big hard disk – 200GB or above. Memory will help speed up applications, so aim for 1GB or above and don't drop below 512MB. The latest games demand the latest graphics cards, but for most people, cards that were new six to 12 months ago will be powerful enough. And look at the CPU's cache memory, which helps eliminate data bottlenecks.

Most PCs are Windows XP, and the Home Edition is fine. If it's for a small business or you need features such as remote access, buy XP Professional. Few PCs are sold running Linux, and we'd recommend only the technically confident buy a Linux-only system. Linux can always be installed later. Finally, don't overlook the monitor, especially if you're using the PC for gaming or imaging; buy the best you can afford.

1

**Panrix Magnum IQ 3700**
£699 ★★★★★
Reviewed April 06
www.panrix.co.uk
Strong performance and impressive features makes this an excellent value for money PC

2

**PC Next Day Zoostorm 9-5401**
£699 ★★★★½
Reviewed April 06
www.pcnextday.co.uk
A conventional PC, but one that performs well and houses all the features most users will need

3

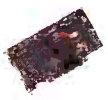
**Fujitsu-Siemens Scaleo E**
£870 ★★★★½
Reviewed April 06
www.microanvika.com
Big and bulky, but powerful enough to make use of its Windows Media Center Edition operating system

# GRAPHICS CARDS

SUB £200

1

**HIS Radeon X700 Pro IceQ II**
£93.94 ★★★★☆
Reviewed February 06
www.hisdigital.com
HIS uses the IceQ II cooling system to deliver excellent performance at a good price.

2 

**Sapphire Radeon X800**
£114.99 ★★★★☆
Reviewed February 06
www.sapphiretech.com
A decent PCI Express card based on ATI's X800 series with 256MB of Ram.

3

**Sapphire Radeon X1300**
£37.99 ★★★★☆
Reviewed February 06
www.sapphiretech.com
Great budget card with a core clock of 450MHz and 128MB of Ram.

£200-£349

1

**Gecube Radeon X850XT Uniwise**
£269.97 ★★★★★
Reviewed May 05
www.gecube.com
A single-slot design using Gecube's own cooling system, and it offers good performance.

2

**Powercolor Radeon X850XT Platinum Edition**
£320 ★★★★★
Reviewed July 05
www.powercolor.com
Based on ATI's fastest Radeon processor, this card will run the latest games with ease.

3

**Gecube X850XT Platinum Edition Uniwise**
£307 ★★★★☆
Reviewed January 06
www.gecube.com
High-end performance and quiet cooling for AGP motherboards.

4

**Galaxy Geforce 6800 Glacier**
£208 ★★★★☆
Reviewed February 06
www.galaxy-hk.com
Nvidia Geforce 6800 card using older AGP technology instead of PCI Express.

£350+

1

**ATI Radeon X1900 XTX**
£363 ★★★★★
Reviewed April 06
www.ati.com
Using the new R580 core, this is the fastest single-core graphics card currently available.

2

**HIS Radeon X850XT Platinum Edition IceQII**
£370 ★★★★★
Reviewed June 05
www.hisdigital.com
Making use of the IceQII efficient cooling system, this is a quiet and super-fast card.

3

**Nvidia Geforce 7800 GTX 512**
£516 ★★★★★
Reviewed February 2006
www.nvidia.com
This card has an updated 7800 GTX chipset with a massive 512MB of Ram.

## HOW TO BUY

Most graphics cards are based on either the Nvidia Geforce or ATI Radeon family of chips. Each has their strengths and both offer state-of-the-art image acceleration and comparable features.

Performance improves as you move up a range. Top chips offer more features and draw more pixels or textures in a single pass than cut-down, lower-cost options. All current graphics processors are fine for office work, but hardcore gamers favour Nvidia's Geforce 6800 or new 7800 series and ATI's latest X1900 XTX card.

Ensure the card you buy can display favoured resolutions with at least a 75Hz monitor refresh rate to avoid eye strain from flicker (if using a CRT monitor).

There are usually three clock speeds quoted (in megahertz). Core clock is the internal speed of the graphics processor. Memory speed (or memory clock) is the speed of data transfer between the graphics card's onboard memory and the graphics processor. Ramdac speed is the capability of the digital-to-analogue converter that provides the graphics output from the card.

Graphics cards use their own dedicated video memory to store data, images and textures. The more you have, the better the performance. A card with 64MB is fine for office tasks, but we recommend at least 128MB or 256MB for the latest games and video applications.

Around £40 will buy you a Geforce FX 5200 or Radeon 9200 card with 128MB of Ram, which is good for 2D action/strategy games, image editing and less demanding 3D games.

To play 3D action games smoothly, look at £100-£150 cards. Serious gamers should consider the Geforce FX 6800 GT at £280-plus, Radeon 850 XT at £320-plus, or 7800 GTX at £350-plus.

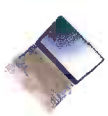
Depending on the motherboard, you'll need an AGP or PCI Express graphics card. PCI Express is the newest interface standard, offering up to double the bandwidth of an AGP 8x slot for even faster and more complex graphics. Both ATI and Nvidia offer PCI Express versions of most of their cards. Nvidia also has its SLI (Scalable Link Interface) technology that lets you use two PCI Express graphics cards in SLI-enabled motherboards for ultimate performance. ATI's rival technology Crossfire is due soon.

Look for support for both analogue (VGA) and digital (DVI) displays, and S-video and composite video outputs for use with TVs. Some 'all-in-one' cards have a built-in TV tuner and video-capture options, so you can save money rather than buying separate cards.

# NOTEBOOKS

1

**Acer Travelmate 8204WLMi**
£1,761.33 ★★★★★
Reviewed April 06
www.acer.co.uk
Powered by Intel's new Core Duo processor, this notebook beats most desktop PCs on performance.

2 

**Sony Vaio VGN-TX1HP**
£1,499 ★★★★★
Reviewed December 05
www.sony.co.uk
A stylish, well-designed notebook with exceptional battery life and a wealth of features.

3

**Evesham Voyager C720**
£1,499 ★★★★★
Reviewed February 2006
www.evesham.com
Great gaming notebook with a 17in display and Geforce Go 7800 graphics.

4

**MV Mobeus 1.4 Celeron**
£586 ★★★★★
Reviewed October 05
www.go-mv.com
A highly portable, feature-packed notebook that's also very affordable.

5

**Gateway 8550GB**
£950 ★★★★☆
Reviewed February 2006
www.uk.gateway.com
This is a quality desktop replacement notebook at an even better price.

## HOW TO BUY

Notebooks have caught on like wildfire with consumers thanks to plummeting prices and massive marketing campaigns. However, there are so many options that it's easy to get confused.

Decide what you want your notebook for. If it's for occasional use, running some office applications, accessing the Internet and email, then almost any low-cost notebook will do the job. If it's for gaming or running video-editing software, you will be looking for a notebook with a large 15in/17in screen – possibly widescreen - a high-end Nvidia or ATI graphics chip, 1GB of memory and an 80GB (or bigger) hard disk.

In the low-cost arena, Intel has its Mobile Celeron chip and AMD has Sempron. In the midrange/high-end space, there are Intel's Mobile Pentium 4 or Pentium 4 chips, while AMD offers Mobile Athlon 64 and Athlon 64. Expect to find these in desktop replacement systems and those used by gamers.

For the best in performance with power-saving technology, go for Intel's Pentium M or AMD's Turion 64 processors.

Any notebook you get should have in-built Bluetooth and Wifi connectivity, a 30-40GB hard disk drive, 512MB of Ram, 14-15in screen, USB2 or Firewire ports, DVD/CD-RW combo drive and three to four hours' battery life.

# MOTHERBOARDS

SUB £100

1

**ECS PF88**
£64.63 ★★★★☆
Reviewed August 05
www.ecs.com.tw
The PF88 is feature-packed and compatible with both Intel and AMD processors.

2

**Aopen i915GMm-HFS**
£79 ★★★★☆
Reviewed July 05
www.aopen.com
The HFS makes the ideal platform for building a quiet, power-efficient Intel PC.

3

**Asus A8N-SLI Deluxe**
£98 ★★★★☆
Reviewed April 05
www.asus.com
A good, all-round AMD SLI board that is packed with plenty of features.

4

**ECS 915-A**
£61.81 ★★★★☆
Reviewed June 05
www.ecs.com.tw
All the features you'd expect from a modern Intel-based motherboard and outstanding value for money.

5

**Asus K8N-E Deluxe**
£59 ★★★★☆
Reviewed November 04
www.asus.com
A tidy AMD board with lots of room around the major components and a wide range of features.

6

**Epox 8HDA3+**
£79.92 ★★★½☆
Reviewed July 04
www.epox.com
An AMD board that stands out from the crowd thanks to its dual Lan and external Sata support.

7

**MSI 945P Platinum**
£99 ★★★☆☆
Reviewed November 05
www.msi.com.tw
An Intel board that features DTS Connect, so you can output true DTS surround-sound audio.

£100+

1

**Gigabyte GA-8N-SLI Royal**
£149 ★★★★☆
Reviewed October 05
www.giga-byte.com
Featuring an Nforce4 chipset, this model from Gigabyte supports all Intel 775 processors.

2

**Abit Fatal1ty AN8**
£119.80 ★★★★☆
Reviewed August 05
www.abit.com.tw
This AMD board has enough flexibility and Bios features to keep overclockers happy.

3

**ECS PF22 Extreme**
£123 ★★★★☆
Reviewed February 06
www.ecs.com.tw
A good range of features including dual graphics support courtesy of ATI's Crossfire technology.

## HOW TO BUY

The motherboard dictates the type of processor you can use, how well the other components communicate, the features on offer and future upgrade potential.

Cheap boards limit processor support, graphics and expansion options. Around £70-£100 gets you the latest technologies.

Most desktop and tower cases use a standard ATX-size motherboard but, if you're building a small system, look at compact MiniATX or MicroATX designs. If using an existing case, make sure you buy the right form factor.

Your choice is also dictated by the processor. You'll need Socket 775 for current Intel processors, Socket A for AMD Athlon XP or Duron, and Socket 939 for an Athlon 64. The Athlon 64 FX series requires Socket 940. If using an older CPU, check the socket type.

We would recommend an Intel P4 or Athlon 64 for a good all-round system. The Athlon 64 can address one terabyte of Ram (1,000GB) and handle difficult calculations with relative ease.

The new generation of processors also change the way data is transferred. Whereas P4s rely on the motherboard chipset to shuttle data between processor and memory, Athlon 64s avoid this by integrating the memory controller into the CPU die.

Divided into northbridge and southbridge, the chipset handles the communication between all the components and dictates the features on offer. Today's leading chipset manufacturers include Via, Silicon Integrated Systems (Sis), ATI, Nvidia and Intel. Chipsets can include integrated graphics.

Today's motherboards mainly use DDR or DDR2 Ram, available in 200, 266, 333 and 400, 667 and 800MHz modules.

Also consider the number of slots available. Fit dual in-line memory modules (Dimms) in pairs if the chipset supports dual-channel operation.

The latest boards support both older IDE and new, faster Serial ATA (Sata) hard disks. Check the number of connectors available for both.

Some chipsets provide Raid support, so data can be spread across two drives for extra performance or backups. SCSI controllers can be found on more expensive boards, or be added with expansion cards.

Also important is the number of USB2 and Firewire sockets for external add-ons. You may need serial, parallel and PS/2 interfaces if using older legacy peripherals. Look out, too, for onboard Ethernet networking, a built-in 56K modem and onboard sound. The latter is fine for all but audio buffs or avid gamers.

# SOUNDCARDS

1

**Creative Audigy 4 Pro**
£179.99 ★★★★☆
Reviewed July 05
http://europe.creative.com
This updated version of Audigy 2 has fantastic performance and a good software bundle.

2

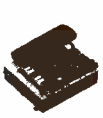
**Creative Soundblaster X-Fi Elite Pro**
£249 ★★★★☆
Reviewed November 05
http://europe.creative.com
This latest Creative offering has a variety of features, but will take time to be fully supported.

3

**M-Audio Revolution 7.1**
£99 ★★★★☆
Reviewed July 05
www.m-audio.com
An excellent mid-priced soundcard offering great audio quality, but gamers might be disappointed.

4

**Hercules Fortissimo IV**
£44.99 ★★★★☆
Reviewed July 05
www.guillemot.co.uk
If you're looking to upgrade your system, but have a limited budget, this is an excellent option.

5 

**Terratec Aureon 7.1 Universe**
£114 ★★★★☆
Reviewed July 05
www.terratec.com
We wouldn't recommend this over the Audigy 4 for gamers, but musicians may be tempted.

## HOW TO BUY

Many PCs have built-in surround sound on the motherboard. Some support six-channel (5.1), others eight-channel (7.1) and the sound quality is fine for most people.

If you want a dedicated soundcard for playing and making CDs and mp3s, DVDs and games, most will fit the bill.

Entry-level soundcards support 16bit-quality sound recorded or played back at 44.1KHz, which is CD-quality. The next step is 24bit sound at higher sampling rates of 48KHz or 96KHz, recommended for those creating music or playing DVD movies with THX surround or Dolby Digital EX 6.1 or 7.1 sound formats. More cards now also support 24bit 192KHz playback, required for the DVD-Audio music format.

The signal-to-noise (SNR) ratio, measured in decibels (dB), is the amount of sound you expect (signal) versus that which you don't (noise). Decibel ratings range from 60dB to over 100dB and the higher the dB rating, the better.

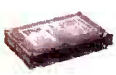
Most cards share many similar options, such as microphone-in, line-in/line-out, line-out, Midi/joystick port, CD-in and headphones connectors. Newer cards also have high-speed Firewire ports. Audio enthusiasts should look for S/PDIF (Sony/Philips Digital Interface) -in and -out, to connect speakers via a single optical or coaxial cable and get higher quality digital sound. ↘

# HARD DRIVES

## INTERNAL

1

**Seagate Barracuda 7200.9**
£293.32 ★★★★☆
Reviewed December 04
www.seagate.com
Massive 500GB capacity and 16MB buffer - smaller models available

2 

**Seagate Barracuda 7200.8 (ST3400832A) 400GB**
£186.96 ★★★★☆
Reviewed July 05
www.seagate.com
This massive 400GB drive offers impressive capacity and an 8ms seek time.

3

**Hitachi Deskstar 7K250 (250GB Sata150)**
£88 ★★★★★
Reviewed May 04
www.hitachi.co.uk
Those needing a large Sata150 drive will find this a great bargain.

4

**Samsung Spinpoint P120S**
£80.11 ★★★★☆
Reviewed February 06
www.samsung.co.uk
This isn't the fastest drive on the market, but it is extremely cool and quiet

5

**Western Digital Caviar WD1600JD (160GB Sata150)**
£72.61 ★★★★☆
Reviewed May 04
www.wdc.com
With dual power connectors this drive will suit users transitioning to Sata technology.

## EXTERNAL

1

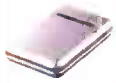
**Maxtor Onetouch II Firewire 800 300GB**
£179 ★★★★★
Reviewed November 05
www.maxtor.com
A good-quality 300GB USB and Firewire hard drive that comes with backup software.

2

**Lacie Safe Mobile Hard Drive 80GB**
£149 ★★★☆☆
Reviewed December 05
www.lacie.co.uk
Featuring a fingerprint reader for security, this 80GB external hard drive would suit business users.

3

**Buffalo Linkstation 120GB**
£240 ★★★★☆
Reviewed October 04
www.buffalotech.com
If you want easy-to-use external network storage, this is a great choice.

4 

**Buffalo Ministation HD-PHS40U2/UC**
£70 ★★★★☆
Reviewed April 06
www.buffalo-technology.com
This 40GB portable hard drive includes shock protection to minimise the risk of data loss.

5

**Smartdisk Firelite 80GB**
£189.98 ★★★★☆
Reviewed October 04
www.smartdisk.co.uk
Available with either USB or Firewire interfaces, it's a great performer at an attractive price.

## 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.

OEM or 'brown box' drives are cheaper - this is the bare drive without the extras, such as cables, included in retail boxed versions.

The transfer rates in today's Ultra ATA drives are 100Mbytes/sec (133Mbytes/sec for Maxtor drives), while Serial ATA (Sata) drives are rated at 150Mbytes/sec. Check the seek times, spindle speed, buffer size and the areal density of the platters (disks).

Usually in milliseconds, seek time is how long a drive's heads take to find data on the disk. The speed at which the spindle holding the disks spins ranges from 4,200rpm for a notebook drive to 15,000rpm for some SCSI drives. Generally, faster speeds give better performance.

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.

Originally Integrated Drive Electronics (IDE), then Enhanced IDE (E-IDE), this common parallel interface is usually written as ATA (AT Attachment), modified with speed improvements in recent years to Ultra ATA/xxx, where xxx is the peak bandwidth in Mbytes/sec. To differentiate Ultra ATA from Sata, the term Parallel ATA is used.

Faster Sata drives are more expensive than Parallel ATA. Sata uses two pairs of high-frequency cables, working at low voltage.

SCSI (Small Computer System Interface) 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. The disadvantage, though, is price.

Most motherboards support Raid (Redundant Array of Independent Disks), which connects multiple drives, to improve performance or provide fault tolerance.

One problem you may hit is the inability to access the new drive's full capacity. Some older Bioses only support drives up to 137GB. This may be solved by updating the PC's Bios. Retail boxed disks often come with software to fool the Bios into recognising the disk, or you can buy a separate disk controller card, which fits into a PCI slot.

# DVD DRIVES

1

**NEC ND4550**
£35 ★★★★★
Reviewed February 06
www.nec.co.uk
Great-value DVD writer that can burn dual-layer in both formats, along with DVD-Ram support.

2

**Pioneer DVR-110 Supermulti**
£40 ★★★★★
Reviewed March 06
www.pioneer.co.uk
Supports all major formats, including DVD-Ram. Good value for money.

3

**Toshiba SD-R6472**
£83.42 ★★★★☆
Reviewed September 05
www.span.com
A slimline dual-layer DVD writer that performs well and is perfect for small form factor PCs.

4

**Philips DVDR16LSK**
£59.99 ★★★★☆
Reviewed October 05
www.philips.co.uk
An excellent Lightscribe-capable dual-layer DVD burner that's very keenly priced.

5

**LG 12X Super Multi DVD**
£116.99 ★★★★☆
Reviewed January 05
www.lge.co.uk
Good-value external USB2/Firewire rewriter with all-format media support.

## HOW TO BUY

DVD drives have largely replaced CD-Rom, CD-R and CD-RW drives in all but a few entry-level PCs and notebooks. Many systems still offer DVD-Rom drives as secondary drives - used for playback of discs only - while a growing number have a DVD writer or rewriter for burning your own DVDs as the main system drive.

DVD burners can be divided into internal and external drives. Internal drives are cheaper than their external counterparts, but require a level of knowledge so you can install them yourself. You can opt for one of the external offerings which can be hooked up simply via USB2 or Firewire.

Most drives are multi-format, meaning they can write to all key media types, so make sure yours supports DVD+R, DVD+RW, DVD-R and DVD-RW discs. Newer double and dual-layer drives can write to new discs which can store 8.5GB versus the 4.7GB capacity of existing discs. This is useful for backing up your DVD movie collection or chunks of your hard drive on a single disc.

The dual-layer drives cost little more than single-layer drives, so are a good investment. The same cannot be said for the cost of dual-layer discs. A branded, dual-layer 8.5GB disc will cost around £3.75. Rewriteable dual-layer discs will not arrive until the end of 2006.

# DIGITAL CAMERAS

## COMPACT

1

**Canon Powershot A520**
£239 ★★★★★
Reviewed July 05
www.canon.co.uk
Perfect for those who want a versatile and easy-to-use digicam without spending a fortune.

2

**Nikon Coolpix S1**
£229 ★★★★★
Reviewed August 05
www.nikon.co.uk
Small enough to fit in the tightest of pockets - and quality images to boot.

3

**Casio Exilim Zoom EX-Z57**
£229 ★★★★★
Reviewed August 05
www.casio.co.uk
Another quality compact, with the added bonus of a manual focus and a 2.6in monitor.

4

**Konica Minolta Dimage X1**
£299 ★★★★☆
Reviewed December 05
www.konicaminolta.co.uk
8megapixels, image stabilisation and a stylish and compact design, but indoor shots can be noisy.

## PROSUMER

1

**Fujifilm Finepix S9500 Zoom**
£469.99 ★★★★☆
Reviewed February 06
www.fujifilm.co.uk
A serious contender to entry-level digital SLRs with a 10x zoom and 9megapixel CCD.

2

**Olympus E-500**
£600 ★★★★☆
Reviewed April 06
www.olympus.co.uk
The long awaited successor to the popular E-300 doesn't fail to impress.

3

**Canon Powershot PRO1**
£400 ★★★★★
Reviewed July 04
www.canon.co.uk
A well-designed camera for the serious user who wants stunning photos.

4

**Nikon Coolpix 8700**
£402 ★★★★☆
Reviewed July 04
www.canon.co.uk
Features an impressive 28Dmm telephoto lens and 30fps (frames per second) movies.

## DIGITAL SLR

1

**Canon EOS 350D**
£799 ★★★★★
Reviewed December 05
www.canon.co.uk
This is a hugely capable digital SLR camera that won't disappoint.

2

**Konica Minolta Dynax 5D**
£649.99 ★★★★☆
Reviewed December 05
www.konicaminolta.co.uk
A very usable camera, although it's a little weighty. Anti-shake mechanism is excellent.

## HOW TO BUY

Decent 4-5megapixels point-and-shoot digital cameras start from about £150, while enthusiasts looking for flexibility can buy a new fully featured digital SLR for under £600.

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 5megapixels is good for 8 x 10in 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.

Many cameras offer higher ISO speeds - some compacts and all DSLRs hit 1,600. But while good for low light photos, it may result in noisy pictures.

The minimum optical zoom is typically 3x; about 35-105mm. If buying an SLR, multiply a lens size by 1.6 to get its true focal length, so a 100mm lens is 160mm when put on a digital body.

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 aren't as good as even a basic camcorder, but are fine for short movie clips to play on your PC. Most offer 15fps, 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.

Built-in flashes are fine for everyday shots, and many include a red-eye reduction mode, but cameras with a hot-shoe for external flashes will allow much greater illumination and control over lighting.

Check start-up time because cheaper models are likely to take longer to be ready from switch-on. And check shutter lag, as there may be a delay between pressing the button and taking the photo.

Many models use NiMH (nickel-metal hydride) rechargeable batteries, but lithium batteries typically last longer. Also, smaller cameras often mean smaller capacity batteries.

Finally, remember digicams must write the image onto flash media before taking the next shot, and the better quality the card, the faster this will happen.

# CAMCORDERS

1

**Sony DCR-HC19E**
£297.87 ★★★★☆
Reviewed September 05
www.sony.co.uk
An excellent low-cost camcorder with a touchscreen LCD and good video software.

2

**Canon MV850i**
£349 ★★★★☆
Reviewed September 05
www.canon.co.uk
Simple to use and good quality, although it doesn't come with video-editing software.

3

**Panasonic VDR-M55B**
£499.99 ★★★★☆
Reviewed December 05
www.panasonic.co.uk
Expensive, but being able to burn footage direct to DVD makes it easy to use.

4

**Samsung VP-D453**
£280.84 ★★★☆☆
Reviewed September 05
www.samsung.co.uk
An attractive, compact camcorder with a good range of features and decent-quality images.

5

**Panasonic NV-GS21**
£322.54 ★★★☆☆
Reviewed September 05
www.panasonic.co.uk
A robust model with good image quality and a wide range of connectivity options as standard.

## HOW TO BUY

Smaller camcorder designs are easy to carry, but can be awkward for larger hands.

The MiniDV format is usually in mid-range to high-end models. Digital-8 is entry-level and plays analogue Hi8 and 8mm tapes.

Some digicams record directly to DVD-R/RW and Ram, or solid-state memory cards. The amount of data needed for quality video makes the latter impractical. Sony's tiny MicroMV is a better alternative. Cassettes are smaller than MiniDV and it stores video in mpeg-2. Files are smaller for editing, but you'll need software that accepts this type of data.

Look at optical zoom and forget digital zoom. Around 10x is normal, with up to 20x for more expensive models.

To transfer edited images back to tape you'll need a DV-in and out Firewire (Ilink/IEEE 1394) port. Otherwise DV-in is fine to transfer footage to your PC.

Built-in microphones are susceptible to noise, so look for a 3.5mm jack or an accessory shoe and use a separate mic.

Most digicams take still photos, but limited resolutions mean you're better off with a dedicated stills camera. In addition, look for image stabilisers (optical is better than digital) and a good range of AV connectors. Some camcorders have a USB port, so they can be used as a webcam. ↘

# PRINTERS

## PHOTO PRINTERS

1

**Epson Picturemate 100**
£100 ★★★★★
Reviewed January 06
www.epson.co.uk
This is a high-quality photo printer that is both cheap and easy to use.

2

**Canon Pixma IP5000**
£129 ★★★★★
Reviewed June 05
www.canon.co.uk
If it's pixel-perfect printing you're after, look no further than the IP5000 – a real bargain.

3

**HP Photosmart 8450**
£170 ★★★★★
Reviewed April 05
www.hp.com/uk
HP's Photosmart 8450 is a bulky printer, but it's capable of producing stunning photo prints.

4

**Epson Stylus Photo R340**
£149 ★★★★½
Reviewed February 06
www.epson.co.uk
Excellent-quality prints and the ability to function without a PC.

## MULTIFUNCTION DEVICES

1

**Canon Pixma MP150**
£69 ★★★★½
Reviewed December 05
www.canon.co.uk
Photo quality might not be the best, but as a budget MFP the MP150 is a great buy.

2

**Dell Photo All In ONe 944**
£121 ★★★½★
Reviewed April 06
www.dell.co.uk
A bulky, but good quality MFD that would suit both home and small office use.

## LASER PRINTERS

1

**Dell 1600n**
£236 ★★★★½
Reviewed September 05
www.dell.co.uk
A good multifunction mono laser, perfectly suited to small or home offices.

2

**Canon LBP-5200**
£224 ★★★★½
Reviewed October 05
www.canon.co.uk
A great-value colour laser printer that's both small and capable of delivering quality prints.

3

**Dell Laser Printer 1100**
£93 ★★★★½
Reviewed November 05
www.dell.co.uk
A cheap mono laser printer, but it comes with a relatively small starter toner cartridge.

4

**HP Laserjet 1020**
£89 ★★★★½
Reviewed August 05
www.hp.com/uk
A great home laser printer that's fast, good quality and is one of the cheapest lasers available.

## HOW TO BUY

If you don't need colour, consider a monchrome laser or LED printer. The latter tend to be cheaper and may last longer than a laser, but LED printers have a fixed resolution and can't take advantage of software-based resolution enhancements.

If you print hundreds of pages a week, a laser is the best option as they're cheaper and more reliable for high-volume printing. If you print a few pages a month, buy a cheap colour inkjet. If printing high-quality colour photos, buy a good photo printer.

Look for the manufacturer's quoted 'duty cycle' – this is how many pages a month the machine can handle. Choose a duty cycle three or four times larger than your expected average usage. Also check the printer's 'engine life' or 'total print volume' – after this expires, the printer's on borrowed time and uneconomical to repair.

Quoted printer speeds often refer to the speed the printer pushes a blank sheet of paper through the mechanism; for documents they tend to refer to lower quality settings. PCW's tests use real documents and photos, giving a better idea of print speed.

For serious inkjet photo printing, consider higher-end models that use six, seven or eight colour cartridges. Normal inkjets use three colours (cyan, yellow and magenta) plus black, while specialised photo printers add extra shades to improve colour fidelity. Cheaper models often combine three colours in a single cartridge, which is not as economical as using separate cartridges for each colour.

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 for business use often have a large number of paper-handling options. They're usually modular so you can add features as required. They also have a wider range of interface options and consumables.

You'll often find bundled software with a printer. Their quality varies, but there can be some useful programs.

The quality and usability of the driver software is vital, but it's difficult to assess before buying. Check PCW's reviews and online forums (www.pcw.co.uk/forums) and read the manufacturer's technical support site for any known problems.

Third-party or refurbished consumables generally work fine, but can cause problems with quality and reliability. Your warranty may not cover the use of non-approved consumables.

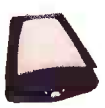
# FLATBED SCANNERS

1

**Epson 2480 Photo**
£79 ★★★★★
Reviewed February 05
www.epson.co.uk
It's rather large, but is easy to use and includes a transparency adapter.

2

**HP Scanjet 3770**
£69 ★★★★½
Reviewed February 05
www.hp.com/uk
You get plenty of scanning options, plus it's fast and produces good image quality.

3 

**Mustek Bearpaw 4800TA Pro II**
£69 ★★★★½
Reviewed February 05
www.mustek.com
Simple to install and it includes a built-in transparency adapter with automatic cropping.

4

**Visoneer Onetouch 9220 USB**
£99.99 ★★★★½
Reviewed February 05
www.visioneer.com
You get plenty of features for your money, and it produces good-quality scans.

5

**Canon Lide 35**
£59 ★★★½☆
Reviewed February 05
www.canon.co.uk
Compact, stylish with some useful software, but it doesn't include a transparency adapter.

## HOW TO BUY

Flatbed scanners are the simplest way of digitising your old photos. Whether you just want to back them up on your PC, email them, stick them on a website or edit them, just hook up a scanner to your PC or notebook and off you go.

That said, not all scanners are created equal and there is a huge choice out there. Here are some key features to look out for to make it easier.

A good scanner will connect via USB2 or Firewire. Try and avoid older models offering USB1.1 since large scans can take a while to transfer to your PC. It should also offer at least 48bit colour depth and a resolution of 2,400 x 2,400dpi. This is more than enough for scanning photos or documents.

Also look out for a 35mm slide adapter for scanning slides or, even better, an automatic film loader that allows you to insert your film negatives or slides for simple scanning and enlargement.

On the software front, see if your model comes with tools that allow you to fix and edit the photos. This can include anything from removing red-eye, to colour restoration and eliminating dust and cracks. Some entry-level models even come with a cut-down version of the leading professional editing software, Adobe Photoshop.

# ROUTERS

WIRELESS/MODEM

1

**Netgear 108 ADSL router**
£159 ★★★★☆
Reviewed April 05
www.netgear.co.uk
If you need a Super-G router with built-in ADSL modem, this offering from Netgear is great value.

2

**Ozenda 11g ADSL Router**
£70 ★★★★★
Reviewed November 04
www.ozenda.com
Ozenda has come up trumps - wireless ADSL doesn't get any easier than this.

3

**3Com Office Connect ADSL Wireless 11G**
£59 ★★★☆☆
Reviewed August 05
www.3com.co.uk
A wireless ADSL router that's good for Soho environments and simple to set up and configure.

WIRELESS

1

**Linksys WAG54G (wireless)**
£76 ★★★★★
Reviewed August 05
www.linksys.com
This 802.11g wirleless model offers advanced features for home and professional users.

2

**D-Link DSL-G624M**
£110 ★★★★☆
Reviewed March 06
www.d-link.co.uk
Combines Mimo technology with Super G to give faster speeds and extended coverage.

3

**Netgear WGT634U**
£106 ★★★★☆
Reviewed August 05
www.netgear.co.uk
Good design, high quality and easy configuration make this a great wireless choice.

4

**Belkin Wireless Pre-N router**
£119.99 ★★★★☆
Reviewed April 05
www.belkin.com
Excellent coverage and easy installation and configuration make this a great product.

VOIP

1

**Intertex IX66+ ADSL Airsip GW (wireless VoIP)**
£269.08 ★★★★★
Reviewed March 05
www.intertex.se
For a small business needing multi-user VoIP telephony, the Intertex IX66+ is hard to beat.

2

**Zoom Zoomtel X5V**
£100 ★★★★☆
Reviewed March 05
www.zoom.com
For a no-fuss VoIP solution at home, the Zoomtel X5V is worth considering.

3

**Draytek Vigor 2500V**
£139.83 ★★★★☆
Reviewed March 05
www.draytek.co.uk
A great wired router for those wanting to reap the benefits of VoIP telephony.

## 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 the broadband connection as well as swap data and let you play networked games. Wireless (Wifi) routers are increasingly popular in the home market, allowing devices to remotely connect to the Internet and each other without the need for cables - but wireless routers also usually have ordinary network (Ethernet) ports to let you connect non-wireless devices.

## Wireless standards

**802.11b** This was the first and, until recently, the most common wireless variant used. With transmission speeds of just 11Mbits/sec it is also the slowest. It also used the 40bit Wireless Equivalency Privacy (Wep) security protocol, which was found to have a number of holes. An updated version of this, 802.11b+ boosted speeds to 22Mbits/sec.

**802.11g** This is now the mainstream standard in use, offering more respectable data transfer speeds of up to 54Mbits/sec - although in reality speeds are much lower. It also uses the more robust Wifi Protected Access (WPA) security protocol. Both 'b' and 'g' products can work together, which is handy if you have older 802.11b kit you still wish to use on your home network.

**802.11n** This is still in the process of being officially ratified and will not arrive in its final form until next year. It promises real data transfer speeds of 100Mbits/sec and, theoretically, up to 300Mbits/sec as well as increased range. At the moment there are two competing groups battling for supremacy. There are already numerous 'Pre-N' or 'Mimo' routers available that offer significant data transfer speeds over 'g' routers.

# SPEAKERS

1

**Creative Gigaworks S750**
£237 ★★★★★
Reviewed April 04
http://europe.creative.com
Although no Dolby Digital encoder is included, the sound quality and construction are superb.

2

**Logitech X-530**
£59.99 ★★★★☆
Reviewed July 05
www.logitech.co.uk
Sleek design, great sound quality and a performance that belies the bargain price.

3

**Hercules XPS5-101-Black**
£99.99 ★★★★☆
Reviewed July 05
www.guillemot.co.uk
Excellent build quality, easy to set up, lots of power and a fantastic remote control.

4

**Creative Inspire T7900**
£99.99 ★★★☆☆
Reviewed July 05
http://europe.creative.com
A 7.1 surround system with surprisingly good sound quality, but it won't cost you a fortune.

5

**Logitech Z-5500 Digital**
£279.99 ★★★☆☆
Reviewed July 05
www.logitech.co.uk
With a built-in Dolby Digital decoder, this set also delivers impressive audio performance.

## HOW TO BUY

PC speakers have come a long way, with most manufacturers now offering 2.1, 5.1, 6.1, 7.1, and even 8.1 packages.

Here are three things to watch for when you're looking to buy. First is the output, often expressed in watts. Try to look beyond the manufacturer's statements, as they can be misleading. For instance, a 125w output might comprise a 100w sub-woofer and five 5w speakers. You may see speaker output quoted as PMPO (Peak Music Power), which relates to the maximum output that can be achieved under perfect conditions and is misleading. Lastly, there is RMS (Root Mean Square), which is expressed in watts, for example total 200w RMS. This is a better reference for overall power, but not perfect.

Impedance is measured in ohms and tells you how much of an electrical load a speaker presents to the amplifier.

The higher the impedance, the less power the amplifier needs to drive it. The average on most speakers is 8ohms. If lower than 8ohms the amplifier has to work harder to drive the speakers, which can result in distortion.

Frequency response refers to a speaker's tonal qualities and its ability to reproduce sounds at different frequencies. Speakers listed as having a response of 20Hz-20KHz are the most common for PC speakers. ↘

# MONITORS

## 17IN

1

**LG Flatron L1732P**
£239 ★★★★☆
Reviewed February 06
www.lge.co.uk
Fast response times make this 17in panel a good choice for gamers.

2

**Samsung Syncmaster 173P**
£237 ★★★★★
Reviewed November 04
www.samsung.co.uk
Ergonomic, with a good picture quality, if slightly under-saturated, and the screen is very adjustable.

3

**Viewsonic VP171B**
£229 ★★★★☆
Reviewed November 04
www.viewsonic.com
The VP171B has great picture quality, but the viewing angles are slightly restrictive.

## 19IN

1

**Acer AL1922HS**
£279 ★★★★★
Reviewed September 05
www.acer.co.uk
The AL1922HS offers a great balance of features, performance and price.

2

**CTX S966A**
£219 ★★★★☆
Reviewed September 05
www.ctxeurope.com
Excellent value for money and looks a lot more expensive than it really is.

3

**Samsung Syncmaster 913N**
£229 ★★★★☆
Reviewed September 05
www.samsung.co.uk
A great combination of features and quality for this 8ms model, but lacks DVI connectors.

4

**AGM CW-19**
£199 ★★★★☆
Reviewed April 06
www.agm-display.com
A basic, no-frills monitor with a smart and compact design along with decent performance.

## 20IN+

1

**HP f2105**
£549 ★★★★★
Reviewed March 06
www.hp.com/uk
Expensive, but hugely impressive monitor with excellent image quality.

2

**Belinea 10 20 35W**
£367 ★★★★☆
Reviewed March 06
www.maxdata.co.uk
The Belinea offers excellent value for money and good overall performance.

3

**Fujitsu-Siemens S20-1W**
£399 ★★★★☆
Reviewed April 06
www.fujitsu-siemens.co.uk
Superb build and image quality combine to make one of the most attractive monitors in its class.

## HOW TO BUY

CRT (cathode-ray tube) monitors are less fashionable, mainly due to the rapidly dropping prices of TFT (thin-film transistor) flat-panel models. But CRT technology is more than 100 years old and has a lot of strengths. CRTs are bulky, heavy and power-hungry, but are now excellent value for money.

Resolution is the number of graphics elements displayed on a screen. Known as pixels, they are generated by your graphics card. In any TFT or LCD, each pixel is composed of three sub-pixels coloured red, green and blue. In a CRT the pixels are spread in a grid across the screen separated by a distance called the dot pitch. The smaller the dot pitch, the sharper the image.

With TFTs, each pixel is composed of three rectangular thin-film transistors. The number of pixels equals the 'native' resolution; a 1,024 x 768 TFT will have exactly that number of pixels horizontally and vertically.

CRTs usually have a higher resolution than a TFT of the same size and work perfectly at any standard resolution up to the quoted maximum. Running a TFT below its native resolution can result in a poor picture.

Check your TFT's native resolution meets your needs – gamers wanting 1,600 x 1,200 will probably need an expensive 20in model - most 19in panels are currently limited to 1,280 x 1,024 and budget 14/15in models might only support 800 x 600.

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 - 12-25ms is typical - faster is better. Some newer monitors now have response times of 4ms or 8ms.

TFTs have high quoted contrast ratios, but this is often a maximum figure. Evenness of lighting is more important than the overall brightness specification.

The ISO 13406-2 standard specifies minimum requirements for display contrast, viewing angle, brightness, reflections, flicker, contrast and defective pixels. You may see the standard incorporated in a TUV label with the words 'Ergonomics Approved' or 'ISO 13406-certified'. The TCO'95 and '03 standards cover electromagnetic emissions, noise and ergonomics - ensure the monitor has at least one of these. 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 some dead pixel guarantees with Class II TFTs.

# TV TUNERS

1

**Nebula Digitv**
£99.95 ★★★★★
Reviewed August 05
www.nebula-electronics.com
This external USB2 tuner has a built-in web server to let you share TV over your network.

2

**Twinhan Magic Box**
£69.99 ★★★★☆
Reviewed August 05
www.twinhan.com
A stylish external USB2 tuner with good software and an attractive price.

3

**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.

4

**Visionplus VisionDTV**
£69.99 ★★★★☆
Reviewed November 04
www.twinhan.com
A bargain price and top-notch features make this a must-buy USB2 digital TV tuner.

5

**Avermedia Avertv DVB-T USB2**
£84.99 ★★★★☆
Reviewed August 05
www.averm.co.uk
The Avertv impressed us with its sheer simplicity, and its small size makes it ideal for notebook users.

## 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. Check if you run Windows 98 or NT.

A Freeview digital tuner offers the best channel choice, picture and sound, but may need an outdoor aerial or a wideband aerial (you can check at www.freeview.co.uk). Analogue terrestrial TV tuners may give better results if using an indoor receiver. If a digital tuner receives radio it doesn't always mean digital audio broadcasting (DAB) support. Look for Teletext and subtitle support.

Digital tuners record to disk for maximum quality; analogue signals need to be digitally encoded – look for mpeg-2 hardware for realtime video and audio encoding; cheaper tuners need your CPU to do this in software.

Most analogue systems let you capture video from a VCR or camcorder. Look for composite or S-video connectors and stereo phono inputs. Typically, an hour of mpeg-2 video uses up to 2GB of disk space. VHS-quality mpeg-1 gives just over an hour on a CD.

Better TV cards have personal video recorder functionality, letting you pause, fast forward and rewind live TV, and have an electronic programme guide to record shows to your PC.

# DIGITAL MUSIC PLAYERS

1

**Apple Ipod**
£219 ★★★★★
Reviewed January 06
www.apple.com/uk
All the usual Ipod features but now with the ability to play video.

2

**Creative Zen Nano Plus**
£99 ★★★★★
Reviewed December 05
http://europe.creative.com
1GB flash player that houses a radio, voice recorder and mp3 encoding from a line-in source.

3

**Philips HDD6320**
£229 ★★★★☆
Reviewed March 06
www.philips.co.uk
Sleek and stylish, this 30GB player from Philips is incredibly easy to use.

4

**Apple Ipod Shuffle**
£89 (1GB); £69 (512MB) ★★★★☆
Reviewed May 05
www.apple.com/uk/ipod
Small yet perfectly formed, it's easy to use, has good sound and is set to be a big hit.

5

**Iriver H340 SE**
£339 ★★★★☆
Reviewed January 05
www.epinx.com
A good all-round player with a colour screen and built-in FM tuner.

# SMARTPHONES

**O2 XDA Mini**
£99.99 ★★★★☆
Reviewed March 06
www.o2.co.uk
A compact and well-featured PDA, complete with a slide out keyboard

2

**T-Mobile MDA Pro**
£139 ★★★★☆
Reviewed January 06
www.t-mobile.com
A well-designed smartphone that's absolutely loaded with features.

3

**Sony Ericsson P910i**
£contract dependent ★★★★★
Reviewed December 04
www.sonyericsson.co.uk
The Symbian-powered P9101 has heaps of features and impressed us a great deal.

4

**Motorola A780**
From free ★★★★☆
Reviewed April 06
www.dialaphone.co.uk
Combines a mobile phone, PDA and satellite navigation in one easy to use smartphone.

5

**Sony Ericsson D750i**
£contract dependent ★★★★☆
Reviewed December 05
www.t-mobile.com
It's no substitute for a digicam, but this 2megapixel camera phone is packed with features.

# PDAS

1

**Dell Axim X50v**
£304 ★★★★☆
Reviewed May 05
www.dell.co.uk
A good PDA, with a great VGA-resolution screen, which is perfect for multimedia use.

2

**Asus My Pal A730W**
£356 ★★★★☆
Reviewed July 05
www.uk.asus.com
A fully-loaded Pocket PC, with a large set of utilities at a reasonable price.

3

**Palm Tungsten T5**
£279 ★★★★☆
Reviewed March 05
www.palm.com
Another sterling Tungsten upgrade with great new features, let down only by having no Wifi.

4

**HP IpaqRX3715 MMC**
£224 ★★★★★
Reviewed November 04
www.hp.com/uk
A fantastic Pocket PC with some great features, but the camera's viewfinder could be better.

5

**Palmone Zire 72**
£169 ★★★★☆
Reviewed August 04
www.palm.com
Provided you don't mind the styling, the Zire 72 is a cheap, yet powerful PDA.

## HOW TO BUY

The mp3 music format recently celebrated its tenth birthday and in that short space of time it has revolutionised the music industry. On the way, it has spawned a global market for digital music players, none more famous than Apple's Ipod and related offerings.

There are two main categories that players can be divided into: Flash memory-based players, which range in size from 256MB to 1GB and mini hard drive-based models, which run from 4GB to 60GB. Prices for a 256MB player start as low as £20 rising to around £300 for a 60GB player. In terms of songs, the difference is the ability to hold 40 on one and 15,000 on the other. If you just want something for using on-the-move, then Flash-based players are the way to go, since they are very small and light.

The software used in many players determines how easy it is to use in terms of tracklisting and organising songs.

If you need a portable record store, then start by looking at the wide range of 4GB-6GB players and, if that's not enough, head for the 20GB, 40GB and 60GB models. Ensure whatever you buy supports playback in different formats. The ability to listen to FM radio and record voice is also a bonus. Most importantly, check out the battery life, since this can vary wildly between similar devices.

## HOW TO BUY

Smartphones are essentially mobile phones that can do a lot more than send texts and make calls. They are increasingly popular because you get both phone and PDA functions in a single device.

There are two key types of smartphones - those that look roughly like slightly bigger mobile phones and those that are essentially PDAs with voice functionality (Blackberry, Palm, Nokia, etc). We will look primarily at the mobile phone smartphones. They usually boast small colour screens and allow you to send email, access the Internet, run third-party applications, use instant messaging software and sort out your calendar and contacts. Even better, all of this information can be synchronised with your PC or laptop and some even allow you to store and play mp3s, take photos and shoot video.

There are two main operating systems in use: Symbian and Microsoft's Windows Mobile 2003, the latter with a new version due. Symbian controls the lion's share of the market at the moment and its key partner, Nokia, ships over 50 per cent of all smartphones. These smartphones are general-purpose devices and suitable for all the above tasks in moderation.

If you are a heavy email user or plan to work on documents on the move, then consider a PDA-style smartphone with a keypad.

## HOW TO BUY

A PDA, or personal digital assistant, is essentially a handheld computer. The PDA market is not as clear cut as it once was, as newer devices with voice capabilities have now arrived. For our purposes, handhelds do not include smartphones.

There are two main types of devices: those that run the Palm operating system and those that run Pocket PC from Microsoft. Both have their advantages, but if you want familiarity, go with a Pocket PC-based device, since it will run versions of common Microsoft applications.

If you plan to write a lot, consider a model with a keyboard. Otherwise, go for a pen-based device which is typically half the price and offers an on-screen keyboard or has handwriting recognition features.

Most PDAs use memory for storage, so look for a device with 64MB or more, if possible. Storage can be boosted using flash memory cards in the SD card slot. Newer devices now have tiny hard disk drives with capacities of up to 4GB.

Most PDAs come with colour screens for viewing photos and media files. If watching video is a priority, go for one with the highest screen resolution. For the best in connectivity, opt for a model with in-built Bluetooth and wireless networking or Wifi technology. ↘

## PORTABLE MEDIA PLAYERS

1

**Archos AV400 20GB**
£314.99 ★★★★★
Reviewed June 05
www.datamind.co.uk
A great alternative to Microsoft-based models, offering more features than the competition.

2

**Archos Gmini 400 20GB**
£239.99 ★★★★★
Reviewed June 05
www.datamind.co.uk
A scaled-down version of the AV400, it's portable, with great battery life and an array of features.

3

**Digital Cube I-Station 20GB**
£329.99 ★★★★☆
Reviewed July 05
www.datamind.co.uk
A 20GB model with an FM tuner and mp3 recorder, it also supports a wide range of video formats.

4

**Hauppauge PVMP 20GB**
£399 ★★★★☆
Reviewed June 05
www.hauppauge.co.uk
The PVMP offers a large 7in widescreen display, perfect for watching movies.

5

**MSI Megaview 566 20GB**
£250 ★★★★☆
Reviewed June 05
http://msicomputer.co.uk
A lightweight media player that will happily record from a video source.

### HOW TO BUY

Portable media players (PMPs), also called personal video players (PVPs), are the big brothers of mp3 players with video capabilities thrown in. You may also come across the term Personal Media Center (PMC), which are players built around Microsoft's Windows Mobile operating system.

PMPs, like many larger mp3 players, are based on mini hard disk drive technology and usually start at around 20GB. They allow you to watch movies, view photos and play music files. A good model will support mpeg-2 and 4, wmv and DivX movie formats, as well as mp3, wav asf and wma audio files. Some can also receive and record FM radio and voice.

They come in a variety of sizes, with screens ranging from just over 2in to around 4in. The most common screen size is around 2.5-3in. Thanks largely to the screen and the mini hard drives, PMPs weigh a bit more than, say, an Ipod, but at 150-300g they're not going to be too heavy to carry around. Many of the features on these devices are similar, from screen size to hard disks and supported formats. What sets them apart is weight, screen resolution, movie playback quality and battery life.

Test them out, if possible, or check out the PCW reviews before splashing out.

## PERSONAL VIDEO RECORDERS

1

**Plextor ConverTX PVR**
£151.56 ★★★★☆
Reviewed June 05
www.plextor.be
The ConverTX is an external analogue tuner that can also record from most video sources.

2

**Twinhan Magic Box**
£69.99 ★★★★☆
Reviewed August 05
www.twinhan.com
Another PC-based stylish external USB2 tuner with good software and an attractive price.

3

**Kiss DP-558**
£293.75 ★★★☆☆
Reviewed October 05
www.kiss-technology.com
A networkable PVR that lets you play Internet radio, although it has only got an analogue tuner.

4

**Mustek DVD R580**
£244.87 ★★★☆☆
Reviewed September 05
www.mustek.com
Lots of features and connectivity options in this combo DVD recorder/hard disk standalone PVR.

5

**Humax PVR-9200T**
£229 ★★★★☆
Reviewed February 06
www.humaxdigital.com/uk
Twin digital tuners and a 160GB hard drive make this a great choice.

### HOW TO BUY

The personal video recorder (PVR), also known as a digital video recorder (DVR), is a device that records TV onto a hard drive in digital format. Unlike video and DVD recorders, there is no need for tapes or disks.

Tivo launched the world's first PVR in 1999 and most PVRs use the mpeg format for encoding video. Unlike VHS recorders, PVRs give you the ability to pause live TV, instantly replay scenes just watched while continuing to record and, most importantly, skip through adverts.

In the UK, Sky+ PVRs dominate the market, with other players, including Tivo and Telewest, trailing a long way behind.

The first thing to consider when buying a PVR is the size of the hard drive. Try going for one with a minimum of 40GB, but 80GB would be better. Most will come with a single Freeview tuner for getting free digital TV signals, but an increasing number are arriving with two. This means you can watch one channel and record another or even record two different channels while watching a previous recording.

At the heart of any PVR is the electronic programme guide (EPG). It's needed for selecting all the things you want your PVR to record. The better the EPG, the more intuitive your PVR becomes, recording programmes by itself based on your previous choices.

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# BACKUP SOFTWARE

**Roxio Backup My PC Deluxe 6**
£34.99 ★★★★★
Reviewed June 05
www.roxio.co.uk
Takes the mystery out of backups and is ideal as a simple solution to protect PC files.

2 **Acronis True Image 8**
£29.99 ★★★★★
Reviewed February 05
www.phoenixglobalsoftware.co.uk
This easy-to-use disk imaging package should be part of every PC owner's toolkit.

3 **X Drive**
$99.50 per year for 5GB ★★★★☆
Reviewed October 05
www.xdrive.com
A flexible, simple-to-use and attractively priced online backup service.

## HOW TO BUY

Backing up important data is something a lot of home users, and homeworkers, fail to take seriously. Until, of course, they lose everything and have no way of getting it back. In order to avoid such a calamitous event, consider some form of backup solution now.

Most of the leading backup packages cost between £30 and £50. A good solution will allow you to do full hard disk backups, as well as single files and folders, plus let you schedule backups of data that's changed since the last full backup was executed. They should be easy to install and set up.

Backups should be easy to restore and retain the original file organisation. Any solution should be able to write backups to your hard drive, external hard drives and blank CD/DVD discs.

# DIGITAL IMAGE-EDITING SOFTWARE

1 **Adobe Photoshop Elements 4**
£69 ★★★★★
Reviewed December 05
www.adobe.co.uk
A great choice for home users looking for an image-editing package that's easy to use.

2 **Adobe Photoshop CS2**
£538 ★★★★☆
Reviewed June 05
www.adobe.co.uk
Still the undisputed leader for professional photo editing, but its high price will put most off.

3 **Corel Paintshop Pro X**
£99.95 ★★★★☆
Reviewed December 05
www.corel.co.uk
Power, sophistication plus ease of use make this great for beginners and experienced users.

## HOW TO BUY

Many digital cameras come bundled with some form of basic photo-editing software, but to move on to the next level you really need to start using a dedicated editing package.

For good mid-range programs, prices range from free for open-source programs such as Gimp, up to about £90.

Look out for features including advanced colour correction, lighting controls, automatic photo-fix wizards, scratch and blemish remover, multiple undo options, special effects, layers and templates. The software should also let you create slideshows, publish to the web, save in many different formats and archive images to CD/DVD discs.

Most importantly, there should be extensive help files, FAQs, tutorials, web forums, email and phone support.

# MEDIA CREATION SOFTWARE

1 **Roxio Easy Media Creator 8**
£59 ★★★★★
Reviewed January 06
www.roxio.co.uk
Intuitive media editing suite to sort, enhance and share all your digital media.

2 **Pinnacle Studio Media Suite**
£89.99 ★★★★☆
Reviewed March 05
www.pinnaclesys.com
A massive amount of software for your money, including an excellent video editor.

3 **ROxio Easy DVD Copy 2**
£19.99 ★★★★☆
Reviewed April 06
www.roxio.co.uk
Useful if you've got a variety of unprotected material to copy or convert to DivX.

## HOW TO BUY

This is the software you need for burning CDs and DVDs. Most new PCs and DVD burners come bundled with some kind of media creation software. A good product will allow you to burn audio and video content onto CDs and DVDs, back up data, create electronic photo albums, and make your own DVD menus and labels.

Bundled versions are usually limited, or 'lite', versions of leading brands such as Nero, Roxio Easy Media Creator, Intervideo WinDVD or Pinnacle CD/DVD Creator, among others. You can usually upgrade to the full version online and save about 20 per cent or more on what you would pay for a standalone version.

Prices for standalone media creation software start at £20 for basic CD/DVD authoring software and rise to around £60 for the most advanced suites.

# PC MAINTENANCE/UTILITY SOFTWARE

1 **Winzip 10 Professional**
$49.95 (£28 approx) ★★★★☆
Reviewed March 06
www.winzip.co.uk
A Standard version is available, but this Pro version offers advanced compression

2 **Allume BoostXP**
£19.99 ★★★☆☆
Reviewed May 05
www.allume.com
BoostXP makes tweaking your system much easier than doing it manually.

3 **Orlogix Replacemypc Suite**
£59.99 ★★★☆☆
Reviewed March 06
www.orlogix.com
Useful package to securely migrate data from one PC to another.

## HOW TO BUY

Just like your car, PCs need regular maintenance to keep them in good working order. There are tools within Windows that can help, but a dedicated suite of maintenance or utility software should do a better job.

Utility software often comes with a virus scanner, but you may already have one, so concentrate on one with the following features. It should offer a simple overview of system and application performance, the ability to clean out the Registry and restore it easily if any mistakes occur, defragment the hard disk drive and memory, and optimise application performance. It should have some form of reporting and let you simplify the control of key Windows settings.

Other common tools will back up data, recover deleted files and speed up your Internet surfing.

## PC SECURITY SOFTWARE

1 **Bitdefender 8 Professional Plus**
£39.99 ★★★★☆
Reviewed August 05
www.bitdefender.com
An easy-to-use suite that includes two years of free updates and 24/7 live online support.

2 **Norton Internet Security 2006**
£49.99 ★★★★☆
Reviewed March 06
www.symantec.com
This latest version from Norton provides omplete online security for your PC

3 **Zone Labs Zone Alarm Security Suite 6**
£49.95 ★★★★☆
Reviewed November 05
www.zonelabs.com
A comprehensive product that offers excellent Internet security, including spam filtering.

### HOW TO BUY

You cannot own a PC or laptop today without taking adequate security measures. The Internet may have opened up many opportunities, but it is also a dangerous place for an unprotected PC. In order to cover yourself, both online and offline, you will need a decent security software suite which combines numerous utilities to tackle different threats.

Popular brands include those from Zone Labs, Trend Micro, Norton and McAfee.

A good security suite should include a firewall, email scanner, spyware checker, anti-virus and anti-spam tools.

Prices for some of the best tools start at around £35 and usually include a year's online updates. After a year you will need to pay a yearly subscription to keep your software up to date.

## OFFICE SOFTWARE

1 **Microsoft Office Professional 2003**
£459 ★★★★½
Reviewed May 04
www.microsoft.com/uk/office
Sets the standard for office suites for those prepared to pay the price.

2 **Openoffice.org 2**
Free ★★★½☆
Reviewed July 05
www.openoffice.org
New features and improved compatibility make this a genuine alternative to Microsoft Office.

3 **Microsoft Works 2006**
£90 ★★★★★
Reviewed February 06
www.microsoft.com/uk
Comprehensive office package suitable for most home users. Great value for money.

### HOW TO BUY

Office software generally refers to word processors, spreadsheets, presentation software and email utilities. Microsoft Office dominates this arena. But most new PCs come bundled with Microsoft Works Suite 2005, which has Word, Works Database, Spreadsheet and a range of home packages.

To upgrade to a full version of Microsoft Office will cost around £150. Many will not need the functionality of Office though, and the Outlook Express email software shipped with all Windows PCs is enough for most users. If you can wait, then do so, since Microsoft plans to launch Office 12 in July 2006. But don't forget the competition either: products such as Ability Office, Star Office and the free open-source version, Open Office, are available.

## VIDEO-EDITING SOFTWARE

1 **Adobe Premiere Elements 2**
£69.32 ★★★★★
Reviewed February 06
www.adobe.com
The best video-editing package available for beginners and intermediate users.

2 **Pinnacle Studio 10**
£69.99 ★★★½☆
Reviewed February 06
www.pinnaclesys.com
Suitable for novices or intermediate users, Studio 10 is a good budget option.

3 **Ulead Videostudio 9**
£49.99 ★★★★☆
Reviewed February 06
www.ulead.co.uk
Simple yet thorough, Videostudio offers plenty, whatever your level of expertise.

### HOW TO BUY

This is a must for anyone hoping to turn hours of camcorder footage into tightly edited, watchable movies. There are a lot of packages to choose from, but new tools geared towards the novice are popping up in all of them. Not only are they making it easy to get your movies onto DVD, but a wider range of tools allow you to personalise what you've shot.

Basic packages cover capture, storyboarding, timeline video editing and template-based DVD authoring. More advanced software will let you create a wide range of special effects and are aimed at the home movie enthusiast. Prices start at around £40, but it's important to find a package with good help files - video-editing software often assumes a lot of prior knowledge.

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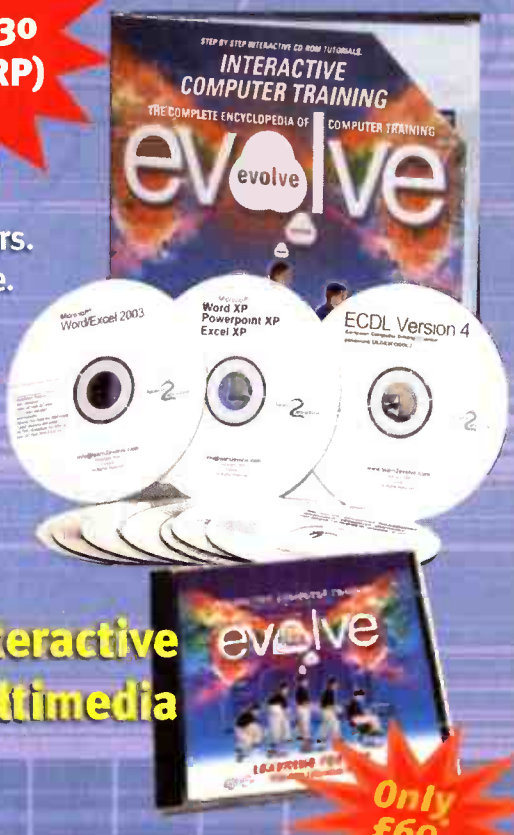


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# PRODUCT INDEX

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

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| Nvidia | Geforce 6800 Ultra | Feb 06 | 3 |
| ★ Nvidia | Geforce 7800 GTX 512 | Feb 06 | 5 |
| ★ Nvidia | Geforce 7800 GTX 512MB | Feb 06 | 5 |
| O2 | XDA Mini (PDA) | Mar 06 | 4 |
| Olympus | E-300 (camera) | Dec 05 | 4 |
| ★ Ontrack | Easy Recovery Lite | Mar 06 | 4 |
| Orange | SPV M5000 (mobile phone) | Feb 06 | 4 |
| Orlogix | Replace MyPC Suite (utility software) | Mar 06 | 3 |
| Packard Bell | Audiostar | Feb 06 | 2 |
| Panasonic | SDR-S100 (digital camcorder) | Mar 06 | 3 |
| ★ Panrix | IQ Cube 3800X2 (SFF PC) | Mar 06 | 5 |
| PC Next Day | Zoostorm 9-6201 (SFF PC) | Mar 06 | 3 |
| PC Tools | File Recover 5 (data recovery software) | Mar 06 | 3 |
| Philips | 170X6 (monitor) | Mar 06 | 3 |
| Philips | Brilliance 200W6 (TFT monitor) | Mar 06 | 4 |
| Philips | Digital Photo Display | Feb 06 | 3 |
| ★ Philips | HDD6320 | Mar 06 | 4 |
| Pinnacle | Studio Plus 10 | Feb 06 | 3 |
| ★ Pioneer | DVR-110 Supermulti | Mar 06 | 5 |
| Pipex | 1000 (broadband) | Feb 06 | 3 |
| ★ Pixmantec | Rawshooter Premium 2006 | Feb 06 | 4 |
| PNY Technologies | Geforce 6200 (graphics card) | Feb 06 | 2 |
| Powercolor | X800 GameFX 256 | Feb 06 | 3 |
| ★ R-Tools Technology | R-Studio (data recovery) | Mar 06 | 4 |
| Realviz | Stitcher 5 (photo software) | Jan 06 | 4 |
| ★ Restoration Manager | (utility software) | Mar 06 | 5 |
| ★ Route 66 | Mobile Britain 2006 (GPS) | Jan 06 | 3 |
| ★ Roxio | Easy Media Creator Suite 8 | Jan 06 | 5 |
| Samsung | SE-W084 Slim | Mar 06 | 4 |
| Samsung | SH-W162L (removable storage) | Mar 06 | 3 |
| Samsung | M50 (laptop) | Feb 06 | 3 |
| Samsung | Spinpoint P120S SP2504C | Feb 06 | 4 |
| Sanyo | Xacti E6 (digital camera) | Feb 06 | 3 |
| ★ Sapphire | ATI Radeon X1300 | Feb 06 | 4 |
| Sapphire | Radeon X550 Silent Cooling | Feb 06 | 2 |
| Sapphire | Radeon X800 (graphics card) | Feb 06 | 4 |
| Sapphire | Radeon X800GTO (AGP) | Mar 06 | 4 |
| ★ Sapphire | Radeon X800GTO2 | Feb 06 | 5 |
| Sapphire | Radeon X850XT Platinum Edition 256MB (graphics card) | Feb 06 | 3 |
| Sapphire | Radeon X1800XT (graphics card) | Mar 06 | 4 |
| Seagate | Barracuda 7200.9 (hard disk) | Mar 06 | 4 |
| Seasonic | S12 (PSU) | Feb 06 | 3 |
| ★ Showshifter | 3.12 (TV software) | Jan 06 | 5 |
| Shuttle | M1000 (Media Center PC) | Jan 06 | 4 |
| Snapstream | Media BeyondTV3 (TV software) | Jan 06 | 3 |
| ★ Sonic Wall | TZ 170 (VPN device) | Mar 06 | 5 |
| Sony | DPP-FP50 (printer) | Jan 06 | 3 |
| ★ Sony | Playstation Portable | Feb 06 | 5 |
| ★ Sourceforge | Media Portal (TV software) | Jan 06 | 4 |
| Speed | i640 (webcam) | Jan 06 | 3 |
| ★ Sports Interactive | Football Manager 2006 | Jan 06 | 5 |
| Stellar | Phoenix Fat + NTFS | Mar 06 | 2 |
| ★ Supportplus | Q-Be (portable media player) | Feb 06 | 4 |
| ★ Symantec | Norton Internet Security 2006 | Mar 06 | 4 |
| Telewest | Broadband Complete | Feb 06 | 4 |
| Tesco | Broadband 512K (broadband) | Feb 06 | 3 |
| The Matrix: Path of | Neo | Mar 06 | 3 |
| Think Outside | Stowaway Bluetooth keyboard | Feb 06 | 2 |
| Tiscali | Broadband 2MB | Feb 06 | 4 |
| ★ T-Mobile | MDA Pro (phone) | Jan 06 | 4 |
| T-Mobile | Sidekick II (PDA) | Mar 06 | 3 |
| Tomtom | Navigator 5 (GPS) | Jan 06 | 2 |
| Translution | Pro (translation software) | Feb 06 | 4 |
| Ubisoft | Peter Jackson's King Kong | Feb 06 | 3 |
| ★ UK Online | Broadband 8000 | Feb 06 | 5 |
| ★ Ulead | Videostudio 9 | Feb 06 | 4 |
| Vadim | Fusion CS (PC) | Feb 06 | 4 |
| Viamichelin | Navigation 3 (GPS) | Jan 06 | 2 |
| Virgin | Plan One (broadband) | Feb 06 | 3 |
| ★ Vivendy Games | First Encounter Assault Recon | Feb 06 | 5 |
| Vodafone | Mobile TV | Feb 06 | 4 |
| Wacom | Graphire4 Studio XL (tablet) | Jan 06 | 4 |
| Wanadoo | Heavy User (broadband) | Feb 06 | 3 |
| Watford | Media Centre Cube (SFF PC) | Mar 06 | 4 |
| ★ Winzip | 10 Pro (utility software) | Mar 06 | 4 |
| ★ Xara | Xtreme 3D (graphics) | Jan 06 | 4 |
| XFX | Geforce 7800GTX | Feb 06 | 3 |
| Zalman | FS-C77 Fatal1ty (CPU cooler) | Feb 06 | 3 |
| Zalman | FS-V7 Fatal1ty VGA cooler | Mar 06 | 3 |
| Zen | ZenADSL Home 2000 | Feb 06 | 3 |
| Zicplay | Minikey 256MB FM | Mar 06 | 3 |
| ★ Zoostorm | 5-6401 Family PC | Jan 06 | 5 |
| Zoo Tycoon 2: Endangered Species | | Mar 06 | 3 |

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| 3TY7PW | TravelMate 4650 DVD-RW XP Pro | 937.99 | 754.03 |
| 3M39PW | TravelMate 8101WLMi P-M 730 | 981.00 | 809.35 |
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| 3WHTPW | Amilo L1310G C-M380 512 80 XPH | 587.49 | 499.99 |
| 3SHSPW | Amilo Pro V2045 P 1.73 512 DVDR 15.4 XP | 768.99 | 654.46 |
| 3T1GPW | Amilo Pro V8010 DVD-RW XP Pro | 942.34 | 801.99 |
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| 3S48PW | R50e M360 XPP 256Mb40Gb DVDCD | 510.51 | 434.48 |
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| 3VL0PW | R50e 1.8 512 60 DVD-RW XPHOME | 719.99 | 612.76 |
| 3S78PW | R52 M740 512Mb 40Gb 15"XGA XPP | 736.09 | 626.46 |
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| 3V6GPW | Q30 PM-1.1 512 60 DVD-RW XPP | 1517.50 | 1291.49 |
| 3NG6PW | X50 HWM 760 Pentium M 2.0Ghz | 1517.50 | 1291.49 |
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| 3VSYPW | Satellite Pro M70 1.73 60 512 XPPRO | 818.99 | 697.01 |
| 3V4XPW | Tecra A5 P-M 1.7 XP Pro 512 60 | 846.99 | 720.84 |
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| 3SDXPW | Mac Mini G4/1420 512MB COMBO | 421.26 | 358.52 |
| 3SDWPW | Mac Mini G4/1420 512MB 80GB | 526.99 | 448.50 |
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| 3XH6PW | X103 CEL 2.8 256 80 DVD XPH | 314.00 | 267.23 |
| 3VLHPW | X102 P4 3.06 256 40 DVD XPP | 397.29 | 338.12 |
| 3RKBPW | E300 i865GV,Cel D335 XP PRO | 445.91 | 379.50 |
| | **IBM** | | |
| 3TY9PW | A35 2.8G 256 40 XP | 290.81 | 247.50 |
| 3X2PPW | A35 CelD330 256 40 DVD XPPRO | 320.99 | 273.18 |
| 3S81PW | A51 tower D335 256Mb 80Gb XPP | 357.19 | 303.99 |
| 3S88PW | A51 desktop P4-530 256Mb 80Gb | 463.02 | 394.06 |
| 3X2SPW | A52 P4 3.06 256 80 DVD XPPRO | 536.39 | 456.50 |
| 3TYDPW | A52 P4-3.00 512 80 COMBI XPPRO | 590.99 | 502.97 |
| 3TYFPW | A52 P4-3.00 512 160 DVD XPPRO | 719.99 | 612.76 |
| | **HP** | | |
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| 3NHXPW | Pavilion a1020 AMD Ath3200+ 512/160 XPH | 415.99 | 354.03 |
| 3RN1PW | Pavilion M7140 P4 516 512/160 XPH | 631.00 | 537.02 |
| 3RN0PW | Pavilion w5161 P4 630 1GB/160GB XPH | 859.99 | 731.91 |
| 3NHKPW | Pavilion M7091 P4 550 1GB 400GB XPH | 1193.99 | 1016.16 |
| 3RXHPW | dc7600 CMT P4 521 512/80 XPP | 602.99 | 513.18 |
| 3RXJPW | dc7600 CMT P4 630 512/80 XPP | 628.99 | 535.31 |
| 3RX1PW | dc7600 SFF P4 521 512/40 XPP | 542.99 | 462.12 |
| 3RX4PW | dc7600 SFF P4 521 512/80 XPP | 578.99 | 492.76 |
| 3RX9PW | dc7600 SFF P4 630 512/80 XPP | 615.99 | 524.25 |
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| 3P58PW | dx2000 Cel 325 256/40 XPP | 347.99 | 296.16 |
| 3M5QPW | dx2000 MT P4 3.0 512/80 XPP | 643.99 | 548.08 |
| 3P5CPW | dx2000 P4 2.8Ghz 256/40 XPP | 422.99 | 359.99 |
| 3BKGPW | dx2000M/P2.8A/40bfr/256F/47F | 540.99 | 460.42 |
| 3ND0PW | dc5100 P4 520 256/40 SFF XPP | 467.99 | 398.29 |
| 3ND1PW | dc5100 P4 520 512/80 SFF XPP | 527.99 | 449.35 |
| 3P5GPW | dc5100 P4 530 512/80 SFF XPP | 571.99 | 486.80 |
| 3NCQPW | dc5100 P4 520 256/40 MT XPP | 422.99 | 359.99 |
| 3NCSPW | dc5100 P4 520 512/80 DVD MT XPP | 478.99 | 407.65 |
| 3NCYPW | dc5100 P4 530 512/80 MT XPP | 528.99 | 450.20 |
| 39D0PW | dc7100 P4 520 256mb/40 XPP | 530.99 | 451.91 |
| 39D2PW | dc7100 P4 520 512mb/80 XPP | 522.88 | 445.00 |
| 39D3PW | dc7100 P4 530 512mb/80 XPP | 605.00 | 514.89 |
| 39C7PW | dc7100 P4 530 512mb/80 XPP | 560.48 | 477.00 |
| 39CQPW | dc7100 P4 530 512mb/80 XPP | 628.99 | 535.31 |
| 3GZTPW | dc7100 USDT P4 520 512/40 XPP | 543.99 | 462.97 |
| 3PD4PW | dc7100 USDT P4 530 512/80 XPP | 721.99 | 614.46 |
| 3BSGPW | dc7100 CMT P4-520 | 586.99 | 499.57 |
| 3BSCPW | dc7100 CMT P4-530 | 711.99 | 605.95 |
| 3BLYPW | dc7100 CMT P4-550 | 932.99 | 794.03 |
| 3RXMPW | T5520 VIA 800MHz 128MB 64MB | 212.44 | 180.80 |
| 3P5JPW | T5510 TM5700 800Mhz 128MB | 213.84 | 181.99 |
| 3P5KPW | T5710 TM5700 800MHz 256MB | 301.96 | 256.99 |
| 3Q3BPW | TM5700 1.2GHZ 256MB 256MB | 412.99 | 351.48 |
| | **SONY VAIO** | | |
| 3XVXPW | XL100 | 117 | 00 |
| 3XVTPW | RC202 | 15 | |
| 3XVWPW | VA1 all-in-one | | 00 |
| 3XVQPW | RC204 | 19 | 9.00 |

price drop see website

## SURGE PROTECTION

| quicklinx | BELKIN | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 25M3PW | 4-Outlet Economy Power Strip | 4.58 | 3.90 |
| 2D4CPW | 1-Way SurgeCube | 6.30 | 5.36 |
| 3W42PW | 6Way Strip Surge Protector 2M | 5.88 | 5.00 |
| 25M0PW | 6-Way Economy Surge Protector | 8.05 | 6.85 |
| 2D48PW | 4-Way Home SRS SurgeMaster 2m | 7.64 | 6.50 |
| 3BFXPW | PureAV Home Cinema Surge | 13.42 | 11.42 |
| 2D4JPW | Travel Surge with C8 Connector | 13.43 | 11.43 |
| 2D41PW | 8-Way Max SRS SurgeMaster | 20.59 | 17.52 |
| 2D3WPW | 7-Way Gold SRS SurgeMaster | 27.25 | 23.19 |
| 2C9WPW | 6-Surge Protected Sockets | 16.47 | 14.02 |

## UPS

| quicklinx | BELKIN | £ inc VAT | £ ex VAT |
|---|---|---|---|
| QBWPW | Regulator Gold Series 325VA | 57.60 | 49.02 |
| QBXPW | Regulator Gold Series 425VA | 69.04 | 58.76 |

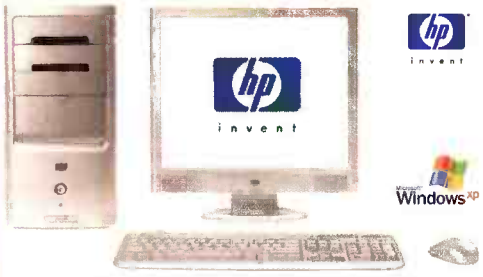
## WinTV HVR 1300

quicklinx 3W22PW Hauppauge!

- TV for your PC on a single slot PCI board
- WinTV2000 application to watch & record TV

only **£89.99** (£76.59 ex VAT)

## PAVILION A1209 CELERON-D 336

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An affordable PC that delivers all-round performance and impressive ease-of-use, all wrapped up in a stylish design. This feature packed desktop PC boasts powerful processors, high-capacity hard drives, top software, the latest security features, Internet and wireless capabilities and great quality digital sound - all at a very attractive price. With extensive digital imaging and digital video features, such as HP Image Zone Plus and new Sonic™ Digital Media Plus software, and DVD technology this PC makes digital entertainment child's play. An elegant PC with matching metallic keyboard, mouse and monitor, to complement any room in the house.

•Intel Celeron-D 336 •256MB Memory •80GB Hard Drive
•DVD+-R/+-RW •Microsoft Windows XP Home

only **£349.99** (£297.87 ex VAT)

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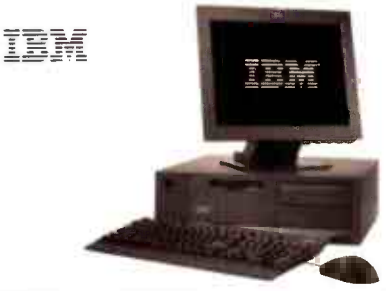


quicklinx 3TY9PW

ThinkCentre desktops make power seem effortless. They feature steel-chassis designs for durability and serviceability and support the latest technology to help keep you ahead of the game.

- Intel Celeron D 2.8GHz
- 256MB Memory
- 40GB Hard Drive
- DVD-ROM
- Microsoft Windows XP Home Edition

Image for illustrative purposes only excludes monitor, keyboard & mouse

•Intel Celeron D 2.8GHz •256MB Memory •40GB Hard Drive
•CD ROM •Windows XP Home Edition

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## XL100 VAIO DESKTOP

quicklinx 3XVXPW

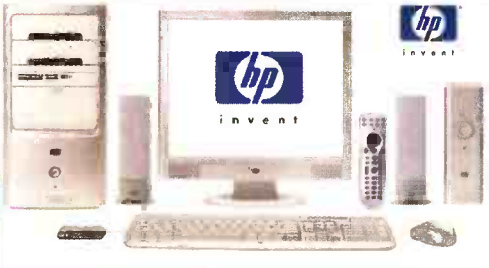
The next stage of home entertainment

The VAIO VGX-XL100 represents the next stage of the home entertainment. Unlike a conventional desktop, it is designed to be used in your living room connected to a TV. To take advantage of a true HD experience, connect the XL100 to an HD-ready TV, as it offers a HDMI™ (High Definition Multimedia Interface) and Component TV outputs. Of course the VAIO XL100 lets you watch both analogue and digital TV with its hybrid turner. The capacious 250GB hard disk means that the VAIO XL100 can act as a video recorder as well, not to mention as a music centre and DVD player!

•430mm device with high HDD capacity
•Super high quality DSD audio & HD video supported by Intel™

only **£1173.82** (£999.00 ex VAT)

## MEDIA CENTER M7281 PC

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Complete digital entertainment – all your media stored in one place, a digital or analogue TV tuner for live TV, optional personal video recorder (PVR), electronic programme guides for schedule information and even an infrared remote control. With two hard disc drives you can store a wealth of digital media – video, music and photographs. More storage is available with the HP Personal Media Drive, which you can dock in the PC's storage spot and then take with you wherever you go.

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The SCENIC Edition X103 is the gateway to professional computing. This PC extends the Fujitsu Siemens Computers' Value Line product portfolio. The basic professional PC is the ultimate balance of valuable performance at very attractive prices. The SCENIC Edition X103 is aimed towards the price-conscious professional buyer. The SCENIC Edition X103 is a reliable professional PC for all office applications.

•Intel Celeron D 2.8GHz •256MB Memory •80GB HDD
•DVD-ROM •Microsoft Windows XP Home

only **£313.99** (£267.23 ex VAT)

## VX924 19" TFT DISPLAY

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ViewSonic's 19" VX924 LCD delivers extreme performance with astounding, industry-leading 4ms video response time for smooth, broadcast-quality, full-motion video.

- 1280 x 1024 resolution
- 550:1 contrast ratio
- 4ms video response time

ViewSonic

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## VE710S 17" TFT DISPLAY

quicklinx 395LPW

The ViewSonic VE710 LCD display not only brings images to life with vivid colour and outstanding realism. Delivering ViewSonic's renowned image quality, it enhances your viewing comfort with high brightness and progressive styling.

- 1280 x 1024 resolution

ViewSonic

only **£185.03** (£157.48 ex VAT)

## SYNCMASTER 730B 17" TFT LCD

quicklinx 3THBPW

If only every decision in your workday was this easy. The Samsung 730B Series 17" LCD monitor is just what your need to make your text sharper, your pictures brighter, your day just a little easier. Exclusive MagicBright and MagicTune technologies give you brilliant, easily adjustable colour

SAMSUNG

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## PROLITE H481S-B 19" TFT DISPLAY

quicklinx 3R68PW

The Prolite H481S-B has a native resolution of 1280 x 1024 and accompanying the ultra fast response time of 8msec is a contrast ratio of 700: 1 and a brightness measurement of 300cd/m. The height of the display can be adjusted through 110mm and the screen itself rotates for a landscape or portrait-viewing mode.

iiyama

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## SDM-S95DS 19" TFT DISPLAY

SONY

ULTIMATE STYLE

quicklinx 3QYSPW

The Sony SDM-S95DS is designed for human performance. Sony StylePro LCD's are thoughtfully designed to optimize comfort and enhance productivity with the ErgoStand design including digital and analog input. These latest displays are customized to meet the demands of today's demanding users-all while remaining true to the Sony tradition of renowned quality, reliability and style.

- 250 cd/m2 image brightness
- Digital (DVI-D) and analog (HD15)
- Mac and Windows PC compatible

•1280 x 1024 resolution •700:1 contrast ratio
•170° viewing angle •Anti-glare / protective coating

only **£299.61** (£254.99 ex VAT)

## SYNCMASTER 740N 17" LCD SILVER

quicklinx 3TJCPW

The Samsung SyncMaster 740n is a 17-inch analog TFT-LCD delivering a 600:1 contrast ratio, 300cd/m2 brightness, 1280 x 1024 resolution, 160/160 degree viewing angle and scanning frequency of 30-81 kHz horizontal and 56-75 Hz vertical with a fast response time of 8ms.

SAMSUNG

only **£206.67** (£157.89 ex VAT)

## SYNCMASTER 913N 19" TFT LCD

quicklinx 3L8RPW

Sleek and minimalist, the dynamic lines and slim frame of Samsungs monitors bring you adaptable and versatile working, while fast response times and high contrast ratios deliver staggering image quality.

- 1280 x 1024 resolution
- 700:1 contrast ratio

SAMSUNG

only **£192.70** (£164.00 ex VAT)

## SM913V 19" TFT SILVER/BLACK

quicklinx 3PRWPW

This 19" TFT delivers a 1280 x 1024 resolution and 600: 1 contrast ratio for razor-sharp text and brilliant colours. Its patented PVA technology allows for a full 170° viewing angle. The display offers VESA wall mount compatibility, and MagicBright and MagicTune come standard for truly optimized viewing.

SAMSUNG

only **£183.00** (£156.00 ex VAT)

## L1715SS 17" TFT DISPLAY

quicklinx 3XQGPW

The perfect choice for home or small office users

- 1280 x 1024 resolution
- 12ms response time
- 550:1 contrast ratio
- 160 degree horizontal / 140 degree vertical viewing angle
- 3 year warranty

LG

only **£161.56** (£137.50 ex VAT)

## LCD DISPLAYS

| quicklinx | ACER | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3PL3PW | AL1922R 19"Multimedia TFT LCD | 272.98 | 232.33 |
| 3SXBPW | AL2021ms 20" TFT silver/black | 430.99 | 366.80 |
| 3TX7PW | 17"Acer AL1716S 8ms LCD TFT | 148.05 | 126.00 |
| | **AG NEOVO** | | |
| 3JD0PW | F417 17" TFT Display Black | 148.03 | 125.99 |
| 3K9BPW | E17-A 17" TFT Panel Black | 179.77 | 153.00 |
| 3R6GPW | M17S 17" TFT Display Silver | 199.38 | 169.69 |
| 3JWZPW | F419 19" TFT Display Black DVI | 182.12 | 155.00 |
| | **BENQ** | | |
| 3Q6SPW | 17" TFT Silver/Black 5ms | 232.81 | 198.14 |
| 3KTQPW | FP71E+ 17" TFT Display 8ms | 195.39 | 166.29 |
| 3Q6TPW | FP72V 17" TFT white 25ms DVI | 269.99 | 229.78 |
| 3Q6WPW | FP91V+ 19" TFT Silver/Black6ms | 295.99 | 251.91 |
| | **DABSVALUE** | | |
| 3KK2PW | 19" TFT LCD 1280x1024 | 204.99 | 174.46 |
| 3XQHPW | 15" LCD | 115.00 | 97.87 |
| 3WPBPW | 17" LCD | 144.00 | 122.55 |
| 3XRMPW | 19" LCD | 175.99 | 149.78 |
| 3L4VPW | 20" LCD | 359.98 | 306.37 |
| | **IIYAMA** | | |
| 2V98PW | ProLite H380 15in Ivory | 199.69 | 170.18 |
| 3R66PW | 17" TFT Prolite E431S Silver | 205.61 | 174.99 |
| 3R73PW | Prolite H431S-W 17" TFT WHITE | 237.58 | 202.20 |
| 3T7YPW | ProLite 17" Iiyama Prolite X436S | 235.00 | 200.00 |
| 3THWPW | 21.3"Prolite PLH2130 LCD TFT | 958.98 | 816.16 |
| 3T17PW | 17" Sliver TN Wide Angle LCD | 239.68 | 203.99 |
| 3Q7QPW | 19" TFT E481S-B ProLite Black | 287.99 | 245.10 |
| 3RGYPW | ProLite Graphic Pro 20" TFT Black DVI | 721.99 | 614.46 |
| 3R68PW | 19" TFT Prolite H481S-B | 308.98 | 262.97 |
| 3R67PW | 19" Prolite H481S dvi-d | 317.23 | 269.99 |
| | **LG** | | |
| 36GYPW | L1715S 17" TFT Display Silver | 157.45 | 134.00 |
| 3XQGPW | L1715SS 17" Slim Silver TFT | 178.23 | 151.69 |
| 3R7FPW | L1915S 19" TFT 12ms | 187.98 | 159.99 |
| | **PHILIPS** | | |
| 3VC9PW | 17" Philips 8ms Silver DVI TFT | 192.95 | 164.22 |
| 3Q0NPW | PHILIPS 17" TFT Black 12ms | 179.46 | 152.74 |
| 3VCGPW | 17"Philips 8ms Ivory DVI TFT | 236.09 | 200.93 |
| 3R7GPW | 19" Philips Silver LCD TFT | 399.00 | 339.58 |
| | **RELISYS** | | |
| 2CPFPW | TL565b 15" TFT Monitor Black | 146.87 | 125.00 |
| 2DQPPW | TL766B 17" TFT in Black | 152.73 | 129.99 |
| 2BGPPW | TL766 17" TFT Monitor | 152.73 | 129.99 |
| 3PVHPW | 17" Multimedia TFT Silver | 202.22 | 172.11 |
| | **SAMSUNG** | | |
| 3V2RPW | SM540N 15" 16ms Narrow Bezel | 152.75 | 130.00 |
| 3PRWPW | SM913V 19" Analogue LCD TFT | 183.30 | 156.00 |
| 3TJBPW | SM710N17" Analogue LCD TFT | 170.49 | 145.01 |
| 3L8RPW | SM913N19" Height Adjust | 192.70 | 164.00 |
| 3TJCPW | SM740N17" Height Adjust | 206.67 | 175.89 |
| 3THBPW | SM730BF17" 4ms Display TFT | 214.23 | 182.33 |
| 3PRXPW | SM913N 19" TFT Display | 227.79 | 193.82 |
| 3TJDPW | SM740B 17" Digital LCD TFT | 211.56 | 180.05 |
| 3THCPW | SM930BF19" 4ms Display TFT | 249.99 | 212.76 |
| 3VBJPW | SM204T 20" Daul Input TFT | 431.99 | 367.65 |
| 3TJJPW | SM214T21" Digi AngPiv Sliver | 626.99 | 533.61 |
| | **SONY** | | |
| 3QYKPW | SDM-S75AS 17" TFT SXGA Silver | 170.37 | 145.00 |
| 3MSZPW | SDM-HS75B 17" black | 203.50 | 185.00 |
| 3MT0PW | SDM-HS75S 17" Silver | 196.22 | 167.00 |
| 3QYPPW | SDM-S75DB 17" TFT DVD-D Black | 222.07 | 189.00 |
| 3QYQPW | SDM-S75DS 17" TFT DVI-D Silver | 224.29 | 190.89 |
| 3QYYPW | SDM-X75KS 17" TFT DVI-D Silver | 267.90 | 228.00 |
| 3QYZPW | SDM-X75KB 17" TFT DVI-D Black | 238.52 | 203.63 |
| 3MT5PW | SDM-HS95/S 19" Silver | 264.38 | 225.00 |
| 3MT3PW | SDM-HS75PS 17" Silver | 279.99 | 238.29 |
| 3QYNPW | SDM-S95AS 19" TFT SXGA Silver | 268.99 | 228.93 |
| 3MT1PW | SDM-HS75PB 17" Black | 246.73 | 209.99 |
| 3MT4PW | SDM-HS95B 19" Black | 242.00 | 220.00 |
| 3QYSPW | SDM-S95DS 19" TFT DVI-D Silver | 299.61 | 254.99 |
| 3QZ0PW | SDM-X95KS 19" TFT DVI-D Silver | 369.99 | 314.89 |
| 3QZ1PW | SDM-X95KB 19" TFT DVI-D Black | 369.99 | 314.89 |
| 3G7FPW | SDM-HX93B 19" TFT Display | 408.99 | 348.08 |
| 394TPW | SDM-P234B 23" Widescreen TFT | 1150.37 | 979.04 |
| | **VIEWSONIC** | | |
| 395LPW | VE710S 17" TFT Display | 185.04 | 157.48 |
| 395MPW | VE710B 17" TFT Display | 187.54 | 159.61 |
| 3652PW | VX715 17" TN + Film Silv/Blk#U | 199.88 | 170.11 |
| 3KWVPW | VG712S 17" TFT Display Silver | 224.35 | 190.94 |
| 3MR6PW | VP171S-2 17" TFT Display 8ms | 217.55 | 185.15 |
| 3MR7PW | VP171B-2 17" TFT Display 8ms | 233.83 | 199.00 |

## HANDHELDS

| quicklinx | HP | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 380JPW | iPAQ rz1710 Handheld PDA | 164.51 | 140.01 |
| 3VB8PW | iPAQ rx1950 | 205.61 | 174.99 |
| 3VB9PW | iPAQ hw2190 | 249.14 | 212.03 |
| 380KPW | iPAQ rx3715 | 257.74 | 219.35 |
| 3VBBPW | iPAQ hw2490 | 291.99 | 248.50 |
| 3QYDPW | iPAQ rz1710 Navigator | 318.99 | 271.48 |
| 380LPW | iPAQ 4700 | 337.23 | 287.00 |
| 3VD5PW | iPAQ hw2790 | 353.99 | 301.27 |
| 380MPW | iPAQ h6340 | 366.99 | 312.33 |
| 3PFHPW | iPAQ hw6510 | 421.83 | 359.00 |
| 3NWDPW | iPAQ hw6515 | 422.99 | 359.99 |
| | **HP IPAQ ACCESSORIES** | | |
| 2R7FPW | Charger Adaptor (Barrel) | 15.99 | 13.61 |
| 3HWJPW | iPAQ Stylus 3 pack | 18.57 | 15.80 |
| 3HHYPW | Universal Stylus Kit | 18.79 | 15.99 |
| 2R71PW | Slimline Nylon Case | 19.99 | 17.01 |
| 34XHPW | Expandable Nylon Case | 19.99 | 17.01 |
| 2R7SPW | Stylus 3-Pack iPAQ h2210 | 24.99 | 21.27 |
| 2R70PW | Zipped Leather Case | 26.99 | 22.97 |
| 2R72PW | Slimline Leather Holster Case | 26.99 | 22.97 |
| 2R7LPW | Auto Adapter | 27.99 | 23.82 |
| 3J5JPW | Leather Flip Case | 27.99 | 23.82 |
| 3K4FPW | iPAQ Thumb Keyboard | 33.99 | 28.93 |
| 2R7MPW | SD Card - 128MB | 34.99 | 29.78 |
| 2R6VPW | Expansion Pack CF Card | 35.99 | 30.63 |
| 2R73PW | 3 Pack Screen Protectors | 35.99 | 30.63 |
| 2R7KPW | h1900 series battery 900mAh | 38.99 | 33.18 |
| 2R74PW | Removable Battery 920mAh | 39.99 | 34.03 |
| 3K4HPW | AC Adapter 4 Head Kit | 41.00 | 34.89 |
| 2R7TPW | USB/Serial Desktop Cradle | 41.99 | 35.74 |
| 2R7XPW | USB Desktop Cradle | 41.99 | 35.74 |
| 2R6ZPW | Premier Leather Case | 43.99 | 37.44 |
| 2R7CPW | Battery Charger for Rem Batt | 43.99 | 37.44 |
| 2R70PW | Slim keyboard h5000/3900 serie | 47.99 | 40.84 |
| 3FVWPW | Cradle Kit | 47.99 | 40.84 |
| 3HWKPW | USB Desktop Cradle | 52.99 | 45.10 |
| 2R7GPW | h5000 series slim battery | 60.99 | 51.91 |
| 3K4QPW | Bluetooth Stereo Headphones | 60.99 | 51.91 |
| 3KB5PW | h6300 series standard battery | 62.99 | 53.61 |
| 2R75PW | Removable Battery 1800mAh | 67.99 | 57.86 |
| 2R6SPW | CF Card Expansion Pack Plus | 70.99 | 60.42 |
| 2R7NPW | SD Card - 256MB | 74.99 | 63.82 |
| 2R7PPW | Foldable Keyboard (UK) | 75.99 | 64.67 |
| 32YRPW | Ipaq Rugged Case For all IPAQS | 75.99 | 64.67 |
| 2R7HPW | h5000 series extended battery | 76.99 | 65.52 |
| 3K19PW | iPAQ Bluetooth Folding Keyboar | 82.99 | 70.63 |
| 365JPW | 56K CF Modem | 95.99 | 81.69 |
| 2R6PPW | PC Card Expansion Pack Plus | 108.99 | 92.76 |
| 3KBFPW | hx4700 extended battery | 122.99 | 104.67 |
| 2R6WPW | Expansion Pack with Dual PC | 133.99 | 114.03 |
| 3HWHPW | 1GB SD Memory Card | 347.80 | 296.00 |
| | **PALM** | | |
| 3VDNPW | Zire 22 | 76.33 | 64.97 |
| 34W9PW | Zire 31 | 79.99 | 68.08 |
| 3NH2PW | Tungsten E2 | 136.30 | 116.00 |
| 3FXWPW | Tungsten T5 | 193.86 | 164.99 |
| 3VDSPW | Palm TX | 211.64 | 180.12 |
| 3PPFPW | LifeDrive - Mobile Manager | 305.99 | 260.42 |
| 3M9MPW | Treo 650 | 399.99 | 340.42 |
| | **PALM ACCESSORIES** | | |
| 3H9YPW | Travel Cable | 7.40 | 6.30 |
| 27WHPW | Zire Stylus 3-Pack | 5.99 | 5.10 |
| 3H9XPW | Stylus Pack for Tungsten E/T5 | 10.01 | 8.52 |
| 3HB0PW | Vehicle Power Charger | 10.37 | 8.83 |
| 3542PW | Slim Leather Case | 13.46 | 11.46 |
| 31FLPW | Mobility Kit | 14.88 | 12.67 |
| 3H9ZPW | Travel Charger | 15.87 | 13.51 |
| 3F3MPW | Car Charger 5.2v for Treo 600 | 17.40 | 14.81 |
| 3F3TPW | USB Docking Cradle | 17.40 | 14.81 |
| 3F3NPW | International AC Charger | 20.57 | 17.51 |
| 3H9QPW | Tungsten T5 Hard Carry Case | 21.37 | 18.19 |
| 373QPW | 64MB Expansion Card | 23.58 | 20.07 |
| 30N2PW | 128MB Expansion Card | 34.76 | 29.59 |
| 3HB2PW | Wireless Keyboard | 41.66 | 35.46 |
| 3543PW | 256mb Expansion Card | 44.13 | 37.56 |
| 38HYPW | Power To Go Charging Pack | 47.76 | 40.65 |
| 3H9RPW | 512MB Expansion Card | 69.32 | 59.00 |
| 3FXXPW | WiFi Card | 77.10 | 65.62 |
| | **FUJITSU SIEMENS** | | |
| 37T0PW | Pocket Loox 420 | 260.99 | 222.12 |
| 3FF9PW | Pocket Loox 710 | 326.99 | 278.29 |
| 3FFBPW | Pocket Loox 720 | 329.99 | 280.85 |

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| quicklinx | NAVMAN | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 32RJPW | GPS4460 Palm Bluetooth Receiver | 208.39 | 177.91 |
| 3VMJPW | Navman ICN 635 GPS V3 UK Maps | 299.98 | 255.31 |
| | **ROAD ANGEL** | | |
| 3KXWPW | Road Angel - Blackspot and Camera Alert | 399.99 | 288.51 |
| | **SONY** | | |
| 3XWTPW | NV-U50 Nav-U Navigation | 292.57 | 249.00 |
| | **TOM TOM** | | |
| 34PZPW | Navigator GPS Kit for Palm T3 | 200.15 | 170.34 |
| 34PYPW | Navigator BT GPS Kit for Palm T3 | 239.11 | 202.37 |
| 3MY5PW | GO 300 | 363.90 | 300.42 |
| 3MY6PW | GO 500 | 450.03 | 369.00 |
| 3MY7PW | GO 700 | 527.58 | 399.00 |

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The sleek and stylish HP iPAQ rx1950 Pocket PC offers a range of simple-to-use features, popular applications and multimedia options meaning you can stay organised, entertained and in-touch.

Featuring the latest Microsoft® Windows Mobile™ 5.0 software this Pocket PC allows users to manage information, contacts, messages, photos and music wherever they go. With Integrated Wi-Fi for access to the Internet, e-mail, and news – stay connected to your world.

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- GPS Navigation powered by TomTom for turn-by-turn, visual and spoken directions
- Integrated keyboard, making it easier to type e-mail, notes and instant messages at anytime

•Intel PXA270 Processor 312MHz •128MB •1.3mp camera
•Bluetooth, GSM, GPRS, Infra Red •Windows 2003 2nd Edition

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## IPAQ HW2190 POCKET PC

quicklinx 3VB9PW

Features Data encryption from HP ProtectTools providing enhanced protection for both data and device. VPN software delivers added security for wireless connection when accessing information remotely. Bluetooth enabled allow's for file sharing and printing between personal devices.

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## ZIRE 22 HANDHELD

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Palm puts the pleasure in staying organised with the Palm ® Z 22 handheld: an incredibly easy-to-use personal organiser. Featuring a bright colour display, it gives you easy access to your calendar, contacts and photos. You can make changes and add new records by writing on the screen.

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## TX HANDHELD

quicklinx 3VDSPW

If you've been looking for an affordable handheld with total wireless connectivity, then the Palm® T|X handheld is what you've been waiting for. Use the built-in Wi-Fi and Bluetooth® technologies to check email, browse the web and access files on a network 1. Web pages, PowerPoint® presentations, Word documents and Excel spreadsheets come to life on the large, stunning colour display that rotates from portrait to landscape.

It's perfectly compatible with Microsoft® Outlook® 2. Not surprisingly, the Palm T|X handheld is easy on the eyes, too. The sleek design is anything but business as usual.

•Built-in Wi-Fi and Bluetooth® technologies
•128MB non-volatile, flash memory (100MB storage capacity)

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NEW

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Based on the award-winning iCN 630, the Navman iCN 635 is a first-class Drive-Away navigation system delivering awesome performance and functionality. This intuitive in-car GPS solution boasts the very latest Navman SmartST V3 navigation software, giving you masses of features and boasts an awesome 3.8-inch TFT screen delivering a highly detailed 3D map view. It also gives you clear turn-by-turn voice guidance, Back-On-Track rerouting, postcode search and the very latest map data from TeleAtlas. You also have a huge fully customizable Points-of-interest database. The new 'Active POIs' feature allows you to set an alarm to tell you when a particular POI is approaching.

•The latest fully featured SmartST V3 navigation software
•Highlty detailed 3D maps displyed on awesome 3.8" TFT

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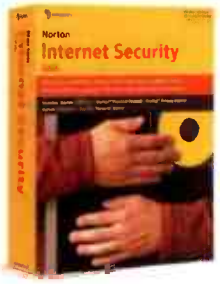


symantec.

NEW

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Norton Internet Security 2006 provides essential protection from viruses, hackers, and privacy threats. Norton AntiVirus is the world's most trusted antivirus solution. Norton Personal Firewall keeps personal data in and hackers out.

- Allows you to travel the Internet with confidence
- Includes: Norton AntiVirus™*, Norton™ Personal Firewall, Norton™ Privacy Control, Norton AntiSpam™, & Norton™ Parental Control
- Protects you from hackers, viruses, and spyware
- Filters out phishing email and spam
- For Windows XP/2000 only

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Microsoft

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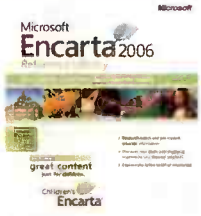


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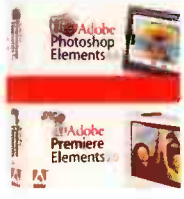


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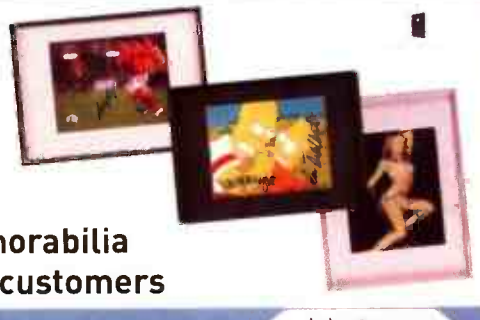

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| 2Z5QPW | Adobe FrameMaker 7 | 784.99 | 668.08 |
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| 3FS4PW | Adobe Photoshop Elements 3 | 67.55 | 57.49 |
| 33FBPW | Adobe Premiere Pro 1.5 | 535.99 | 456.16 |
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| 3DX2PW | Microsoft Works 8 | 32.39 | 27.57 |
| 3FJ3PW | Microsoft Works Suite 2005 inc Word | 70.50 | 60.00 |
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| 393ZPW | Autodesk AutoSketch V9 VU | 85.13 | 72.45 |
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| 2RZ0PW | Microsoft Office 2003 Small Business VU | 203.26 | 172.99 |
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| 39HJPW | Microsoft Windows XP Pro VU SP2 | 152.74 | 129.99 |
| 3F8YPW | Norton Internet Security 2005 VU | 28.20 | 24.00 |
| 3GRHPW | Pinnacle Studio 9 Plus Version Upgrade | 36.04 | 30.67 |
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| 37CKPW | WinZip 9 | 33.69 | 28.67 |
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| 308KPW | Pinnacle Studio 9 | 23.50 | 20.00 |
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| 3P72PW | Ulead Video Studio 8 | 36.35 | 30.94 |
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| 3SLMPW | PIXMA IP6210D | 83.66 | 71.20 |
| 3SLKPW | PIXMA iP5200 | 128.08 | 99.00 |
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| 3811PW | Deskjet 5740 | 63.45 | 54.00 |
| 3L1PPW | Deskjet 6620 | 96.54 | 82.16 |
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| 34WKPW | FS-1920 | 394.99 | 336.16 |
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| 3KZPPW | Perfection 4990 Photo | 312.98 | 266.37 |
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| 3RSCPW | Scanjet 3800 | 55.23 | 47.00 |
| 3RSFPW | Scanjet 4370 | 61.10 | 52.00 |
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| 3JXDPW | ScanJet 4670vp | 137.31 | 116.86 |
| 3SG7PW | Scanjet 4890 | 164.50 | 140.00 |
| 2R84PW | ScanJet 5530C | 175.08 | 149.00 |
| 34QLPW | ScanJet 5590 | 276.99 | 235.74 |
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| 3VRTPW | PIXMA MP500 | 158.82 | 135.17 |
| 3HBQPW | PIXMA MP780 | 204.99 | 174.46 |
| 3TR8PW | MF5750 | 217.80 | 185.36 |
| 3VZLPW | PIXMA MP800 | 228.14 | 194.16 |
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| 3SN7PW | Stylus DX4800 | 86.55 | 73.66 |
| 3V3FPW | Stylus Photo RX-520 | 114.99 | 97.86 |
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| 34QQPW | Officejet 4215 | 76.38 | 65.00 |
| 3SD9PW | PSC 1510 | 78.61 | 66.90 |
| 3L2QPW | PSC 1610 | 89.99 | 76.59 |
| 34QRPW | OfficeJet 4255 | 92.79 | 78.97 |
| 3SBCPW | Photosmart 2575 | 119.63 | 140.57 |
| 39BSPW | PSC 2355 | 119.99 | 102.12 |
| 3SBDPW | Officejet 5610 | 123.36 | 104.99 |
| 3L1NPW | Officejet 6210 | 135.13 | 115.00 |
| 3SB5PW | Photosmart 3210 | 198.58 | 169.00 |
| 3M4TPW | Officejet 7210 | 211.50 | 180.00 |
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## SELPHY CP510 PHOTO PRINTER

quicklinx 3WPXPW

The Compact Photo Printer SELPHY CP510 will change everything you thought you knew about Canon photo printers. It's so incredibly fast and surprisingly affordable! Plus, you can print directly from Bluetooth camera phones, PictBridge digital cameras and more - all without a computer. It's simply amazing.

- Accepts popular memory cards**
- LCD image selection
- 100 year** durable photos
- Protective glossy coat
- Fast borderless prints • Ideal digital camera partner

•PictBridge compatible, no PC required •Stylish and compact
•Mac and Windows support •Optional battery

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quicklinx 3RFDPW

Get professional quality photos at breathtaking speeds with the world's fastest photo printer. Enjoy efficient printing with 6 individual HP Vivera ink tanks linking into a unique HP ink recirculation system for maximum pages per cartridge. The HP Photosmart 8250 Photo Printer is designed for home users wanting to produce professional-quality photos at lightningfast speeds, with the efficiency provided by an ink recirculation system that maximises use of the 6 separate cartridges.

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A compact and stylish premium quality photo printer, the Epson Stylus Photo R220 provides home users with a cost-effective solution that will print photographs up to A4 and also personalize printable CDs and DVDs.

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•5760x1440 dpi •Produces brighter, sharper and more vivid photos than those from the photo lab •Epson Creativity Suite

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## DX4800 ALL-IN-ONE

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The Stylus DX4800 Series is ideal for a busy home office or where higher volumes of general-purpose printing are required. Memory card slots and PictBridge compatibility have also been added for the benefit of the digital camera user. The Stylus DX4800 Series can do it all.

only **£86.53** (£73.66 ex VAT)

## PHOTOSMART 2575 ALL-IN-ONE

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It's easy to print and share photos and documents with the versatile HP Photosmart 2575 All-in-One. Use built-in networking to share print, copy and scan functions and access to memory cards with multiple computers on a home network.

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Next generation, high speed, high quality photo printer with advanced media handling.

- Superior print quality; maximum 9600* x 2400dpi
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- 4" x 6" borderless photo in approx. 51 seconds

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Paste photos of family in an album, keep baby's photos in wallet, send a letter with instant photo and share it with your friends. Get the Samsung SPP-2040 Digital Photo Printer to take and enjoy all your digital images without limits.

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•7.1 Megapixels •3x optical zoom •2.5" LCD display
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SONY

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Sony Cyber-shot DSC-T7 features 5.1 Megapixel image capture, a Carl Zeiss Vario-Tessar lens with 3X optical zoom and 5 area multi-point auto focus, all in a camera body only 5/8 of an inch thick. It even includes a full-sized 2.5" hybrid LCD monitor1 with a Clear Photo technology for improved viewing in bright sunlight. The T7's ultra-compact design doesn't compromise its performance thanks to Sony's Real Imaging Processor LSI, 14-Bit DXP A/D conversion processor, and multi-pattern measuring. All three combine to provides fast start-up times, fast shutter speeds, and accurate exposures for excellent digital photographs everytime.

•5.1 Megapixels •3X optical zoom •2.5" hybrid LCD monitor
•5 area multi-point auto focus •Carl Zeiss Vario-Tessa lens

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## PHOTOSMART R817

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Ideal for capturing action in the distance or in the same room.

- 5.1 Megapixels
- 5 x Optical Zoom
- 8 x Digital Zoom
- 2" LCD

hp invent

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## EXILIM PRO EX-Z750

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This amazingly compact camera combines style with performance. This EXILIM ZOOM model features innovative functions and adjustable manual settings to keep even ambitious photographers happy.

- 7.2 megapixel CCD sensor
- ultra-slim 3x optical zoom
- arge 2.5" LCD screen

CASIO

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## E900 ZOOM 9.24MP

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Some people want to carry serious photographic ability without the bulk. The FinePix E900 Zoom was developed for such people.

- 4x optical zoom
- 9.24 million pixels
- Flash memory XD-Picture Card

FUJIFILM

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## FINEPIX S9500 ZOOM

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Fujifilm FinePix S9500 Zoom is a new model that marks the point where compact digital cameras and digital SLRs meet. Aimed at amateur and enthusiast photographers.

- 10.7x optical zoom
- 9.0 million pixels
- 1.8" LCD display

FUJIFILM

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quicklinx 3RG8PW

Memories are meant to be shared.

- 4.0 MP for amazing quality prints up to 20 x 30" (50 x 75 cm)
- 3x optical zoom
- 5x digital zoom
- 13 scene modes
- Multi-zone auto-focus

Kodak

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## DIMAGE Z6 BLACK DIGITAL CAMERA

quicklinx 3XCPPW

The DiMAGE Z6 has everything photographers need to take high-quality pictures.

- 6.0 million pixels
- 12x optical zoom
- 4x digital zoom
- 2.0" LCD display

KONICA MINOLTA

only **£252.62** (£215.00 ex VAT)

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| 3T0HPW | Canon Powershot A610 | 196.41 | 167.16 |
| 3T0JPW | Canon Powershot A410 | 99.99 | 85.10 |
| 3LSSPW | Powershot A520 | 145.00 | 123.40 |
| 3T0FPW | Ixus i Zoom - Ultra Violet | 222.99 | 189.78 |
| 3T09PW | Ixus i Zoom JET (Black) | 200.00 | 170.21 |
| 3T0BPW | Ixus iZoom Sahara (Gold) | 222.99 | 189.78 |
| 3T07PW | Ixus i Zoom Cranberry | 200.00 | 170.21 |
| 3SZKPW | Canon Ixus 55 5mp 3x oz | 238.84 | 203.27 |
| 3MHYPW | EOS 350D Digital SLR Lens Kit | 599.99 | 510.63 |
| 3GKHPW | Ixus 40 4MP 3x OZ | 181.08 | 154.11 |
| 3FDPPW | EOS 20D 8MP DSLR Body Only | 1010.50 | 860.00 |
| 3F4VPW | Powershot S70 7MP 3.6x OZ 32Mb | 257.33 | 219.00 |
| 3T0GPW | Canon Powershot A620 | 224.58 | 191.13 |
| 3T0KPW | Canon Powershot S80 | 351.33 | 299.00 |
| | **FUJI** | | |
| 3TC8PW | Fuji FinePix S9500 | 375.00 | 319.15 |
| 3TC9PW | Fuji FinePix S5600 | 220.00 | 187.23 |
| 3N6QPW | Fuji FinePix F10 | 200.00 | 170.21 |
| 3N4VPW | Fuji Finepix A345 Zoom | 99.99 | 85.10 |
| 3QX2PW | Fuji Finepix Z1 Silver | 190.00 | 161.70 |
| | **HP** | | |
| 3N1CPW | Photosmart M22 | 79.99 | 68.08 |
| 3RFFPW | Photosmart R817 | 190.00 | 161.70 |
| 3S0YPW | Photosmart R717 | 150.00 | 127.66 |
| | **OLYMPUS** | | |
| 3Q54PW | C-180 5.1MP 4xDIG ZOOM | 97.41 | 82.90 |
| 3ML8PW | Mju Mini S Blue 5MP 2xOZ | 149.87 | 127.55 |
| 3Q81PW | Mju 800 Digital camera Silver | 282.99 | 240.84 |
| 3R8YPW | Mju 800 Digital camera Blue | 282.99 | 240.84 |
| 3H2TPW | Mju Mini - Silver 4MP 2x OZ | 132.72 | 112.95 |
| 3T3RPW | Olympus SP-350 | 248.75 | 211.70 |
| 3T3QPW | Olympus SP-500 | 248.75 | 211.70 |
| 3T3PPW | Olympus FE-110 | 124.20 | 105.70 |
| 3T3NPW | Olympus FE-100 | 99.39 | 84.59 |
| 3T3MPW | Olympus Mju 600 -Navy Blue | 185.47 | 157.85 |
| 3T3LPW | Olympus Mju 600 - Silver | 185.47 | 157.85 |
| 3KNNPW | E-300 Digital SLR Camera Kit | 562.83 | 479.00 |
| | **PENTAX** | | |
| 3QZCPW | Optio S5z | 203.69 | 173.35 |
| 3QZDPW | Optio S55 | 158.63 | 135.00 |
| 3QZBPW | Optio SVi | 207.29 | 176.42 |
| 3QZFPW | IST DS SLR + 18-55mm DA Silver | 485.99 | 413.61 |
| 3W3XPW | Optio S60 | 180.54 | 153.65 |
| 3W3WPW | Optio S6 | 227.79 | 193.86 |
| 3VK9PW | Optio WPi | 210.00 | 178.72 |
| | **SONY** | | |
| 3MF0PW | DSC-W5S Cyber-shot 5.1 MP | 182.12 | 155.00 |
| 3MF3PW | DSC-W17 Cyber-shot 7.2 MP | 236.17 | 201.00 |
| 3L5JPW | DSC-P200S Cyber-shot 7.2MP | 229.12 | 195.00 |
| 3N2NPW | DSC-S40 Cyber-shot 4.1MP | 119.85 | 102.00 |
| 3PS7PW | DSC-T7S Cyber-shot 5.1 MP | 269.07 | 229.00 |
| 3NLLPW | DSC-S90 Cyber-shot 4.1 MP | 153.92 | 131.00 |
| 3MF2PW | DSC-W7S Cyber-shot 7.2 MP | 234.90 | 199.92 |
| 3MF1PW | DSC-W15 Cyber-shot 5.1 MP | 199.99 | 170.21 |

## DIGITAL CAMCORDERS

| quicklinx | CANON | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3F7MPW | MVX35i Digital Camcorder | 599.99 | 510.63 |
| 3LHQPW | MV800 | 198.42 | 168.87 |
| 3F7LPW | MVX30i | 569.99 | 485.10 |
| 3N7KPW | MVX45i Digital Video Camcorder | 601.99 | 512.33 |
| 3LHVPW | MVX330i | 389.95 | 331.87 |
| 3VGXPW | NEW DIGITAL CAMCORDER MVX4I | 690.00 | 587.23 |
| 3NN5PW | MVX20i | 526.99 | 448.50 |
| 3N7JPW | MVX40 Digital Video Camcorder | 456.17 | 388.23 |
| 3MP4PW | MV880X Digital Video Camcorder | 335.99 | 285.95 |
| 3LHWPW | MVX350i | 441.46 | 375.71 |
| 3LHTPW | MVX300 | 370.99 | 315.74 |
| 3LHSPW | MV850i | 315.99 | 268.93 |
| 3LHRPW | MV830i | 670.51 | 236.59 |
| | **SONY** | | |
| 3L7SPW | DCR-HC90E Handycam Mini DV | 539.32 | 459.00 |
| 3L6WPW | DCR-TRV480E Handycam Digital | 292.57 | 249.00 |
| 3N45PW | DCR-DVD7E DVD Handycam | 417.12 | 355.00 |
| 3L7XPW | DCR-PC1000E Handycam Mini DV | 656.82 | 559.00 |
| 3L7WPW | DCR-PC55ES Handycam Mini DV | 419.47 | 357.00 |
| 3L6SPW | DCR-TRV270E Handycam Digital | 199.39 | 169.70 |
| 3KKVPW | HDR-FX1E High Definition | 2079.75 | 1770.00 |
| 3L7GPW | DCR-HC39E Handycam Mini DV | 358.37 | 305.00 |
| 3L6ZPW | DCR-HC22E Handycam Mini DV | 299.62 | 255.00 |
| 3N43PW | DCR-DVD203E DVD Handycam | 499.99 | 425.53 |
| 3L6VPW | DCR-TRV285E Handycam Digital | 256.99 | 218.72 |
| 32VSPW | DCR-VX2100E MiniDV Handycam | 2078.57 | 1769.00 |
| 3TQPPW | HDR-HC1E High Definition Han | 1157.98 | 985.52 |
| 3N46PW | DCR-DVD92E DVD Handycam | 386.57 | 329.00 |

## 1GB MEMORY STICK PRO DUO

quicklinx 3SZ1PW

SONY

- 1GB flash memory card for Sony Cyber-shot

LOW PRICE

only **£59.99** (£51.06 ex VAT)

## DIGITAL AUDIO PLAYERS

| quicklinx | APPLE | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3L72PW | iPod shuffle 512MB | 69.00 | 58.73 |
| 3L74PW | iPod shuffle 1GB | 86.95 | 74.00 |
| 3TBBPW | iPod Nano 2Gb - White | 135.00 | 114.90 |
| 3TBCPW | iPod Nano 2Gb - Black | 135.00 | 114.90 |
| 3TBGPW | iPod Nano 4Gb - White | 169.99 | 144.68 |
| 3TBHPW | iPod Nano 4Gb - Black | 169.99 | 144.68 |
| 3VFDPW | iPod Video 30Gb - White | 215.00 | 182.98 |
| 3VFCPW | iPod Video 30Gb - Black | 215.00 | 182.98 |
| 3VFGPW | iPod Video 60Gb - White | 285.00 | 242.56 |
| 3VFFPW | iPod Video 60Gb - Black | 285.00 | 242.56 |
| | **CREATIVE** | | |
| 3RLBPW | Zen Nano Plus 256MB - White | 48.99 | 41.70 |
| 3RLGPW | Zen Nano Plus 256MB - Black | 48.99 | 41.70 |
| 3RLCPW | Zen Nano Plus 512MB - White | 64.98 | 55.31 |
| 3RLHPW | Zen Nano Plus 512MB - Black | 64.98 | 55.31 |
| 3RLDPW | Zen Nano Plus 1GB - White | 79.99 | 68.08 |
| 3RLJPW | Zen Nano Plus 1GB - Black | 79.99 | 68.08 |
| 3SFMPW | Zen Micro 6GB - Silver | 144.99 | 123.40 |
| 3SFKPW | Zen Micro 6GB - Black | 144.99 | 123.40 |
| 3SFLPW | Zen Micro 6GB - Dark Blue | 144.99 | 123.40 |
| 3SFNPW | Zen Micro 6GB - White | 144.99 | 123.40 |
| 3V6HPW | Zen MicroPhoto - Black | 179.99 | 153.19 |
| 3V6JPW | Zen MicroPhoto - White | 179.99 | 153.19 |
| 3V6KPW | Zen MicroPhoto - Grey | 179.99 | 153.19 |
| 3V6LPW | Zen MicroPhoto - Dark Blue | 179.99 | 153.19 |
| | **IRIVER** | | |
| 3RX5PW | H10 6GB Color - Slate Gray | 154.99 | 131.91 |
| 3RX6PW | H10 6GB Color - Deep Red | 154.99 | 131.91 |
| 3RX7PW | H10 6GB Color - Neo Silver | 154.99 | 131.91 |
| 3RX8PW | H10 6GB Color - Midnight Blue | 154.99 | 131.91 |
| 3RXBPW | H10 20GB Color - Slate Gray | 164.99 | 140.42 |
| 3RXCPW | H10 20GB Color - Deep Red | 164.99 | 140.42 |
| 3RXDPW | H10 20GB Color - Neo Silver | 164.99 | 140.42 |
| 3RXFPW | H10 20GB Color - Midnight Blue | 164.99 | 140.42 |
| | **SONY** | | |
| 3SZ6PW | Walkman Bean MP3 Player 512MB Black | 72.99 | 62.12 |
| 3SZ5PW | Walkman Bean MP3 Player 512MB White | 69.99 | 59.57 |
| 3SZ7PW | Walkman Bean MP3 Player 1GB Black | 94.99 | 80.85 |
| 3SZ9PW | Walkman Bean MP3 Player 1GB Pink | 94.99 | 80.85 |
| 3SZ8PW | Walkman Bean MP3 Player 1GB White | 94.99 | 80.85 |
| 3MMMPW | 1GB MP3 Walkman FM Tuner Silver | 139.82 | 119.00 |
| 3TBNPW | 6GB MP3 Walkman Pink | 144.99 | 123.40 |
| 3TBJPW | 6GB MP3 Walkman Silver | 144.99 | 123.40 |
| 3TBMPW | 6GB MP3 Walkman Purple | 144.99 | 123.40 |
| 3TBPPW | 20GB MP3 Walkman Silver | 175.99 | 149.78 |
| 3TBQPW | 20GB MP3 Walkman Purple | 175.99 | 149.78 |

## DAB RADIO

| quicklinx | INTEMPO DIGITAL | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3RXNPW | PG-01 DAB Radio in Beech | 65.00 | 55.32 |
| 3RXQPW | KT-01 DAB Radio in Pink | 59.99 | 51.06 |
| 3RXRPW | KTB-01 DAB Radio in Gray | 59.99 | 51.06 |

## HEADPHONES

| quicklinx | APPLE | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 30KSPW | iPod In Ear Headphones | 28.31 | 24.10 |
| 2Z73PW | iPod Remote & Earphone Kit | 23.50 | 20.00 |
| | **CREATIVE** | | |
| 2Z8XPW | HQ60 BackPhones | 9.40 | 8.00 |
| 3T9LPW | HN700 Noise Cancelling Headphones | 29.31 | 24.95 |
| 3T9MPW | HQ2300D Dolby Digital Headphones | 52.39 | 44.59 |
| 3T9KPW | CB2530 Bluetooth Headphones | 59.87 | 50.96 |
| | **SHURE** | | |
| 3FQQPW | E2c Earphones | 56.07 | 47.72 |
| 3FQSPW | E3c Earphones | 115.07 | 97.94 |
| 3THFPW | E4c Earphones | 167.26 | 142.35 |
| 3FQRPW | E5c Earphones | 288.99 | 245.95 |
| | **SONY** | | |
| 11VCPW | MDR-E829V Fontopia Headphones | 13.99 | 11.91 |
| 2GBZPW | MDR-ED21LP Fontopia Plus | 14.00 | 11.92 |
| 2GC0PW | MDR-ED31LP Fontopia Plus | 17.00 | 14.47 |
| 2LHWPW | Open Air Cordless Headphones | 27.31 | 23.25 |
| 2GBYPW | MDR-EX71SLB Fontopia Headphone | 31.70 | 26.98 |

## SPEAKERS

| quicklinx | ALTEC | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3SPKPW | inMotion iM4 | 55.07 | 46.87 |
| 3SPLPW | inMotion iM7 | 185.22 | 157.63 |
| | **CREATIVE** | | |
| 3T7JPW | SBS Vivid 60 - Black | 17.78 | 15.13 |
| 3T7VPW | SBS Vivid 80 - Silver | 25.42 | 21.63 |
| 3THSPW | TravelSound 250 | 36.37 | 30.95 |
| 3TKFPW | Inspire T3030 | 36.37 | 30.95 |
| 3TKGPW | Inspire T6060 | 50.97 | 43.38 |
| 3TKHPW | I-Trigue 3330 | 51.97 | 44.23 |
| 3THTPW | TravelDock 900 | 60.15 | 51.19 |
| | **JBL** | | |
| 3L6YPW | Duet Speakers - Silver | 32.58 | 27.73 |
| 3L71PW | Creature II - Black | 64.46 | 54.86 |
| 3P8WPW | On Tour Speakers | 59.99 | 51.06 |
| 318CPW | Soundstick II | 110.64 | 94.17 |

## IPOD VIDEO - 30GB BLACK

quicklinx 3VFCPW

- Holds up to 7,500 songs and full-colour album art
- Bright 2.5-inch TFT display
- Up to 20 hours of battery life
- Holds up to 12,500 photos
- Holds up to 75 hours of video
- Apple Click Wheel
- Charges and syncs via USB
- Syncs contacts, calendars and to-do lists

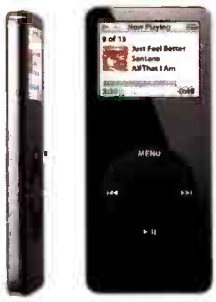
**60GB VERSION AVAILABLE**

Other models available - see website for the full range of Apple iPods

•Holds up to 7,500 songs and full-colour album art
•Holds up to 75 hours of video •2.5" TFT display

only **£215.00** (£182.98 ex VAT)

## IPOD NANO - 2GB BLACK



quicklinx 3TBCPW

- Only 9.0 x 4.0 x 0.69 cm and weighing just 42g
- Bright 3.81 cm colour LCD display
- Up to 14 hours of battery life
- Apple Click Wheel
- Charges and syncs via USB 2.0
- Accessory-compatible Dock connector
- Completely skip-free playback
- Plays music, podcasts and audiobooks
- Holds up to 25,000 photos
- Syncs contacts, calendars and to-do lists

**4GB VERSION AVAILABLE**

Other models available - see website for the full range of Apple iPods

•Holds up to 1,000 songs and full-colour album art
•Works with Mac OS X or Windows 2000/XP

only **£135.00** (£114.90 ex VAT)

## NW-A1000 6GB MP3 WALKMAN SILVER

SONY

WALKMAN

**UP TO 20 HOURS BATTERY LIFE**

quicklinx 3TBJPW

The most stylish and sophisticated digital audio player ever – The WALKMAN MP3 player with 6GB capacity (space for up to 4,000 songs), unique design and advanced features.

- Beautiful and sexy body weighing just 109 grams, available in various colours
- Long battery life of up to 20 hours, rechargeable via AC adaptor and USB connection
- Artist Link – discover new artists of your favourite genre
- New 'My Favourite' and 'Time Machine' Shuffle modes
- Easy to find any Artist, Album or Song by using the new 'Initial Search' tool

•20 hour battery life – rechargeable via AC adaptor and USB
•6GB capacity – holds up to 4000 songs

only **£141.00** (£120.00 ex VAT)

## H10 20GB POCKET JUKEBOX

iriver

quicklinx 3RXFPW

The iRiver H10 is the Pocket Jukebox with a colour display and touchpad at unbeatable sound value for the money. An elegant housing made of aluminium and the integrated touchpad are just two examples of the ingenious design and operating concept of the new H10 family.

- FM tuner - listen & record

only **£164.99** (£140.42 ex VAT)

## H10 6GB COLOR - SILVER

iriver

quicklinx 3RX7PW

- High-contrast 1.5" display with up to 260,000 colours
- Capacity for more than 3,000 songs or lots of other data
- Vertical touchpad for super-easy navigation
- Integrated FM tuner with recording and timer functions
- Built-in microphone for voice recording

only **£149.98** (£127.65 ex VAT)

## ZEN SLEEK PHOTO

CREATIVE

quicklinx 3WMWPW

The incredible Zen Sleek Photo enables people to store & display thousands of photos as well up to 10,000 songs,* with playtimes up to 19 hours. Its advanced colour OLED display combines extra brightness with a wide angle of vision, making this the ideal choice for people who like to share!

*Assumes 4-minute tracks in WMA at 64kbps

only **£199.99** (£170.21 ex VAT)

## ZEN MICRO PHOTO - DARK BLUE

CREATIVE

quicklinx 3V6LPW

The Zen MicroPhoto with colour display is the MP3 player for music and photos. Optimised for use with Windows XP and Windows Media Player 10, it stores 4,000 songs* or thousands of images, enabling people to enjoy their favourite music or share photos with friends. Enjoy simple control via its Vertical Touch Pad. It also features a built-in FM radio and mic.

only **£164.99** (£140.42 ex VAT)

## 32" IDTV WIDESCREEN LCD TV WITH PEDESTAL STAND

TOSHIBA

quicklinx 3S2GPW

As your source for digital home entertainment, Toshiba offers one of the most extensive television lineups in the industry.

- 81cm screen
- LCD widescreen TV
- Freeview digital terrestrial channels
- HD Ready
- Active Vision LCD
- Contrast ratio: 800:1
- Brightness (cd/m2): 500
- Comb filter (3D/Digital)

BUY NOW PAY NOV 06

•16:9 HD Ready

only £1099.99 (£936.17 ex VAT)

## 32" HD READY LCD TV

SAMSUNG

quicklinx 3PFZPW

Ranging from 23" up to an incredible 46" Screen, with a width of as little as only 82mm, SAMSUNG's LCD TVs allow the viewer to experience the ultimate in Home Entertainment without compromising space and style. All of SAMSUNG's LCD TVs above 23" are High Definition Ready. These new standards in TV have an improved resolution of up to 1366 x 768 meaning more visual information on the screen, resulting in the best image you the viewer have ever experienced. With up to 500cd/m 2 of brightness and a contrast ratio of 800:1, SAMSUNG's LCD TVs are always easy on the viewers' eyes

•170 degrees viewing angle
•16:9 image aspect ratio

only £799.00 (£680.00 ex VAT)

## 26" HD READY LCD TV

PHILIPS

quicklinx 3WSSPW

Turn up your viewing experience with Crystal Clear III – Here is an LCD TV that not only enhances the décor of your home with its European styling and slim design, but also provides a great audio-visual experience with Active Control and Virtual Dolby Surround.

- HD ready for the highest quality display of HDTV signals
- Crystal Clear III gives natural images with enhanced quality
- 2D comb filter sharpens images for finer detail
- High definition LCD WXGA display, resolution 1280 x 768p
- Virtual Dolby Surround for a cinema-like audio experience
- Compact design

•176 degrees viewing angle
•16:9 image aspect ratio •HD ready

only £569.99 (£485.10 ex VAT)

## DVD PLAYER AND VIDEO COMBO

SAMSUNG

quicklinx 3W87PW

- Multi Progressive Scan (PAL/NTSC)
- DVD, DVD-R, CD, VCD, CD-R/RW, MP3, WMA,
- JPEG, VHS, S-VHS Playback
- 6 Head HiFi Stereo (4 Video + 2 Audio Heads)
- Letter Box Eliminator (EZ View)
- Front A/V Output
- Digital Audio Output

only £79.99 (£68.08 ex VAT)

## HARMONY 525 REMOTE CONTROL

Logitech

quicklinx 3VP5PW

Control your entire home entertainment system with the press of just one button! Simply select an activity such as "Watch TV" or "Watch a Movie" and your Harmony remote will evaluate the state of all your components and then send the right commands to make your system do exactly what you want

only £55.55 (£47.28 ex VAT)

## SQUEEZEBOX 3 WIRELESS - BLACK

SLIM DEVICES

quicklinx 3VT1PW

The latest innovation from Slim Devices, is designed to bring out the full potential that your digital music files and thousands of Internet radio stations have to offer to your home stereo.

- Built-in support for true 802.11g and advanced lossless compression technologies

only £229.99 (£195.74 ex VAT)

## EMP-S3 MULTIMEDIA PROJECTOR

BUY NOW PAY NOV 06

EPSON

quicklinx 3PH1PW

The Epson EMP-S3 is outstanding in the boardroom or classroom, but just as happy bringing big screen entertainment to your living room.

- Epson 3LCD Advanced Imaging Technology
- Outshine daylit rooms with bright 1600 ANSI lumens

only £499.99 (£425.53 ex VAT)

## VPL-CS20 VIDEO PROJECTOR

BUY NOW PAY NOV 06

SONY

quicklinx 3SPTPW

Combining intelligent set-up functions, powerful 2000 ANSI lumens brightness and multi-input versatility, the VPL-CS20 projectors are extremely user-friendly.

- Latest 3LCD technology
- 2000 ANSI lumens
- Compact portability

only £804.11 (£684.35 ex VAT)

## LCD TV

| quicklinx | PHILIPS | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3S1XPW | 15PF4110 15" LCD TV | 265.98 | 226.37 |
| 3TQ2PW | 23PF4310 23" HD Widescreen LCD TV | 455.00 | 387.23 |
| 3TQ3PW | 23PF5320 23" HD Ready Widescreen LCD FM | 530.99 | 451.91 |
| 3WSSPW | 26PF4310 26" HD Ready Widescreen LCD TV | 569.99 | 485.10 |
| 3SSYPW | 26PF5520D 26" HD Ready Widescreen LCD TV | 691.74 | 588.72 |
| 3TKKPW | 32PF5520D 32" Widescreen LCD TV | 988.17 | 841.00 |
| 3TKLPW | 32PF7520D 32" Widescreen LCD TV | 1099.80 | 936.00 |
| | **SAMSUNG** | | |
| 3PFQPW | LE15S51B 15" Sparta LCD TV | 229.14 | 195.02 |
| 3PFRPW | LE20S51B 20" Sparta LCD TV | 335.99 | 285.95 |
| 3PFTPW | LE23R41BX 23" Rome II LCD TV | 499.99 | 425.53 |
| 3PFXPW | LE26R41B 26" ROME LCD TV | 599.98 | 510.62 |
| 3PFYPW | LE26R41BDX 26" GREENWICH LCD TV | 671.99 | 571.91 |
| 3PFZPW | LE32R41B 32" ROME LCD TV | 839.99 | 714.89 |
| 3V0ZPW | LE32R41BD 32" HD Ready LCD TV | 899.99 | 757.44 |
| 3PG0PW | LE40R51B 40" HD Ready LCD TV | 1299.99 | 1106.38 |
| | **SHARP** | | |
| 3T5NPW | LC-13SH1E 13" LCD TV | 247.86 | 210.95 |
| 3T5QPW | LC-20SH1E 20" LCD TV | 371.81 | 316.44 |
| 3T5XPW | LC-26P50E 26" LCD TV | 529.99 | 451.06 |
| 3L9DPW | LC-26GA5E 26" LCD TV | 616.87 | 525.00 |
| 3T60PW | LC-26GA6E 26" WXGA LCD TV | 727.13 | 618.84 |
| 3T61PW | LC-32P50E 32" LCD TV | 729.99 | 621.27 |
| 3T62PW | LC-32GA6E 32" WXGA LCD TV | 848.98 | 722.54 |
| 3T6KPW | LC-37P50E 37" LCD TV | 1056.32 | 899.00 |
| 3S3WPW | LC-37GA5E 37" Widescreen LCD TV | 1173.82 | 999.00 |
| 3T64PW | LC-32GD7E 32" WXGA LCD iDTV | 1329.99 | 1131.91 |
| 3T6LPW | LC-37GA6E 37" WXGA LCD TV | 1374.75 | 1170.00 |
| 3T6QPW | LC-37GD7E 37" WXGA LCD iDTV | 1805.41 | 1536.52 |
| 3T6SPW | LC-32GD1EA 32" WXGA LCD iDTV | 2179.98 | 1855.31 |
| | **SONY** | | |
| 3TCGPW | 19" Widescreen LCD TV Silver | 605.99 | 515.74 |
| 3PKFPW | 27" Widescreen LCD TV Silver | 703.82 | 599.00 |
| 3TCHPW | 23" Widescreen LCD TV | 786.07 | 669.00 |
| 3PKHPW | 30" Widescreen LCD TV Silver | 797.82 | 679.00 |
| 3TF6PW | 26" High Definition LCD TV S Series | 797.82 | 679.00 |
| 3TCRPW | 32" High Definition LCD TV S Series | 1115.07 | 949.00 |
| 3TF8PW | 26" High Definition LCD TV V Series | 1115.07 | 949.00 |
| 3T8JPW | 32" High Definition LCD TV V Series | 1444.07 | 1229.00 |
| | **TOSHIBA** | | |
| 3S2JPW | 20" IDTV Widescreen LCD TV | 443.43 | 377.39 |
| 3R4MPW | 27" Widescreen LCD TV | 629.99 | 536.17 |
| 3S2HPW | 27" IDTV Widescreen LCD TV | 720.55 | 613.24 |
| 3R4LPW | 32" Widescreen LCD TV | 879.99 | 748.93 |
| 3S2GPW | 32" IDTV Widescreen LCD TV | 1100.00 | 936.17 |
| 3R4KPW | 37" Widescreen LCD TV | 1534.77 | 1306.19 |
| 3S2FPW | 37" IDTV Widescreen LCD TV | 1555.00 | 1323.40 |
| 3TR1PW | 42" IDTV Widescreen LCD | 1979.99 | 1685.10 |

## DVD & HARD DRIVE RECORDERS

| quicklinx | LITE-ON | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3NVYPW | LVW-5002B DVD Recorder | 94.99 | 80.85 |
| 3HL5PW | LVW-5006 DVD Recorder | 129.99 | 110.63 |
| 3KBJPW | LVW-5045 DVD Recorder 160GB HDD | 239.70 | 204.00 |
| | **SONY** | | |
| 3THHPW | DVD Recorder with Digital tuner | 274.98 | 234.03 |
| 3P2KPW | DVD Recorder with 80GB HD | 316.07 | 269.00 |
| 3THJPW | DVD Recorder with 80GB HD & Digital tuner | 392.99 | 334.46 |

## FREEVIEW

| quicklinx | MUSTEK | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3TWMPW | DVB-T300 Freeview Receiver | 45.00 | 38.30 |
| | **SONY** | | |
| 2S8GPW | Freeview Digital TV Receiver | 81.99 | 69.78 |
| | **DABSVALUE** | | |
| 3VDMPW | Digital Freeview Set Top Box | see | website |
| 2NIMPW | Digital Freeview Set Top Box - Top Up TV Ready | see | website |
| 3JC8PW | Single Freeview and Hard Drive Recorder | see | website |
| 3VDNPW | Twin Freeview and Hard Drive Recorder | see | website |

## VIDEO PROJECTORS

| quicklinx | SONY | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3FWFPW | VPL-CS7 1800 ANSI projector | 703.85 | 599.00 |
| 3SPSPW | VPL-CX20 2000 ANSI projector | 1135.53 | 881.31 |
| 3XPZPW | VPL-CX76 2500 ANSI projector | 1499.99 | 1276.59 |
| 3KZNPW | VPL-HS50 Home Cinema projector | 1649.00 | 1404.25 |

## NETWORKING

| quicklinx | 3COM | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 27YDPW | 3Com 10/100 Managed NIC | 23.38 | 19.90 |
| 395KPW | Wireless ADSL Modem Router & USB Adapt. | 49.98 | 42.54 |
| 311VPW | Wireless ADSL Modem Router & PC Card | 49.99 | 42.55 |
| 3KY1PW | OfficeConnect Wireless Access Point | 59.99 | 51.06 |
| | **BELKIN** | | |
| 2CS5PW | 802.11g Wireless PCI Adapter | 18.67 | 15.89 |
| 36VSPW | 125g Wireless PCI Adapter | 22.18 | 18.88 |
| 31VYPW | 802.11g Wireless Client Bridge | 44.65 | 38.00 |
| 3774PW | 802.11g Wireless Print Server | 50.77 | 43.21 |
| 3L8WPW | ADSL2+ Modem with High-Speed | 75.71 | 64.43 |
| | **BUFFALO** | | |
| 3GW2PW | 125Mbps Wireless Notebook Adapter | 25.83 | 21.99 |
| 3NFBPW | 54Mbps Cable/DSL Router | 28.78 | 24.50 |
| 3JK2PW | 54Mbps Airstation Wireless Bridge | 45.23 | 38.50 |
| 3X43PW | Wireless Router & PCI Card | 45.89 | 39.06 |
| 3X44PW | Wireless Router & USB Adaptor | 46.98 | 39.99 |
| 3XKHPW | Wireless Router & PC Card | 46.98 | 39.99 |
| 3W01PW | 108Mbp/s Wireless Router | 95.38 | 81.18 |
| | **DLINK** | | |
| 2THNPW | Wireless PCMCIA CardBus 11Mbps | 14.48 | 12.33 |
| 24JJPW | 4-Port Broadband Router | 25.97 | 22.11 |
| 36YNPW | 54mbps Wireless Access Point | 37.83 | 32.20 |
| 3VDMPW | WIRELESS 108G MIMO ADSL2/2+ | 89.86 | 76.48 |
| | **LINKSYS** | | |
| 2D13PW | Wireless-G PCI Card | 28.66 | 24.39 |
| 2D12PW | Wireless-G Access Point | 44.63 | 37.99 |
| 2CM7PW | Wireless-G Broadband Router | 46.99 | 39.99 |
| 38DVPW | Wireless-G Broadband Router + Speedbooster | 56.98 | 48.50 |
| | **NETGEAR** | | |
| 2NYGPW | 54Mbps Wireless PCI Card | 28.60 | 24.34 |
| 2DMGPW | WG511 802.11g Wireless PC Card | 29.25 | 24.90 |
| 3KF6PW | WG111T 108Mbps USB 2.0 Wireless Adapter | 35.20 | 29.96 |
| 2DMHPW | WG602 802.11g Wireless Access Point | 40.53 | 34.50 |
| 2VCDPW | 54Mbps Wireless ADSL Modem | 68.03 | 57.90 |
| 3V6QPW | Network Storage Central | 66.62 | 56.70 |
| | **US ROBOTICS** | | |
| 3WRNPW | Wireless USB Adapter | 26.01 | 22.14 |
| 3TXHPW | WIRELESS MAXG ROUTER | 63.45 | 54.00 |
| 3WNFPW | MAXg ADSL2+ 4 Port Router | 77.43 | 65.90 |

## KEYBOARDS

| quicklinx | BELKIN | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 2V5KPW | Classic Keyboard | 10.28 | 8.75 |
| 2V5JPW | Classic Keyboard, Black; USB Only | 13.37 | 11.38 |
| | **LOGITECH** | | |
| 248QPW | Deluxe Access Keyboard | 10.99 | 9.35 |
| 39N4PW | Media Keyboard | 15.00 | 12.77 |
| 3FXVPW | Cordless Desktop Express | 18.04 | 15.35 |
| 39Z4PW | Cordless Desktop LX 500 | 38.48 | 32.75 |
| 3KMRPW | Cordless Desktop LX 300 | 31.34 | 26.67 |
| 3FHRPW | Cordless Desktop LX 501 | 38.47 | 32.74 |
| 248LPW | Cordless Desktop Comfort | 37.46 | 31.88 |
| 3H7VPW | Cordless Desktop LX 700 | 51.78 | 44.07 |
| 3J1JPW | diNovo Cordless Desktop for Notebooks | 59.10 | 50.30 |
| 3JQDPW | diNovo Media Desktop 2.0 | 118.49 | 100.84 |
| | **MICROSOFT** | | |
| 22N8PW | Internet Keyboard White | 10.22 | 8.70 |
| 3K8SPW | Internet Keyboard Black | 7.90 | 6.72 |
| 39JFPW | Digital Media Pro Keyboard | 19.76 | 16.82 |
| 2PKVPW | Natural MultiMedia Keyboard | 20.43 | 17.39 |
| 2PKGPW | Basic Wireless Optical Desktop | 38.88 | 33.09 |
| 37XVPW | Wireless Optical Desktop 3.0 | 43.89 | 37.35 |
| 2PKFPW | Wireless Optical Desktop Pro | 47.94 | 40.80 |
| 2PKDPW | Wireless Optical Desktop Elite | 45.83 | 39.00 |
| 3FKHPW | Wireless Optical Desktop + Fingerprint Read | 43.50 | 37.02 |
| 3FKJPW | Optical Desktop Elite for Bluetooth | 69.33 | 59.00 |

## MICE

| quicklinx | BELKIN | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 2DH1PW | 3 Button Mouse PS2 in Black | 4.11 | 3.50 |
| 2V6QPW | 3 Button with/Scroll Mouse | 7.34 | 6.25 |
| | **LOGITECH** | | |
| 3FXJPW | Click Optical | 14.71 | 12.52 |
| 2Q4CPW | MX310 Optical Mouse | 22.81 | 19.41 |
| 3FXNPW | Cordless Click Optical | 21.97 | 18.70 |
| 39NCPW | Cordless Click+ Optical | 27.66 | 23.54 |
| 33M6PW | MX510 Performance Optical | 32.01 | 27.24 |
| 3FPQPW | MX1000 Laser Cordless Mouse | 43.48 | 37.00 |
| 2T84PW | MX900 Optical Mouse Bluetooth | 65.14 | 55.44 |
| 3QWFPW | Harmony 655 Remote Control | 52.01 | 44.26 |
| 3QWCPW | Harmony 688 Remote Control | 90.95 | 77.40 |
| 3QWBPW | Harmony 680 Remote Control | 78.01 | 66.39 |
| 3QW9PW | Harmony 885 Remote Control | 144.56 | 123.03 |
| | **MICROSOFT** | | |
| 3F2RPW | Standard Wireless Optical Mouse White | 16.72 | 14.23 |
| 3F2SPW | Standard Wireless Optical Mouse Black | 16.72 | 14.23 |
| 396VPW | Wireless Optical Mouse Mood Ring | 15.08 | 12.83 |
| 396TPW | Wireless Optical Mouse Groovy | 20.00 | 17.02 |
| 37XSPW | Optical Mouse by S+ARCK Blue | 21.77 | 18.53 |
| 37XTPW | Optical Mouse by S+ARCK Orange | 19.83 | 16.88 |
| 2PK6PW | Wireless IntelliMouse Explorer Metallic Grey | 27.01 | 22.99 |
| 2QNDPW | Wireless IntelliMouse Explorer Platinum | 23.99 | 20.42 |
| 3FKFPW | Wireless IntelliMouse Explorer Bluetooth | 37.31 | 31.75 |
| | **SONY** | | |
| 35YNPW | Mini Optical Mouse for Vaio | 35.25 | 30.00 |
| 3XPJPW | VGP-BMS30 Bluetooth Mouse | 48.32 | 41.13 |

## ADSL2+ WIRELESS STARTER KIT

ADSL2 Ready

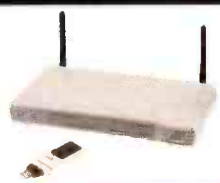
U.S.Robotics

quicklinx 3WNGPW

Everything you need to bring wireless broadband networking to your home or small business. The 802.11g Wireless ADSL2+ Router includes an ADSL modem & wireless access point. And, the 802.11g Wireless USB Adapter can be plugged into a laptop or PC for incredibly flexible wireless broadband connectivity.

only **£56.98** (£48.50 ex VAT)

## ADSL WIRELESS MODEM ROUTER



INCLUDES FREE USB ADAPTER

3com

quicklinx 395KPW

The 3Com® ADSL Wireless 11g Firewall Router combines an ADSL modem, router, 802.11g wireless access point, four-port switch, and firewall to enable up to 253 total (128 wireless) users to economically and securely share a single ADSL connection. Comes with USB adapter.

only **£49.99** (£42.55 ex VAT)

## WIRELESS PRE-N ROUTER

BELKIN.

quicklinx 3L11PW

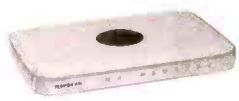
Create a wider, faster wireless network in your home or office. The Wireless Pre-N Router allows your connected computers to share files, printers, and other resources with no wireless drops.

- 800% greater coverage and 600% greater speeds than standard 802.11g

only **£86.95** (£74.00 ex VAT)

## MIMO-G ADSL MODEM/ROUTER

802.11G



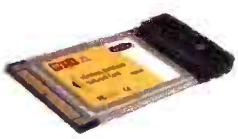
NETGEAR

quicklinx 3VZ5PW

The Netgear DG834PN wireless modem router is compatible with 802.11b, 802.11g and SuperG™ products and will boost their range and speed. Enjoy consistently high-speed connections, everywhere in your house or office - no signal dropouts or wireless dead spots.

only **£94.58** (£80.50 ex VAT)

## 802.11G WIRELESS NOTEBOOK CARD



BELKIN.

quicklinx 2CS4PW

Belkin networking presents its latest innovation, the 54g Wireless Notebook Network Card. The Card works as an ideal standalone to give you instant networking capabilities. It features breakthrough 54g technology that makes wireless file transfers and downloads faster than ever before.

only **£17.62** (£15.00 ex VAT)

## 802.11G WIRELESS USB ADAPTER

802.11G

NETGEAR

quicklinx 36P3PW

- Plugs directly into your PCs USB port
- 5x the speed of 802.11b
- Easy set-up via Smart Wizard install assistant
- Compact, pocket-sized design
- Works with all 802.11g and 802.1b wireless routers and access points

only **£28.07** (£23.89 ex VAT)

## SUPER-G 108Mbps PCMCIA

dabsvalue

quicklinx 3V2XPW

- Super-G 108Mbps Wireless LAN PC Card
- IEEE-802.11g & IEEE-802.11b Standards
- Supports WPA, WPA2, WEP Data Encryption
- Supports Windows 98SE/Me/2000/XP
- Supports 32bit Cardbus Interface

only **£20.24** (£17.23 ex VAT)

## SUPER-G 108Mbps USB STICK

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quicklinx 3V2VPW

- Complies with EEE-802.11g / b WLAN standard
- High-Speed Wireless data rate up to 108Mbps
- 64/128/256-bit WEP, WPA Data Encryption
- Complies with USB 2.0 / 1.1 / 1.0 interface
- Portable mini size design

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## BASIC OPTICAL MOUSE - BLACK

Microsoft

quicklinx 3PXTPW

Experience the convenience of optical technology at a great value. Replace that old-fashioned "roller ball" with a mouse that works on virtually any surface. It's easy to use, comfortable, and features a scroll wheel.

only **£11.57** (£9.85 ex VAT)

## WIRED KEYBOARD 500 LITE - BLACK

Microsoft

quicklinx 3NFXPW

The Microsoft® Wired Keyboard gives you one touch access to e-mail, the Web, and the Microsoft Windows® features you use most. The compact, durable keyboard design fits easily in most keyboard trays - or just gives you more space on your desktop.

only **£9.45** (£8.05 ex VAT)

## GEFORCE 7800GT DDR PCI-E DVI

quicklinx 3SGTPW

Featuring the brand new NVIDIA GeForce 7800 GT graphics processor, with a core clock speed of 400MHz, 256-bit memory interface and PCI Express support, this next-generation superscalar GPU architecture is sure to bring your games to life.

dabsvalue

only £213.25 (£181.49 ex VAT)

## STUDIO 500-PCI V10

quicklinx 3T96PW

Pinnacle Studio 500-PCI version 10 provides the ease and power to quickly combine and enhance your precious memories from digital and analogue camcorders and effortlessly preserve and share them on DVD and beyond.

- Simplicity and Ease-of-Use simple 3 step process
- Features SmartMovie

pinnacle

only £61.65 (£52.47 ex VAT)

## RADEON X850 CROSSFIRE 256MB PCI-E

quicklinx 3VXWPW

- 256MB of GDDR3 memory
- 256-bit memory interface
- PCI Express x16 lane native support
- Dual display support
- 2048x1536 @ 85Hz Maximum Resolution
- S-Video TV-out port

SAPPHIRE

only £229.12 (£195.00 ex VAT)

## GEFORCE 6200 256/128MB TURBOCACHE

quicklinx 3TWPPW

The GV-NX62TC256D8 which benefits from NVIDIA TurboCache technology enhances graphics processing without compromising performance. Additionally, the card is equipped with various display outputs. It's passive cooling design not only saves power, but also eliminates noise pollution.

GIGABYTE TECHNOLOGY

only £44.07 (£44.73 ex VAT)

## SOUNDBLASTER X-FI XTREME MUSIC

quicklinx 3TFZPW

The Sound Blaster X-Fi XtremeMusic sound card harnesses the full power of the Creative X-Fi Xtreme Fidelity audio processor to upgrade any existing library of MP3 or any music files to the Xtreme Fidelity audio standard.

CREATIVE

only £88.37 (£75.21 ex VAT)

## OVERTURE II QUIET MEDIA CASE

quicklinx 3SPXPW

Overture II is the updated version of Antec's classic, timeless enclosure design for high-performance media center systems. With its elegant finish, blue LED illumination and chrome accents, Overture II blends gracefully into any living space.

Antec The Power of You

only £77.26 (£65.76 ex VAT)

## ATHLON 64 3200+ SOCKET 939 512KB INCLUDING FAN

AMD

AMD 64 Athlon

quicklinx 3P7BPW

You live at the forefront of technology and won't settle for less. Try an AMD Athlon 64™ processor and you'll discover a powerful and exiting leap forward in your computing experience. AMD Athlon 64 processors mean faster more powerful desktop PC's & notebooks. Computers that run applications better,putting the digital multimedia world at you fingertips. Digital video, music, photos and gaming are faster and more fun than you thought possible. All with the added security of AMD's Enhanced Virus Protection, enabled by Windows R XP SP2*. So, if you're thinking about what will be your best bet for today and tomorrow, remember the smart money is on the AMD Athlon 64 processor.

- AMD Athlon 64 3200+ 2GHz
- HyperTransport Technology
- Socket 939
- Integrated DDR memory controller

only £114.53 (£97.47 ex VAT)

## PENTIUM D 820 SOCKET 775 800FSB BOX

intel

quicklinx 3R9RPW

The Intel Pentium D processor delivers new levels of performance that end-users can experience and appreciate With the power and features of the Intel® 945G, Intel® 945P and the Intel® 955X Express Chipsets, this platform provides a high bandwidth PCI Exoress* interface, dual channel DDR2 memory at 667 MHz, integrated serial ATA controller at 3 GB/s, Intel® Matrix Storage Technology and Intel® High Definition Audio to deliver an outstanding computing experience.

GREAT PERFORMANCE AT A GREAT PRICE!

- 2.8 GHz
- 800MHz Bus Speed
- Socket 775
- L2 Cache - 2 MB
- 3 Year Warranty

only £171.53 (£145.99 ex VAT)

## VIDEO CARDS

| quicklinx | GIGABYTE | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 2ZB2PW | GeForce MX4000 128MB AGP VO | 29.82 | 25.38 |
| 3MG1PW | GF 6200TC 32MB PCI-E DVI-I | 37.92 | 32.27 |
| 3TWPPW | GF 6200 256/128MB TC PCI-E | 45.92 | 39.08 |
| 3K56PW | GeForce 6600GT 128MB AGP DVIVO | 120.37 | 102.44 |
| 3K54PW | GeForce 6600GT 128MB PCIE VIVO | 111.93 | 95.26 |
| 3R2ZPW | GF 7800GTX 256MB PCI-E D/VIVO | 372.99 | 317.44 |
| 3SJSPW | GF 7800GT 256MB PCI-E DVI-I | 239.30 | 203.66 |
| 3KRMPW | Radeon 9600Pro 128MB AGP DVI-I | 52.09 | 44.33 |
| 3P20PW | Radeon 9250 128MB AGP DVI-I VO | 30.08 | 25.60 |
| 3MFNPW | Radeon X800XL 256MB PCIE DVIVO | 186.83 | 159.00 |
| | **SAPPHIRE** | | |
| 3L36PW | R7000 64MB AGP DVI | 22.44 | 19.10 |
| 3HQ7PW | Radeon 9250 256MB AGP DVI-I VO | 34.00 | 28.94 |
| 36JDPW | Radeon 9550 256MB AGP DVI-I VO | 43.30 | 36.85 |
| 2WJ3PW | Radeon 9600XT 256MB AGP DVI VO | 72.00 | 61.28 |
| 3L38PW | R X300SE 128MB PCIE DVI/VO | 40.97 | 34.87 |
| 3TZJPW | Radeon X550 256MB PCI-E DVI | 50.53 | 43.00 |
| 3HQ8PW | Radeon X700 Pro 256MB PCIE | 105.87 | 90.10 |
| 3MX8PW | Radeon X800XL 256MB AGP DVI VO | 231.35 | 196.89 |
| 3M7VPW | Radeon X850Pro 256MB PCIE VIVO | 293.99 | 250.20 |
| 3MP3PW | Radeon X850XT 256MB PCIE D/VO | 197.40 | 168.00 |
| 3VXWPW | Radeon X850 XFire 256MB PCI-E | 236.25 | 201.06 |
| 3VXVPW | Radeon X1300 512MB PCI-E D/VO | 89.62 | 76.27 |
| 3WZJPW | Radeon X1800XT 512MB PCI-E | 356.97 | 303.80 |
| | **MSI** | | |
| 3VXNPW | Radeon X300 HM 128MB PCIE D/VO | 38.72 | 32.95 |
| 3F1FPW | GeForce FX5500 256MB AGP D/VO | 53.77 | 45.76 |
| 3JQ5PW | GeForce 6600GT 128MB PCIE D/VO | 123.67 | 105.25 |
| 3Sk1PW | GeForce 7800GT 256MB PCI-E | 234.75 | 199.79 |
| 3XJPPW | Radeon X1300PRO 256MB PCIE TVO | 77.55 | 66.00 |
| 3XjkPW | Radeon X1800XT 512MB PCIE TVO | 394.99 | 336.16 |

## CASES

| quicklinx | COOLERMASTER | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3RSXPW | Centurion 531 Silver | 46.41 | 39.50 |
| 3GWJPW | Stacker BTX ATX Case Window | 105.74 | 89.99 |
| 3SXXPW | Wave Master Black | 100.25 | 85.32 |
| 3J7DPW | Cavalier 1 Case Silver No PSU | 70.21 | 59.75 |
| 3J7FPW | Cavalier 1 Case Black No PSU | 70.21 | 59.75 |
| 39HXPW | Cavalier 3 Case Black | 49.02 | 41.72 |
| 3SY1PW | Praetorian 732 Black | 97.29 | 82.80 |
| 3SY3PW | Praetorian 732 Silver | 99.88 | 85.00 |

## SOUND CARDS

| quicklinx | CREATIVE | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3W44PW | SoundBlaster Audigy SE 7.1 OEM | 18.26 | 15.54 |
| 3VVJPW | SoundBlaster Audigy 4 OEM | 36.81 | 31.33 |
| 3KDFPW | Audigy 2 ZS Notebook PCMCIA | 80.03 | 68.11 |
| 3M94PW | SoundBlaster Live 24Bit Extern | 45.47 | 38.70 |
| 3GJ4PW | Audigy 2 ZS Platinum PCI | 121.45 | 103.36 |
| 3LRYPW | Audigy 4 Pro PCI | 144.65 | 123.11 |
| 3TFZPW | SoundBlaster X-Fi Xtreme Music | 88.38 | 75.22 |
| 3TG0PW | SoundBlaster X-Fi Fatal1ty FPS | 146.86 | 124.99 |
| 3TG1PW | SoundBlaster X-Fi Elite Pro | 219.44 | 186.76 |

## PROCESSORS

| quicklinx | AMD | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3T8PPW | Sempron 2600+ S754 256KB Box Inc Fan | 45.75 | 38.94 |
| 3T8NPW | Sempron 2800+ S754 256KB Box Inc Fan | 52.10 | 44.34 |
| 3T8QPW | Sempron 3000+ S754 256KB Box Inc Fan | 59.13 | 50.32 |
| 3T8NPW | Sempron 2800+ S754 256KB Box Inc Fan | 52.10 | 44.34 |
| 3T8LPW | Sempron 3300+ S754 256KB Box Inc Fan | 77.88 | 66.28 |
| 3T8KPW | Sempron 3400+ S754 256KB Box Inc Fan | 83.72 | 71.25 |
| 3P7BPW | Athlon 64 3200+ Socket 939 512KB Inc Fan | 114.53 | 97.47 |
| 3P78PW | Athlon 64 3500+ Socket 939 512KB In Fan | 146.09 | 124.33 |
| 3P77PW | Athlon 64 3700+ Socket 939 1MB Inc Fan | 154.89 | 131.82 |
| 3P76PW | Athlon 64 3800+ Socket 939 512KB Inc Fan | 198.74 | 169.14 |
| 3P75PW | Athlon 64 4000+ Socket 939 1MB Inc Fan | 236.81 | 201.54 |
| 3RFMPW | Athlon 64 FX-57 Socket 939 1MB Inc Fan | 714.99 | 608.50 |
| 3R2RPW | Athlon 64 X2 4200+ Socket 939 512KB | 288.99 | 245.95 |
| 3R2SPW | Athlon 64 X2 4400+ Socket 939 1MB BOX | 350.98 | 298.71 |
| 3R2TPW | Athlon 64 X2 4600+ Socket 939 512KB Box | 443.99 | 377.86 |
| 3R2XPW | Athlon 64 X2 4800+ Socket 939 1MB Box | 556.99 | 474.03 |
| | **INTEL** | | |
| 3RP7PW | Celeron 326 So775 2.53GHz 256Kb EM64T | 50.15 | 42.68 |
| 3RP6PW | Celeron 331 So775 2.66GHz 256Kb EM64T | 55.23 | 47.00 |
| 3RP5PW | Celeron 336 So775 2.8GHz 256Kb EM64T | 59.69 | 50.80 |
| 3RP4PW | Celeron 341 So775 2.93GHz 256Kb EM64T | 65.19 | 55.48 |
| 3RP3PW | Celeron 346 So775 3.06GHz 256Kb EM64T | 75.73 | 64.45 |
| 3RP1PW | Celeron 351 So775 3.2GHz 256Kb EM64T | 88.00 | 74.89 |
| 36LKPW | Celeron D 330 So478 256Kb 533FSB Inc Fan | 50.55 | 43.02 |
| 36SVPW | Celeron D 335 So478 256Kb 533FSB Inc Fan | 56.00 | 47.66 |
| 3HWTPW | Celeron D 340 So478 256Kb 533FSB Inc Fan | 62.77 | 53.42 |
| 3RPDPW | Celeron 350 So478 3.2GHz 256Kb | 92.25 | 78.51 |
| 3N1NPW | Pentium 4 630 So775 2MB 800FSB Inc Fan | 118.45 | 100.81 |
| 3N1PPW | Pentium 4 640 So775 2MB 800FSB Inc Fan | 144.74 | 123.18 |
| 3M4ZPW | Pentium 4 650 So775 2MB 800FSB Inc Fan | 190.73 | 162.32 |
| 3M50PW | Pentium 4 660 So775 2MB 800FSB Inc Fan | 281.99 | 239.99 |
| 3RPBPW | Pentium 4 670 So775 3.8GHz 2MB | 414.99 | 353.18 |
| 3R9RPW | Pentium D 820 2MB So775 800FSB | 171.54 | 145.99 |
| 3R9SPW | Pentium D 830 2MB So775 800FBS | 210.33 | 179.00 |
| 3R9TPW | Pentium D 840 So775 800FSB | 376.99 | 320.84 |
| 3RM2PW | Pentium D Ext840 3.2GHz So775 2x1MB | 685.99 | 583.82 |

## MOTHERBOARDS

| quicklinx | ASUS | £ inc VAT | £ ex VAT |
|---|---|---|---|
| 3GNLPW | S478 Intel 865PE ATX A L | 53.05 | 45.15 |
| 3TY1PW | S754 VIA K8M800 AGP MATX A V L | 37.12 | 31.59 |
| 3SMRPW | S754 ULI M1689 ATX A L | 40.84 | 34.76 |
| 3GNRPW | S754 K8T800 ATX A L R | 40.85 | 34.77 |
| 3GNQPW | S754 nForce 3 ATX A L R | 45.84 | 39.01 |
| 3RWHPW | S754 nForce4 4X ATX | 63.45 | 54.00 |
| 3RWGPW | S939 nForce4 Ultra ATX | 65.75 | 55.96 |
| 3GNPPW | S939 K8T800PR ATX A L R | 64.68 | 55.05 |
| 3RWFPW | S939 nForce4 SLI ATX | 113.08 | 96.24 |
| 38KVPW | Intel915G S775 PCI-E MATX AVL | 68.87 | 58.61 |
| 3FCQPW | Intel 875P 2xS604 ATX ALR S150 | 178.69 | 152.08 |
| 3KGXPW | S939 nForce 4 SLI PCI-E ATX | 82.19 | 69.95 |
| 3KGWPW | S939 nForce 4 SLI PCI-E ATX | 105.27 | 89.59 |
| | **GIGABYTE** | | |
| 3KR2PW | SoA nForce2 Ultra AGP8x ATX | 33.28 | 28.32 |
| 3SL7PW | S478 Sis661 AGP MATX A L | 42.85 | 36.47 |
| 31PBPW | S478 Intel 865G ATX A L | 52.23 | 44.45 |
| 3PR0PW | S478 SiS648FX AGP ATX | 38.55 | 32.81 |
| 2LMPPW | S478 Intel 865G MATX A V L | 58.35 | 49.66 |
| 37GJPW | VIA K8M800M S754 MATX A L R | 40.17 | 34.19 |
| 2QPNPW | S754 VIA K8T800 ATX A L R | 40.51 | 34.48 |
| 37G6PW | nForce 250 S754 ATX A L R | 46.47 | 39.55 |
| 3KZQPW | S775 SiS 648FX AGP 8x ATX | 48.18 | 41.00 |
| 37G2PW | Intel 915G S775 MATX A V L | 65.76 | 55.97 |
| 3SL0PW | INTEL 945P S775 PCI-E ATX ALR | 71.22 | 60.61 |
| 3P2BPW | S939 nForce3 250 AGP ATX | 56.31 | 47.92 |
| 3VZ4PW | S939 GeForce 6100 PCI-E MATX | 57.56 | 48.99 |
| 3KSZPW | S939 nForce 4-4X PCI-E ATX | 65.94 | 56.12 |
| 3SL9PW | S939 nForce4 2XPCI-E ATX | 79.28 | 67.47 |
| 3SL6PW | S775 NVIDIA CRUSH 19 ATX A L | 138.19 | 117.61 |
| | **MSI** | | |
| 3SMKPW | S754 VIA K8M800 MATX A V L | 41.29 | 35.14 |
| 3SMGPW | S775 VIA P4M800 MATX A V L | 36.19 | 30.80 |
| 3SMJPW | S775 Intel 915PL ATX A L | 50.53 | 43.00 |
| 3P4RPW | S775 nForce4 SLI PCI-E ATX | 137.39 | 116.93 |
| 3VLDPW | S939 nForce 4 PCI-E ATX A L R | 61.96 | 52.73 |
| 3L94PW | S939 nForce 4 SLI ATX A 2L | 113.11 | 96.26 |

## OPTICAL DRIVES

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| 3P8VPW | CLASSIC RW 52x24x52x | 48.06 | 40.90 |
| 3FMYPW | DVD+-R/RW 16x D/Lyr USB2 | 63.57 | 54.10 |
| 3RP3PW | Celeron 346 S775 3.06GHz 256Kb | 75.73 | 64.45 |
| 3WW1 | Classic DVD+/-RW 16x L/S USB2 | 74.31 | 63.24 |
| 3FN0PW | DVD+-R/RW 16x D/Lyr USB2/Fwire | 97.97 | 83.38 |
| | **ASUS** | | |
| 3MH9PW | DVD+-R/RW DL 16x IDE Beige RP | 32.23 | 27.43 |
| | **LITEON** | | |
| 3407PW | 52x Internal IDE Retail | 10.27 | 8.74 |
| 39VMPW | CD-RW Int IDE 52r 52w 32rw RP | 15.76 | 13.41 |
| 3KC0PW | DVD16x 52x52x32x IDE Beige RP | 22.05 | 18.77 |
| 3V6NPW | DVD+-R/RW DL 16x Beige/Black | 32.94 | 28.03 |
| 3SJWPW | DVD+-R/RW 16x Dual Layer USB2 | 53.62 | 45.63 |
| 3HRKPW | DVD+-R/RW 8x8x USB2 | 69.70 | 59.32 |
| 3VTXPW | DVD+-R/RW 16x DL LS Beige Kit | 34.09 | 29.01 |
| 3XQ9PW | DVD+-R/RW DL 16x Beige + S/W | 31.22 | 26.57 |
| 3XQDPW | DVD+-R/RW DL 16x Black + S/W | 31.76 | 27.03 |
| | **LG** | | |
| 35YRPW | 16xDVD 52r52w32rw Int IDE RP | 23.50 | 20.00 |
| 3TFKPW | DVD+-R/RW 16x DL IDE OEM Beige | 29.92 | 25.46 |
| 3V0QPW | DVD+-R/RW/RAM 16x DL Beige Kit | 32.54 | 27.69 |
| 3TPSPW | DVD + - R/RW 16x DL Black RP | 32.32 | 27.51 |
| 3X16PW | DVD+-R/RW/RAM 16x DL L/Scribe | 38.53 | 32.79 |
| | **NEC** | | |
| 3VPHPW | DVD+-R/RW 16x DL Black OEM | 29.73 | 25.30 |
| 3TQDPW | DVD+-R/RW/RAM 16x DL Beige OEM | 32.57 | 27.72 |
| 3TQFPW | DVD+-R/RW/RAM 16x DL SILVER | 33.04 | 28.12 |
| 3VTYPW | DVD+-R/RW 16x DL LS Black Kit | 34.08 | 29.00 |
| 3TQFPW | DVD+-R/RW/RAM 16x DL SILVER | 33.04 | 28.12 |
| 3VTXPW | DVD+-R/RW 16x DL LS Beige Kit | 34.09 | 29.01 |
| 3W5WPW | DVD+-R/RW 16x DL LS Beige/Blk | 39.89 | 33.95 |
| | **PLEXTOR** | | |
| 3XDSPW | DVD+-R/RW/RAM 16x DL Beige RP | 52.50 | 44.68 |
| 3XB0PW | DVD+-R/RW 16x16x IDE Beige RP | 67.74 | 57.65 |
| 3RWQPW | DVD-RW 16x16x SATA RETAIL | 82.38 | 70.11 |
| 3V5VPW | DVD+-R/RW DL 16x USB2/FW BK RP | 122.83 | 104.54 |
| | **PIONEER** | | |
| 3S44PW | DVD+-R/RW DL 16x IDE Beige OEM | 28.94 | 24.63 |
| 3TS3PW | DVD+-R/RW/RAM DL 16x IDE BLACK | 34.19 | 29.10 |
| | **SAMSUNG** | | |
| 3RL5PW | CD-RW 52r52w32rw OEM BK | 14.85 | 12.64 |
| 3S9VPW | DVD16x CD48x IDE Beige Retail | 15.04 | 12.80 |
| 3L32PW | DVD+-R/RW 16x16x OEM Black | 30.28 | 25.77 |
| 3L31PW | DVD+-R/RW 16x16x Beige OEM | 33.92 | 28.87 |
| 3SN1PW | DVD+-R/RW DL 16x USB2 RP Black | 52.50 | 44.68 |
| | **SONY** | | |
| 3P8RPW | CD-RW 52x32x52 Silver OEM | 16.44 | 13.99 |
| 2T3DPW | CD-RW 52x32x52x Int IDE OEM | 16.46 | 14.01 |
| 2W4RPW | CD-RW 52x32x52x Int OEM Black | 16.96 | 14.44 |
| 33K7PW | CD-RW/DVD 52x32x52x16 OEM | 22.74 | 19.35 |
| 33K8PW | CD-RW/DVD 52x32x52x16x OEM Black | 23.44 | 19.95 |
| 33S3PW | CD-RW/DVD 52x32x52x16x OEM Silver | 23.35 | 19.87 |
| 3SQZPW | DRU-810A DVD+/-RW Dual Layer | 38.99 | 33.19 |
| 3VQ7PW | DWQ30ASV DVD+/-RW 16x Silver OEM | 29.59 | 25.19 |
| 3VQ5PW | DWQ30A10 DVD+/-RW Beige Drive Only | 28.67 | 24.40 |
| 3WVSPW | DRX-810UL16x DVD+/-RW DL USB2/Firewire | 90.46 | 76.99 |

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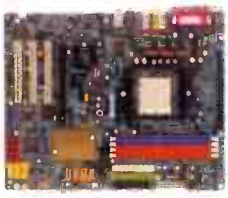

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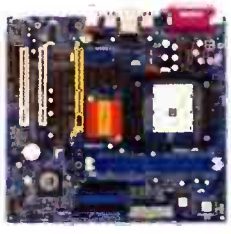

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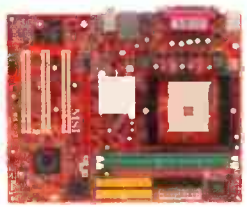

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16X

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Maxtor

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iomega

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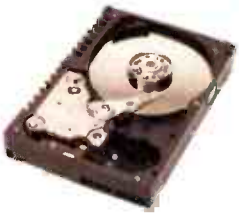

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| 389JPW | FHD-3 160GB USB2 External HDD | 98.64 | 83.95 |
| 389LPW | FHD-3 160GB USB2/Firewire | 112.37 | 95.63 |
| 389QPW | FHD-3 250GB USB2 External HDD | 122.24 | 104.03 |
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| 389NPW | FHD-3 400GB USB2/Firewire | 262.62 | 223.51 |
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| 3X03PW | Screenplay Lite 60GB USB2 | 111.06 | 94.52 |
| 3X04PW | Screenplay PRO 300GB USB2/FW | 218.70 | 186.13 |
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| 2SDKPW | P3 160GB Ext USB2 HDD & Cbl | 78.71 | 66.99 |
| 2SDMPW | P3 160GB Ext Firewire HDD & Cbl | 93.66 | 79.71 |
| 31PLPW | P3 250GB Ext USB2 HDD & Cbl | 84.99 | 72.33 |
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| 3Q2DPW | One Touch II 300GB USB2 16mb | 138.70 | 118.04 |
| 3H1LPW | One Touch II 300GB USB2/Fwire | 147.50 | 125.53 |
| 3Q2GPW | One Touch II 200Gb 10/100 | 153.77 | 130.87 |
| 3QV6PW | One Touch II 300GB USB2/FW800 | 163.27 | 138.95 |
| 3Q2HPW | One Touch II 300Gb 10/100 | 201.32 | 171.34 |
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| 3976PW | 7K400 400GB UDMA100 8MB 7200rpm | 173.89 | 147.99 |
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| 3P5WPW | DiamondMax Plus10 200GB U133 | 59.42 | 50.57 |
| 3P5XPW | DiamondMax Plus10 250GB U133 | 68.14 | 57.99 |
| 3PJWPW | DiamondMax Plus10 160GB S150 | 53.53 | 45.56 |
| 3NXJPW | DiamondMax Plus10 200Gb S150 | 62.00 | 52.77 |
| 3NXKPW | DiamondMax Plus10 300Gb S150 | 84.95 | 72.30 |
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| 2FZQPW | 7200.7 80GB UDMA100 | 34.50 | 29.36 |
| 2FZVPW | 7200.7 120GB UDMA100 | 51.64 | 43.95 |
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| 3K5ZPW | 7200.8 300GB UDMA100 7200rpm 8MB | 89.29 | 75.99 |
| 3K60PW | 7200.8 400GB UDMA100 7200rpm 8MB | 159.82 | 136.02 |
| 3K5RPW | 7200.7 NCQ 80GB SATA150 7200rpm 8MB | 39.99 | 34.03 |
| 3K5SPW | 7200.7 NCQ 120GB SATA150 7200rpm 8MB | 55.53 | 47.26 |
| 3K5TPW | 7200.7 NCQ 160GB SATA150 7200rpm 8MB | 63.22 | 53.80 |
| 3K61PW | 7200.8 NCQ 250GB SATA150 7200rpm 8MB | 76.36 | 64.99 |
| 3K62PW | 7200.8 NCQ 300GB SATA150 7200rpm 8MB | 91.32 | 77.72 |
| 3K63PW | 7200.8 NCQ 400GB SATA150 7200rpm 8MB | 166.03 | 141.30 |
| 3W4MPW | 7200.8 NCQ 500GB SATA300 7200rpm 8MB | 234.94 | 199.95 |
| | **WESTERN DIGITAL** | | |
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| 12NMPW | Caviar 160GB UDMA100 2MB 7200rpm | 52.83 | 44.96 |
| 2J7ZPW | Caviar 160GB UDMA100 8MB 7200rpm | 54.18 | 46.11 |
| 25T3PW | Caviar 200GB UDMA100 2MB 7200rpm | 56.75 | 48.30 |
| 25T5PW | Caviar 200GB UDMA100 8MB 7200rpm | 59.06 | 50.26 |
| 3PJHPW | Caviar 300GB UDMA100 8Mb 7200rpm | 83.64 | 71.18 |
| 3PJJPW | Caviar 320GB UDMA100 8Mb 7200rpm | 91.64 | 77.99 |
| 3WDXPW | Caviar 320GB UDMA100 8mb 7200rpm | 94.81 | 80.69 |
| 2SLSPW | Raptor 74GB SATA150 8MB 10000rpm | 115.01 | 97.88 |
| 2N5BPW | Caviar 120GB SATA150 8MB 7200rpm | 55.21 | 46.99 |
| 2N7DPW | Caviar 250GB SATA150 8MB 7200rpm | 72.64 | 61.82 |
| 3RDNPW | Caviar 300GB SATA150 8mb 7200rpm | 86.28 | 73.43 |
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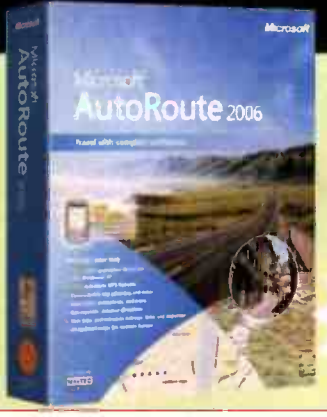


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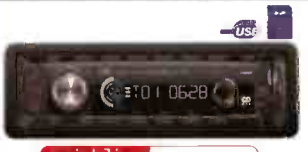

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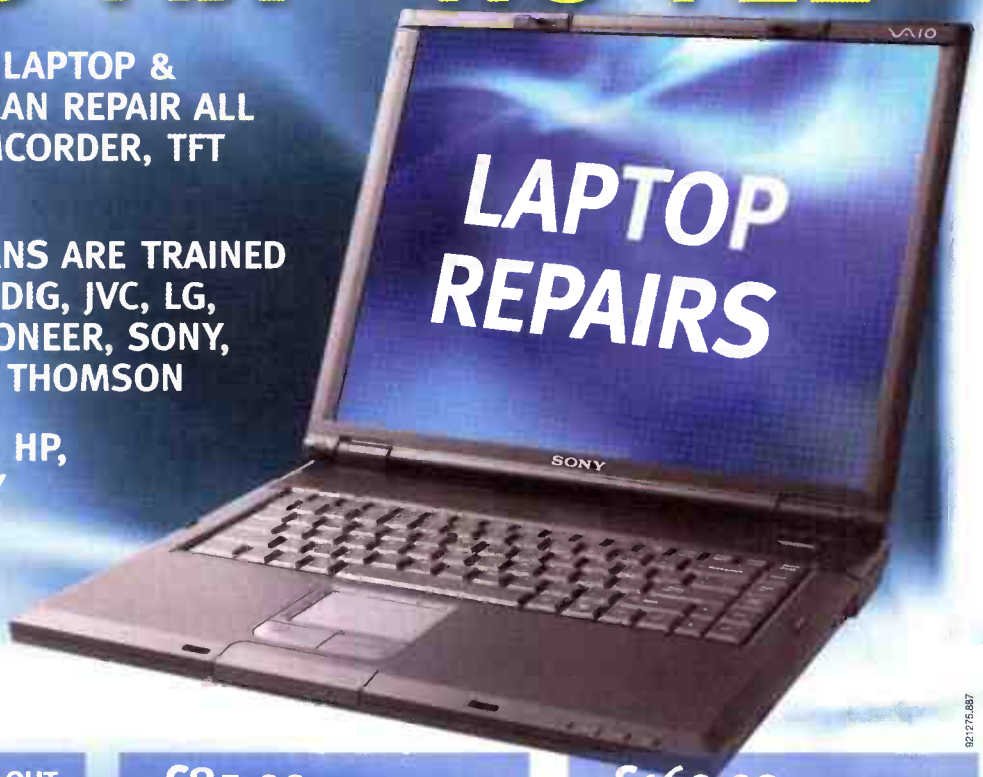


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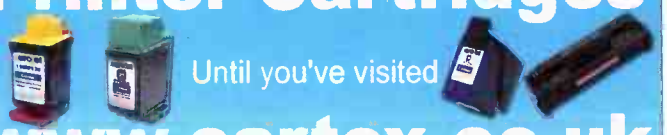

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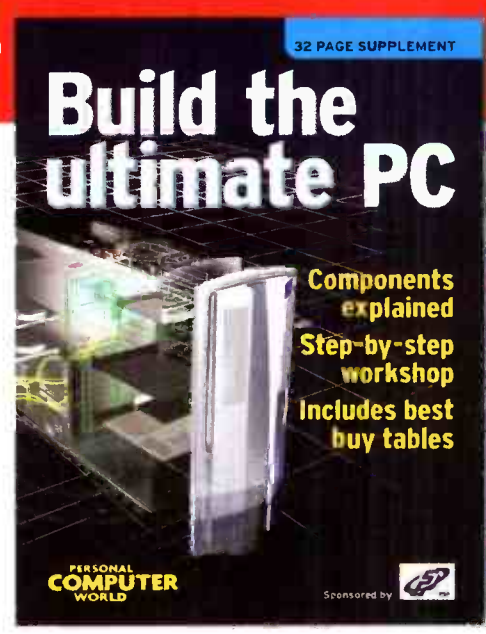


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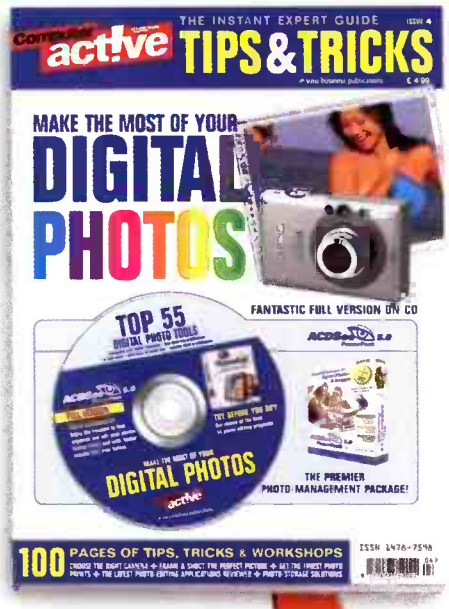


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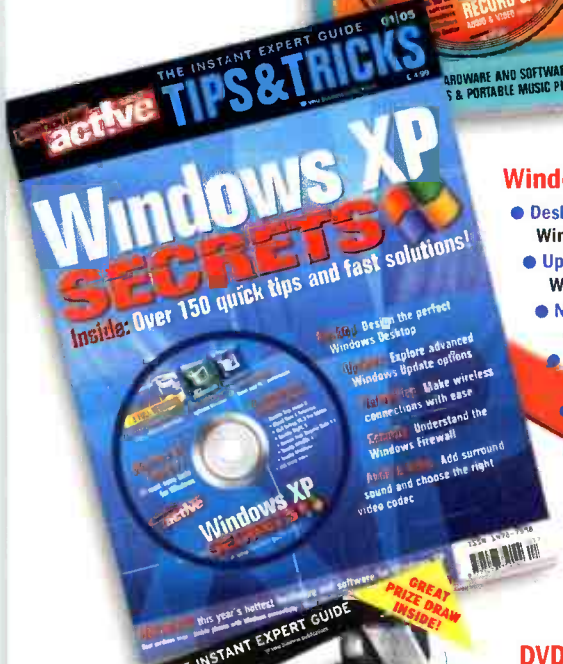


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# All you need to know about this month's software



COVER DISC

## ON THE CD

**Laplink PCmover • O&O Defrag Pro 4.0.508 • Turbodemo Album 1.9 • Mail Manager 2.1 • Shopfactory 5 Light • Translution Light**

## ON THE DVD

**Chronograph 4.31 • Laplink PCmover • O&O Defrag Pro 4.0.508 • Turbodemo Album 1.9 • Mail Manager 2.1 • Shopfactory 5 Light • Translution Light • Edubuntu • Komposé 0.5.4**

## SOFTWARE LISTING

### ON THE CD

**FULL VERSIONS**
Laplink PCmover
O&O Defrag Pro 4
Mailmanager 2.1
Shopfactory 5 Light
Translution Light
Turbodemo Album 1.9

**TRIAL VERSIONS**
O&O Defrag 8
Paragon Drive Copy 8
Realbasic 2006
Turbodemo Pro 7

**FROM THE MAGAZINE**
ATITool 0.25 Beta 11
Irfanview 3.98
Portable Firefox 1.5
Portable Open Office 2.01
VLC 0.8.4
Xine 1.1.1

**FREEWARE INCLUDING**
AI Roboform 6.6.3
Colorpic 4
Firetune 1.1.0
Icons from File 3.3
Netping 2.2
RK Launcher 0.4
Steganos Locknote

**RESOURCES INCLUDING**
Adobe Reader 7
Faststone Image Viewer 2.29
Google Desktop Search
Mozilla Firefox 1.5
Open Office 2.01
Paint.Net 2.5
Photofiltre 6.2.0
Picasa 2.1

### ON THE DVD

**EVERYTHING ON THE CD PLUS...**

**FULL VERSIONS**
Chronograph 4.3.1

**TRIAL VERSIONS**
Corel Wordperfect Office X3 Standard
Coreldraw Graphics Suite X3

**LINUX & OPEN SOURCE**
Edubuntu 5.10
Komposé 0.5.4

**RESOURCES**
Ultimate Boot CD 3.3

**GAME DEMOS INCLUDING**
Championship Manager 2006
Panzer Elite Action
Star Wars Empire at War

## 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 that 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 2006, cover disc ABT, 306 St Mary's Lane, Upminster, Essex RM14 3HL quoting reference:
'PCW Vol 29 No 4'.

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

**GENERAL DIFFICULTIES**
Call 08700 885 995 (9.30am to 5pm Mon, Tues, Thurs & Fri; open until 8pm on Wed and 10am to 2pm Sat).
Or go to www.vnusupport.co.uk or email us at pcw@vnusupport.co.uk.

**SIX PAGES OF DISC INFO INCLUDING**

- PRODUCT DESCRIPTIONS
- WORKSHOPS
- UPGRADE OFFERS
- KEY FEATURES
- CONTACT DETAILS
- NEED TO KNOW

# Laplink PCmover

## Quickly and easily migrate applications from one PC to another

### INFORMATION

**System requirements** Windows 95/98/NT4/2000/XP; 4MB disk space

**Contact** www.laplink.com/uk

**Registration** Run the setup program and follow the instructions. Make a note of the serial number provided as you'll need it later. **NOTE: the serial number will only be available until 18 May 2006**

**Need to know** PCmover can be used for multiple migrations from one PC only (that is, a single old PC to multiple new PCs). It won't run on other systems after that, so don't make any trial runs

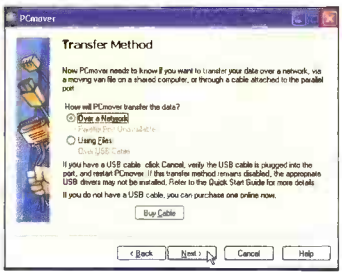
New PCs are great in principle, with loads of extra features, power and hard drive space to enjoy. But in practice, you won't be enjoying anything until you've transferred your applications, their settings and data files from the old system to the new. Hours of manual reinstallation, configuration tweaks and copying of data files isn't too appealing.

PCmover takes the pain out of this process with its speedy migration aids. It works by taking a snapshot of the old PC, and then the new one, which helps the program figure out which applications and Registry settings it needs to move. These are then copied across, either over a conventional network, using a direct cable connection (parallel or Laplink USB file transfer cable), or via any type of removable media that both PCs can read. And then your new PC contains all your favourite applications, configured just as they were on the old system, and with the same data files to hand.

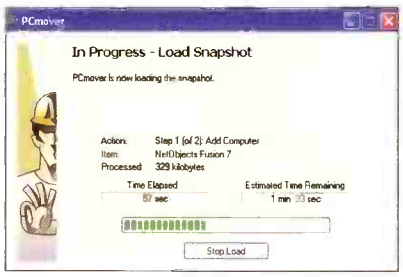
If you can network the two PCs, the process can be done quickly and with the minimum of intervention: just click through the simple wizard-based interface and let the program do its work.

There is one major potential gotcha that you need to be aware of. The program is licensed to perform multiple migrations, but from one PC only. So if you enter your serial number on anything other than the old PC – as part of a trial run, say – you'll find that number won't work again. So follow the instructions carefully, and don't try PCmover out until you really need it.

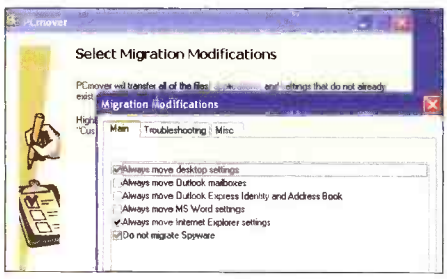
## Transfer applications, settings and data to your new PC




**1** **Install PCmover on the old and new PC. Connect them both to the same network, if possible, then launch PCmover on the new PC. Click Next, tell the program this is the new PC, click Next and choose the data transfer method ('Over a network' for this example). Click Next > Next to complete the 'new PC' part of the process.**




**2** **Now launch PCmover on the old PC, and work your way through the wizard (enter your serial number when requested, tell PCmover this is the old PC, choose the transfer method you picked last time). Give PCmover the network name of your new PC, if it hasn't guessed it already, and leave the program to create its system snapshot.**




**3** **Once the snapshot has been created, PCmover knows exactly which files, applications and settings to transfer. Click Customize Migration if you'd like to make minor changes to this (don't move IE settings) or just click Next to let the migration go ahead. Then sit back and let PCmover handle the rest of the job for you.**

## UPGRADE OFFER

### NEW FEATURES

**Detect and remove spyware**
**Identify rootkits on your PC**
**Web-based virus-scanning tools**
**Stop keyloggers stealing data**
**Dynamically prevent spyware installing**
**Back up key data files**

## ACCESS YOUR PC ANYWHERE, ANY TIME

There's no upgrade path for PCmover (we're giving away the latest version), but Laplink has plenty of other tools you might appreciate.

Laplink Everywhere is a great remote-access solution, for instance, letting you control your PC, search and view files from across the web (yours for a subscription fee from £24.95 a year).

PCdefense (£26.95) is a one-stop security tool that will protect your system against spyware, viruses, keyloggers and rootkits, and includes a Disaster Recovery option to restore your data if you are the victim of an attack. To find out more, go to www.laplink.com/uk.

# O&O Defrag 4 Professional Edition

## Keep your hard drive performance at optimal levels

**INFORMATION**

**System requirements** 64MB Ram, Windows NT SP5/2000 Professional/XP, 30MB disk space, Internet Explorer 5 or later, Microsoft Management Console 1.2 or later

**Contact** www.oo-software.com

**Registration** www.oo-software.com/en/special/defrag4

There are many reasons PCs seem to slow down over time, but file fragmentation bears more responsibility than most, and there's no way to avoid it. As files grow, some will inevitably become spread around your hard drive, increasing the time it takes to reload the file later.

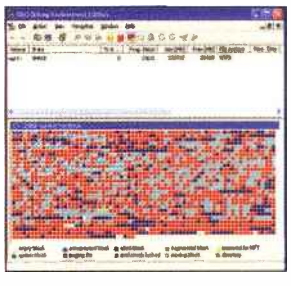
You could try cleaning up the drive with Windows' defragger if you have a few hours spare and don't want to use the PC while it's running.

But O&O Defrag Professional is a more convenient solution. There's an in-depth analysis of your drive. You get a sortable list of every fragmented file, all the currently locked files, and statistics on disk structures such as the Master File Table (if your drive uses NTFS).

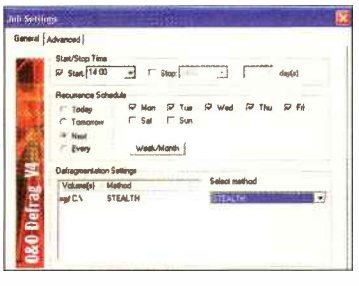
The program comes with five different defrag methods, ensuring files will be rearranged in the way that best suits your needs. These include Space (fast but no reorganisation of the volume) and Stealth (makes minimal requirements of memory or free disk space). There is also a range of Complete methods that defrag files, consolidate free disk space and reorganise files, sorting them by access date, modification date or name.

Defrag Professional can also run at boot time, allowing it to defragment the Windows pagefile, Registry and other files that are normally locked. Add a scheduler and the ability to run whenever your files reach a specified fragmentation threshold, and you have the ideal utility for keeping your hard drive running at peak performance.

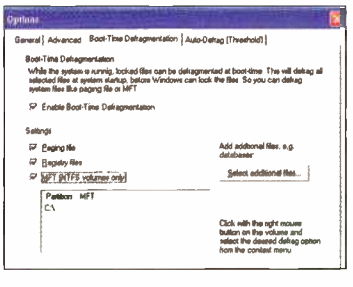
## Three ways to keep your PC's file system in perfect condition



**1** You could use O&O Defrag Professional in the usual, manual way: launch the program, click Action > Defragmentation > Analyze Volume to check your drive, then Action > Defragmentation and choose the defrag method most suitable to you (see the Help file for useful descriptions of who will benefit most from each option).




**2** There's also a powerful scheduler to defrag drives when you're not around. Click Action > Toggle Cluster/Job View, then Action > Job/ Tasks > Add > Job. Pick a start time and choose how often you want the job to run. Click the Advanced tab for options such as the ability to shut down the PC when defragging has finished.




**3** Defrag Professional can even defragment system files such as the paging file, the Registry and the Master File Table (NTFS volumes), which are inaccessible under normal defragging. Click Action > Settings > Boot-Time Defragmentation, check the 'Enable' box and select whatever files you'd like to be defragged when your PC starts.

## UPGRADE OFFER

## O&O DEFRAG 8

**NEW FEATURES**

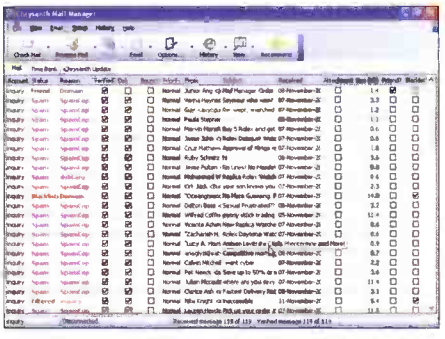
- Full Windows Explorer integration
- Automatic background defragmentation mode
- Needs only five per cent free disk space
- Defrags all Windows-compatible drives
- Run batch files before/after defrag
- Automated defrag with a single click

The latest version of Defrag adds all kinds of useful new features, such as improved Windows integration (defrag your drives directly from Explorer), Screen Saver Mode (defrag only when the screen saver is activated) and special support for notebooks (avoiding draining the battery by defragging only when it's plugged into the mains).

As a registered user of version 4 you can upgrade for only £19.99, saving £10 on the usual price for a new user. Find out more at www.oo-software.com/en/special/defrag4.

# Mail Manager 2.1

FULL VERSION



**INFORMATION**

**System requirements** 64MB Ram, Windows 98 or later, 20MB disk space

**Contact** www.bluesquad.co.uk

**Registration** www.bluesquad.co.uk/vnu/mailmanager/register

**Don't waste your Internet bandwidth by downloading spam: let Mail Manager delete it directly from the mail server instead**

There are many tools and techniques to rid your Inbox of spam, but with most you need to download the junk mail before it can be processed. Chrysanth Mail Manager is different, as it works with your mail server to discover waiting messages, but only downloads the headers, not the emails themselves. This means spam can be dealt with quickly and easily and without your regular email client (which you continue to use as normal) knowing anything about it.

The program comes with a variety of methods to identify unwanted mail. There's support for public DNS-based spam blocking lists, for instance, that identify common sources of spam. Mail Manager comes with a list of 20, four of which are enabled by default, and you can add as many others as you like. You also get a customisable White List (emails that should be accepted) and Black List (emails to be rejected).

Mail Manager comes with a decent set of tools for building filters that enable you to search for suspect keywords in the Subject field, unlikely addresses in From or To fields, and more.

Other features include automated import of Outlook and Outlook Express accounts, and detailed statistics and graphs on the amount of spam each account receives. If your Inbox needs a spring clean, Mail Manager could be worth a look.

## UPGRADE OFFER

## SAVE 25% ON MAIL MANAGER 2.3

New features in this version of Mail Manager include address book import for Outlook 2000 or later, SSL connection support and mail log export to Excel, HTML, XML or Ascii format. An 'Is empty' filter option lets you flag messages with blank From or Subject lines as spam, and Mail Manager can be set up to launch when Windows starts.

Moving to version 2.3 would normally cost £19.99, but visit www.bluesquad.co.uk/vnu/mailmanager/offer, enter BSQ-MAIL as the promotional code, and you'll pay only £14.99, a 25 per cent discount.

# Turbodemo Album 1.9

FULL VERSION

**INFORMATION**

**System requirements** 64MB Ram, Windows 98 or later, 50MB disk space

**Contact** www.bluesquad.co.uk

**Registration** www.bluesquad.co.uk/vnu/turbodemoalbum/register

**Turbodemo Album allows you to add audio and text annotations to your slideshow images**

There's no shortage of ways to obtain digital images, but finding an effective way to share them with others is often more difficult. Unless you use Turbodemo Album, which is one of the most versatile slideshow creation tools around.

You can import your choice of images, drag and drop them into the required order, then export them as an executable (exe) file to pass on to others or a Flash (swf) file for use on the web.

Double-click on a particular image and you can annotate it with a variety of objects: text captions, pointers, rollovers (move the mouse over that region and a caption appears) and more. Each object is highly customisable.

It's also possible to add your own commentary or soundtrack, either by recording it directly within Turbodemo Album, or by importing a wav file. Then during the Export process you get to customise items such as the demo title, style of Control Panel that will be used to step through the slides, or add version information, and much more.

You could just use Turbodemo Album to create slideshows of your digital photos, but that's just the start. The program can also build basic presentations, software demos and so on, for use on the desktop or the web, so if you ever need this kind of function, it's a great place to start.

## UPGRADE OFFER

## TURBODEMO PRO 7

This is the latest version of Album so there is no upgrade, but if you need more demo and tutorial-building power then give Turbodemo 7 a try. This comes in several different versions, which include swf import, new interactive features (clicks, hotkeys, hyperlinks), loads of output options (Flash, Java, exe, avi) and plenty more.

The list price for Turbodemo Standard is £238.14, but use the promo code TURBODEMO when ordering and you'll save 25 per cent, paying around £178.61. Visit www.bluesquad.co.uk/vnu/turbodemopro to find out more.

# Shopfactory 5 Light

## Create your own online store – no specialist knowledge required

Online shopping is the fastest growing retail sector in the UK, with sales for 2006 predicted to be worth £26b. So if you'd like to claim a share of the cash, there's never been a better time to set up your own web store. And there's no easier way to get started in ecommerce than with Shopfactory 5.

Creating your first store doesn't require any knowledge of databases, for instance. Or PHP, Perl, scripting of any kind, or even HTML. All you need to do is work your way through the wizards, typing in company details and text descriptions, and adding the occasional graphic.

This doesn't mean you have to compromise on looks, though. The program comes with 33 different themes, and five different visual styles, which can be blended to produce some attractive results. And you can further customise colours, fonts, images and textures to produce a truly individual look.

A New Product Wizard makes it easy to set up your catalogue, up to a maximum of 50 products for this version. Each product can have a basic and detailed description, an image, and be available in your choice of variations (different colours or sizes, say). Other options let you set up discounts, taxes, shipping costs and more.

You will need to set up a merchant account with another company if you want to take credit card payments online, but Shopfactory can at least point you in the right direction. Once that's done, publish your site to just about any web space (no expensive server-side technologies required), and you're ready to start taking orders and making money.

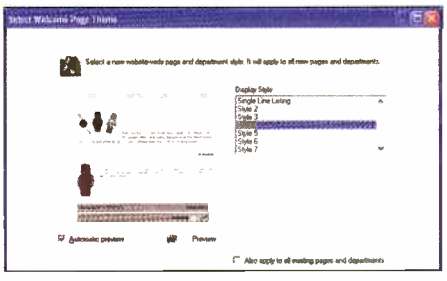
### INFORMATION

**System requirements** Windows 98/ME/2000/NT/XP, Internet Explorer 6, 100MB disk space

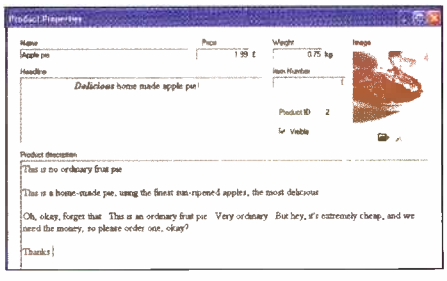
**Contact** www.makemeashop.com

**Registration** Your store is limited to a maximum of 50 products. To register, go to www.makemeashop.com/covermounts/vnu

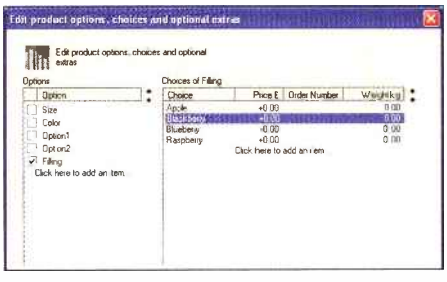
## Get the basics of your store designed in just one evening



**1** Launch the program and click 'Create a new website or shop' to start the Website Setup Wizard (or start it directly from the Properties button). Enter a name, description and image for your store, then pick a visually appealing site style. Fill in other details (such as your address) as the wizard requests them, clicking Finish when it's done.



**2** Your store structure is displayed in an Explorer-like tree at the left of the Shopfactory screen. Right-click the My Shop\Department 1 folder and select 'Add Product' to begin building up your catalogue. Enter a product name, price and weight (important for shipping), an image if you have one, and a description to tempt your customers.



**3** Click Next > Edit Product Options if the customer can choose variations on your products. If there are different fillings available for a fruit pie, say, then add an option called Filling, from a list of options, and add as many fillings as you like. Add shipping costs and discounts if required, and the catalogue is complete.

## UPGRADE OFFER

### NEW FEATURES

- Unlimited pages and products
- Support for Flash graphics
- Integrated shop-search facility
- Use 3D product images
- Flexible site theme designer
- Multilingual site navigation

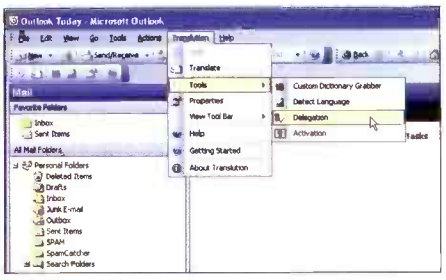
## SHOPFACTORY 6

The latest Shopfactory comes in four varieties. These range from the simple Etrader plus (an updated version of Shopfactory 5), to the powerful Shopfactory International, although our pick for a first upgrade would be Shopfactory Professional. This removes any limitations on products or page numbers, and improves your site style with support for Flash graphics, and a new theme designer. Prices are as shown below, and you can place your order at www.makemeashop.com/magupgrades.

| | | | |
|---|---|---|---|
| **Etrader:** | **£55.98** | **Developer:** | **£296.24** |
| **International:** | **£369.04** | **Professional:** | **£145.04** |

# Translution Light

FULL VERSION



The Translution Outlook plug-in translates your messages to French, German, Italian or Spanish

**INFORMATION**

**System requirements** 256MB Ram, Windows 98, 25MB disk space, Outlook 2000, .Net framework 1.1
**Contact** www.translution.com
**Registration** Follow the instructions during installation, use the activation code PCW60 when requested and register using the same email address as your default email address in Outlook.
**Limitations** Works as Pro edition for initial 60 days; translates up to 15 single recipient emails every 30 days; maximum email size is 250 words

Translution installs an Outlook add-in that automatically handles the process of translating the language of your emails. Just set your required language for a given contact (French, German, Italian and Spanish are supported), then write and send your message as usual. Translution then processes the message, and the translated version arrives in your recipient's mailbox.

This version of Translution won't translate incoming emails, unfortunately, although you can get around this by sending a message to yourself. But you need to be careful about workarounds like that, because Translution Light has some significant restrictions: it only works with single recipient emails, for instance (no cc or bcc entries), each email can be a maximum of 250 words, and it will only translate a maximum of 15 emails every 30 days.

Still, you don't need to worry about any of that just yet, because the program initially installs as a trial version of Translution Pro. Not only does that drop these restrictions, but it also plugs into Word and Internet Explorer to translate documents and Word pages as required. It expires after 60 days and you're back to Outlook-only Translution Light, though, so be sure to try out the translation features while they're available.

## UPGRADE OFFER
## TRANSLUTION PRO

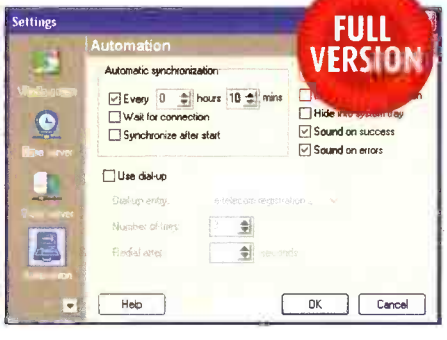
The Pro version of Translution removes the restrictions on words per email and emails per month, and lets you translate up to 500,000 words per year. It can also optionally translate incoming emails and attachments, and translate multiple Word and HTML documents (just choose a folder and the program will process them all).

Prices start at £59.95 for a single-user licence, and you can read more at the Translution site (www.translution.com).

# Chronograph 4.3.1

ON OUR COVER DVD

FULL VERSION




Chronograph can synchronise your PC clock with an Atomic Clock time server as frequently as you like

**INFORMATION**

**System requirements** Windows 98 or later, 2MB disk space, Internet access
**Contact** www.bluesquad.co.uk
**Registration** www.bluesquad.co.uk/vnu/chronograph/register

Can you trust your PC clock? It's difficult to say. Some systems only lose a second or two every month, but others could see that second lost every hour. This may not seem to matter much, but significant errors in your PC time can lead to odd problems elsewhere. We've seen VPN clients that use system time when generating a security certificate, for instance, and if your click is out then you might not be able to connect.

It pays to keep your clock accurate, then, and Chronograph makes that very easy indeed. Run the program and it grabs the current time over the Internet from one of America's National Institute of Standards and Technology (NIST) Atomic Clock servers. Click Adjust to correct your own clock, which will then be accurate to within half a second (variability in the time it takes the NIST packets to reach your PC means that's as close as it gets).

This is simple enough, but it's easier still if you get the program to update your clock automatically. Click Settings > Automation for the options on offer, including the ability to run and synchronise on Startup, or every few hours.

If you're on a network, Chronograph can convert it into a time server. First click Settings > Time Server and check 'Start local time server...' on the host. Then install Chronograph on your networked PCs, click Settings > Time Server, select 'Local server', and specify your host's IP address in the Local server box.

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The latest version of Chronograph can replace Windows' own system tray clock, and Winamp skin support means there are thousands of different digit styles available. There's also a World Time feature, allowing you to check the time in any time zone, with the information displayed in Chronograph's new calendar.

Best of all, you can upgrade for only £8.95, a £5 saving off the regular price. To qualify for this special deal, visit www.bluesquad.co.uk/vnu/chronograph/offer, and enter BSQ-CHRONO as the promotional code.

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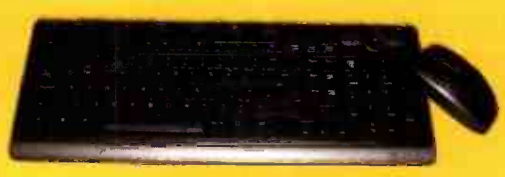

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# COMPETITIONS

## WIN! Crucial memory and USB flash drives

While most computers, PC equipment and peripherals are getting smaller, the files we create are getting larger. The supplied memory card in devices such as digital cameras is unlikely to be bigger than 32MB, so investing in a larger card is essential.

Crucial Technology provides high-quality flash memory products that will give you plenty of room to hold your digital photos or music files. Its Compact Flash (CF) memory card is a solid-state disk designed with flash technology. The cards have no moving parts and are very rugged, providing much greater data protection than conventional magnetic disk drives.

Crucial's Secure Digital (SD) card has been designed to provide data storage for a wide range of portable digital devices, and it has low battery consumption. It features an erasure-prevention switch which gives you the assurance that your data can't be accidentally deleted – just keep the switch in the locked position.

Crucial is giving away 1GB of flash memory cards to 12 lucky winners, who will have a choice of receiving either a Secure Digital or Compact Flash memory card.

Another two winners will each receive a 2GB PC3200 dual inline memory module (Dimm) memory upgrade, to provide DDR SD-Ram memory for desktop computers.

To use DDR memory, your system motherboard must have 184-pin Dimm slots and a DDR-enabled chipset. A DDR SD-Ram Dimm will not fit into a standard SD-Ram Dimm socket.

Five more winners will get a Gizmo Hi-Speed 1GB USB drive, perfect for storing and sharing images, music and other types of files.

It has enough space for thousands of digital images or hundreds of your favourite songs. No installation is required – just plug it into a USB socket and the Gizmo appears as a removable disk.

For more information on Crucial's range of products, go to www.crucial.com/uk. For your chance to win one of the products, just answer the question and return the coupon or enter online by going to the competitions page on the *PCW* website (www.pcw.co.uk/competition).

**February winners:** The winner of the Advent T9304 PC and a copy of Vietcong 2 is Adam Worrall, and Geoff Barratt won the Sony Vaio V3S PC and a copy of Sid Meier's Civilisation 4.

### PCW Crucial competition

#### How to enter

For your chance to win the prizes from Crucial, tick the box next to the correct answer to the question below, fill in the coupon and send it to Crucial competition, *PCW*, PO Box 10218 Sutton Coldfield, B76 1ZB by the closing date. Or go to **www.pcw.co.uk/competition** and follow the instructions. The competition opens on 16 February 2006 and closes on 17 March 2006.

**How many moving parts does Crucial's Compact Flash memory cards contain?**

**a)** None ☐
**b)** 32 ☐
**c)** 184 ☐

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This competition is open to readers of *PCW*, except for employees (and their families) of VNU Business Publications and Crucial. *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.

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# WIN! Shuttle XPC System G5 8300M Media Center

The days of cluttering up your living room with a hi-fi system, DVD player, video recorder and bulky TV set are long gone, thanks to stylish all-in-one solutions such as Shuttle's XPC System.

The Shuttle XPC System G5 8300M is small, attractive and silent. The powerful hardware, in combination with the latest version of Microsoft Windows Media Center Edition, can replace your tape, CD, and DVD player, and even your receiver, allowing you to save money and precious shelf space.

With the remote control, your favourite entertainment is easy to reach from anywhere in the room. It can work as your video recorder, recording TV programmes, pausing live broadcasts, and collecting your favourite shows as well as organising your mp3 collection, delivering a sound-rich experience thanks to its 5.1 Dolby digital audio.

The G5 8300M uses the Intel Pentium 4 630 processor for great performance and the ability to take advantage of 64bit Windows when it becomes more widely available. There is 512MB of system memory and a powerful ATI X550 graphics card with 256MB of memory. The 200GB hard disk gives plenty of room for software and files, while a DVD writer takes care of burning movies and backing up important files, and it can write to high-capacity dual layer discs too.

Shuttle is giving one reader the chance to win the sleek G5 8300M. Also included in the prize is the sleek XP17 monitor, which delivers crystal-clear images from any angle.

Designed to match the design and performance aesthetics of the XPC, the 17in TFT display offers excellent flexibility. Take it on the road, hang it on the wall or turn it to portrait mode – it works equally well for the perfect gaming experience as for enjoying the latest flicks.

For more information Shuttle and its products, visit its website at www.shuttle.com. For your chance to win the G5 8300M Media Center system, answer the question on the coupon and return the coupon to us, or enter online by going to the competitions page on the *PCW* website (www.pcw.co.uk/competition).

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## PCW Shuttle competition

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**How big is the G5 8300M's hard drive?**

**a) 200KB** ☐
**b) 200MB** ☐
**c) 200GB** ☐

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# NEXT MONTH

## ON SALE 16 MARCH 2006

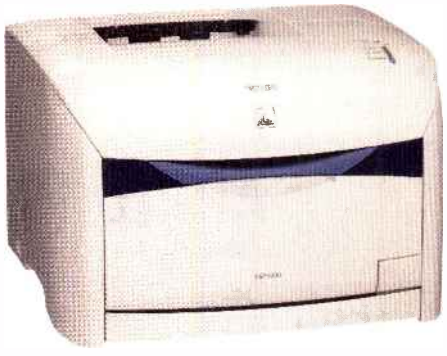
### Ultimate guide to GPS

Confused about waypoints? Don't know your NMEA from your PDOP? Struggling to decide what type of GPS receiver you want? Help is at hand in our group test of the UK's lowest priced all-in-one GPS devices, we've also got all the practical advice and information you need to become a satellite navigation expert.

**Get to grips with satellite navigation with the help of our group test**

### Low-cost colour laser printers

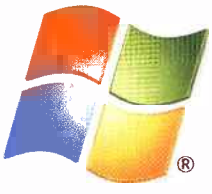
You can now buy a colour laser printer for well under £300, so do they make sense for home or small-business users who find inkjets too expensive to run for day-to-day printing? Our group test investigates.



**Find out if a colour laser printer is a viable alternative for home use**

### Will your PC run Windows Vista?

No-one likes being forced by Microsoft to buy a new PC, but it's likely that many current PCs could struggle to run Windows Vista. We investigate exactly what components you might need to upgrade or replace when Vista launches at the end of 2006.



Windows Vista™

**All you need to know about upgrading your PC to run Vista**

### £699 laptops

It seems as if 2006 is the year of the laptop – everyone now wants one, whether it's as a main system, a second one, or just for travel. We've picked 10 of the best models at a very sweet price point to see just what they offer.

**There's lots more in May's PCW**
**DON'T MISS IT...**

# APRIL 1981

From the archives: Take a look at the important events in technology five, 15 and 25 years ago.

The colourful cover gracing this issue focused on the new, exciting world of word processors. Instead of just being used to write programs, this new breed of machines was employed purely for writing text of various sorts. Identifying the main users of word processors as authors and journalists, technical/managerial report writers and secretaries, Peter Rodwell examined how different users would handle the word processor and how they should choose their hardware and software. Though these machines may seem old-fashioned and obsolete now, Rodwell felt that at the time they were a product of the 'micro-revolution'.

CHOOSING A WORD PROCESSOR
The launch of an important new series

In a piece entitled 'Up the Sharp End', Mike Knight gave PCW readers an insight into the world of technical support and the difficulties encountered. Perhaps not surprisingly, the problems that existed then, and his advice, could still be used to describe some tech support operations today. For example, instead of being left in the lurch when the warranty expires, the user should already have a deal in place with another engineer. Readers were also warned not to expect to be able to duplicate the problem when an engineer was actually looking at the PC.

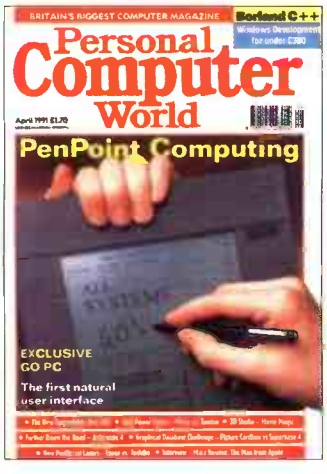
Following a story about a disabled boy in Nottingham improving both his co-ordination, speech and schoolwork by playing Space Invaders, Derrick Daines pondered the ways computers could be used as aids to people with disabilities.

# APRIL 1991

Looking vaguely like the handheld computers used by despatch companies today, the GO PC was featured on the cover of this issue. Selling the Penpoint operating system as a revolutionary idea, the GO Corporation took big risks staking so much on the innovative system. Using a ballpoint-like stylus to perform tasks and write directly on the A5-sized monochrome LCD display, Rupert Goodwins found it to be a product full of potential.

After six months of using Microsoft Word for Windows, Simon Rockman was still pretty happy with it. His latest joys were finding ways to use tables instead of columns and macros for recording various command sets.

Ever wanted to rule the earth or create your own planet? With Sim Earth you could do just about that – virtually, at least. It allowed you to create your own world with control of all the natural elements, geography, evolution and life forms. Depending on your mood, you could tackle environmental issues or destroy everything with rampant plagues and a whole host of natural disasters.




# APRIL 2001

Is it possible to get a powerful PC without paying through the nose? In this issue, we aimed to find out by putting £899 desktop computers to the test. We looked for machines that wouldn't be out of date in a few years' time but at the same time provided value for money. Our Editor's Choice award went to the Mesh Matrix 1GHz ME. With its top-quality Asus A7V motherboard, CD-RW and a 30GB hard drive, we considered it to strike the best balance between features, performance and price.

As Apple has recently revealed its new Intel-based machine, it's interesting to compare it to one of its early ventures into the designer notebook market. The Titanium G4 Powerbook was an attractive addition to the Apple notebook family on its release in 2001, and still holds up in terms of stunning looks and versatile features. It was available in 400 and 500MHz varieties, with the high-end model priced at a staggering £2,936. Apart from a few niggles, our reviewer was overwhelmed by its applications and adaptability.

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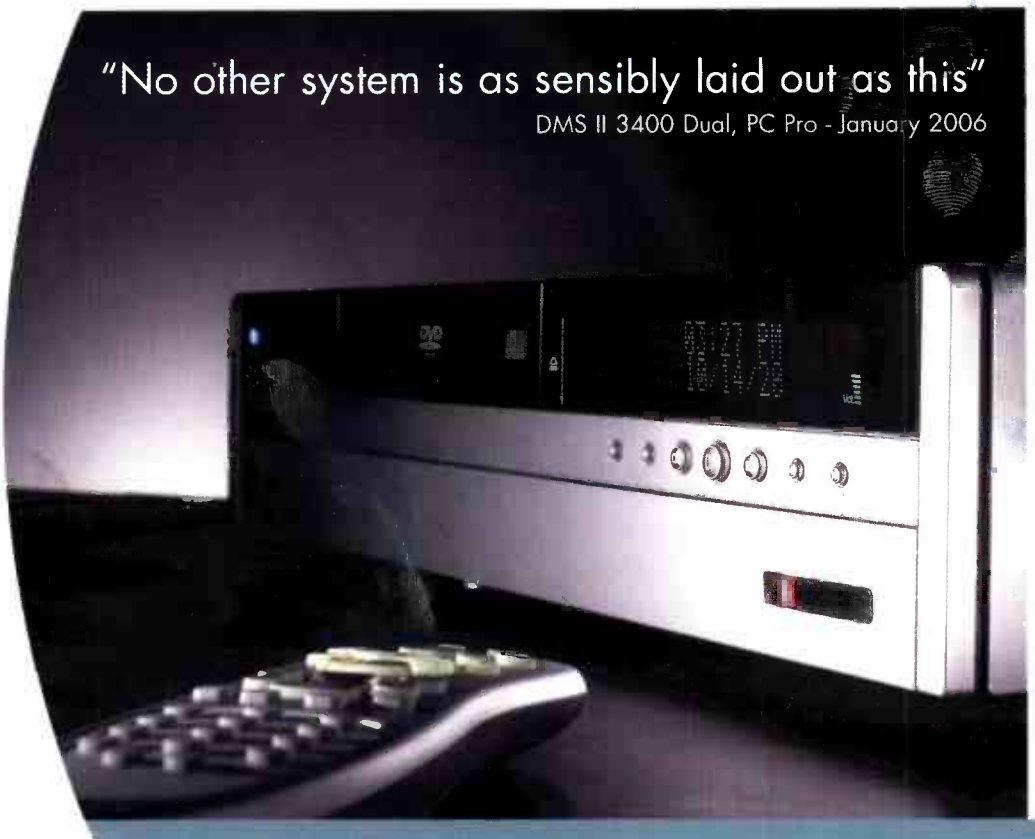
# A sight to behold

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