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Acer recommends Microsoft® Windows® XP Professional for Business.

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Modem, Gigabit Ethernet LAN, No FDD
4-in-1 Card Reader, Li-Ion Battery

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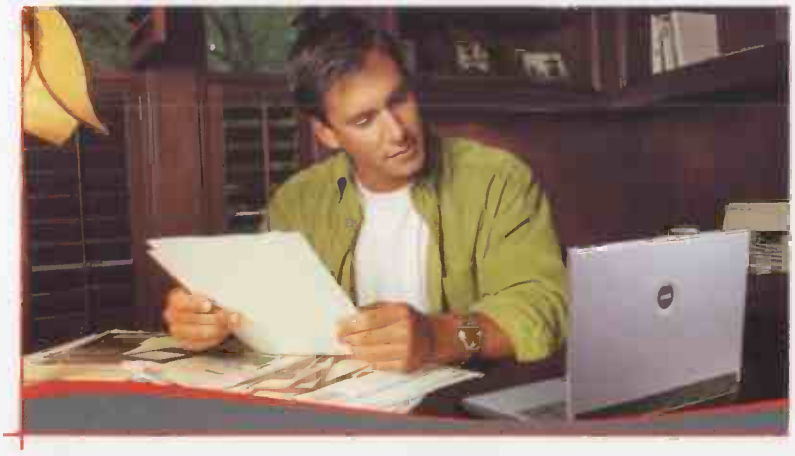

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A1

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  - Intel® PRO/Wireless Network Connection 802.11g
  - Intel® 855GM Chipset
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- 512MB (2x 256MB) DDR RAM (upgradable to 2GB upon availability)
- Wide Display: 15.4" WXGA TFT 1280 x 800 pixels, 16.7 million colours
- 40GB / 60GB Hard Disk drive
- DVD/CDRW Combo drive or DVD-RW (Dual)
- ATI® RADEON™ 9700 64MB DDR-VRAM
- WLAN, 10/100 LAN und 56K Modem
- 1 Year collect and return (Including International Travellers Warranty)

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£ 899 EX VAT

Intel® Pentium® M Processor 1.50GHz, Microsoft® Windows® XP Home Edition, 40GB, 512MB DDR-333 (2x 256MB), 15.4" TFT, 64MB ATI® Radeon™ 9700, DVD/CDRW Combo, Modem, Wired & wireless LAN

Acer Aspire 2012WLMi

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Acer Aspire 1350

VERSATILE WORK AND ENTERTAINMENT

Acer recommends Microsoft® Windows® XP Professional for Business.

The Acer Aspire 1350 has been designed specifically to meet the needs of small business and SOHO professionals looking for a comprehensive work device that offers complete multimedia and communication features, high performance and ease of portability in a durable package to enhance productivity and stay ahead of competition. It is also perfect for space-conscious private users in need of an easily transportable computer that supports full home and multimedia applications, including Internet access and entertainment.

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- Microsoft® Windows® XP Home Edition
- 14.1" or 15.0" XGA TFT
- 256MB DDR-RAM
- 30GB or 40GB HDD
- CD-RW/DVD Combo
- Connectivity: 10/100 LAN, 56K Modem
- 4x USB 2.0 Ports, Firewire (IEEE 1394), S-Video Output, Infrared (FIR)
- 1 Year collect and return (Including International Travellers Warranty)

Acer Aspire 1355XC

£ 657 INC VAT

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AMD Athlon™ XP-M Processor 2600+, Microsoft® Windows® XP Home Edition, 30GB, 256MB DDR, CD-RW/DVD Combo, Modem, LAN, 14.1" TFT, Li-Ion Battery

A2

Acer Aspire 1355LC

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AMD Athlon™ XP-M Processor 2600+, Microsoft® Windows® XP Home Edition, 40GB, 256MB DDR, CD-RW/DVD Combo, Modem, LAN, 15.0" TFT, Li-Ion Battery

AMD Athlon™ XP-M

Acer TravelMate 240

COMPLETE MOBILE CONNECTION

- Mobile Intel® Celeron® Processor up to 2.80GHz
- Microsoft® Windows® XP Professional or Microsoft® Windows® XP Home Edition
- Built-in 10/100 ethernet and 56kb/s V.90 modem
- Li-Ion battery with average 2.5 hours battery life
- 14.1" or 15.0" display options.*
- 256MB DDR RAM (upgradable to 2GB upon availability)
- 20GB / 30GB Hard Disk drive
- Integrated 1.44MB, 3.5" Floppy Disk drive on selected models
- 8/4/24/8x CD-RW+DVD Combo drive
- 1 Year collect and return (Including International Travellers Warranty)

Acer TravelMate 244XC

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Mobile Intel® Celeron® Processor at 2.60GHz, Microsoft® Windows® XP Home Edition, 30GB, 256MB DDR, No FDD, CR-RW+DVD, 14.1" TFT, Modem/LAN

Acer TravelMate 246LC

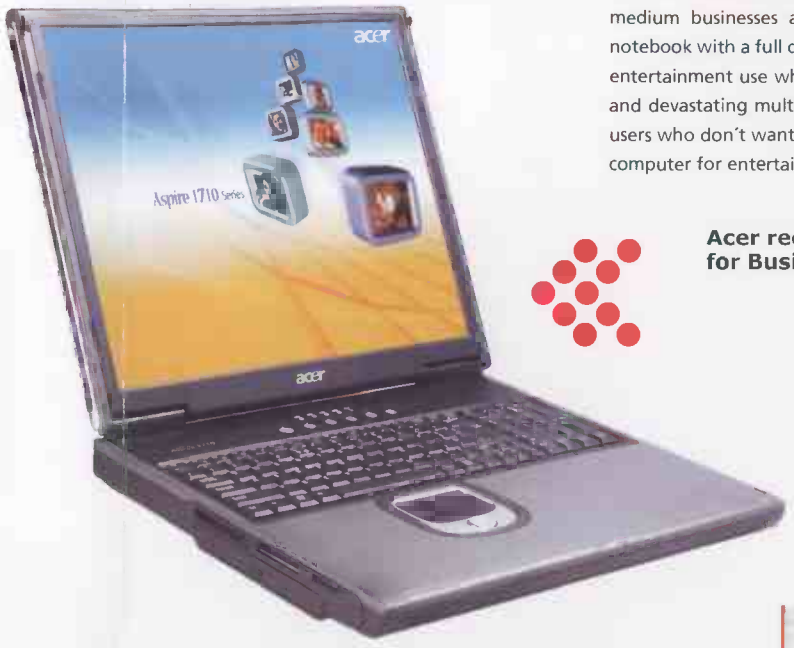
£ 821 INC VAT

£ 699 EX VAT

Mobile Intel® Celeron® Processor at 2.80GHz, Microsoft® Windows® XP Professional, 30GB, 256MB DDR, CD-RW+DVD Combo, 15.0" TFT, Modem/LAN

Acer Aspire 1710

BUSINESS PANORAMA



The Acer Aspire 1710 series has been specifically designed for employees of small and medium businesses and for self employed professionals looking for a transportable notebook with a full desktop sized screen for stunning detail and clarity for both work and entertainment use wherever they stay. Great for relaxed viewing of complex worksheets and devastating multimedia presentations. It is also the ideal choice for selected private users who don't want space consuming PC's around the house, but still need a removable computer for entertainment, access to the internet and for home applications.

Acer recommends Microsoft® Windows® XP Professional for Business.

- Intel® Pentium® 4 Processor up to 3.40GHz
- Microsoft® Windows® XP Home Edition
- 56Kbps modem
- Built-in 10/100 LAN & Wireless LAN.*
- 17"SXGA Display
- 512MB or 1024MB DDR RAM (upgradeable to 2GB upon availability)
- 80GB or 120GB Ultra ATA-100 Hard Disk drive
- CD-RW+DVD Combo Drive or DVD-RW*
- Li-Ion battery with average 1.25 hours battery life
- 1 Year collect and return (Including International Travellers Warranty)

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£ 999 INC VAT
£ 850 EX VAT

Intel® Pentium® 4 Processor 2.80GHz, Microsoft® Windows® XP Home Edition, 512MB DDR, 80GB, CD-RW+DVD Combo, 6-in-1 Card Reader, 17.0" SXGA, Modem, Wired & wireless LAN

Acer Aspire 1714SMi

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Intel® Pentium® 4 Processor 3.40GHz, Microsoft® Windows® XP Home Edition, 120GB, 1024MB DDR, 17.0" SXGA+, 128MB nVidia GeForce FX Go5600, 6-in-1 Card Reader, Modem/LAN, DVD-RW Super Multi-Drive,

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Entry Level Portable DLP™ Projector

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PD112

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- Resolution 1280 x 1024
- Brightness 300 cd/m²
- Contrast Ratio 450:1
- Viewing Angle 140°
- Internal Power Supply
- Response rate 25ms
- Black and Super Slim design
- ISO 13406-2 compliant
- 3 year warranty
- TCO '99

Acer AL1711b

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£255 EX VAT

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17" A WIDE FORMAT FOR A DIGITAL FUTURE

The new AL1751WM 17" widescreen delivers the ultimate visual experience for true entertainment and efficient work performance within one compact and stylish design. The intelligent display features a 16:9 screen format with ultra-brightness and broad viewing angles.

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- Brightness 450 cd/m²
- Contrast Ratio 600:1
- Viewing Angle 170°
- Response rate 25ms
- S Video & Composite
- Digital (DVI-D) and Analogue
- Silver Metallic Sleek design
- External power supply
- 3 year warranty
- TCO '99

Acer AL1751WM

£410 INC VAT
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Purchase the AL1751WM and get a FREE AX120 TV Tuner

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THE NEXT GENERATION OFFICE

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- TCO '99
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- 16.7M
- Viewing Angle 170°
- Brightness 300 cd/m²
- Contrast Ratio 600:1
- Response time 25ms
- Digital (DVI-D) and Analogue
- Super Slim design

Acer AL1921ms

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64bit

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- 80GB ATA/100 HDD
- ATI® Mobility™ Radeon™ 9700 with 128MB
- Integrated: Super- Multi (slot-in) DVD-RW, 4-in-1 Card-Reader
- Connection: WLAN 802.11g, 10/100/1000 GBit LAN
  56K Modem, Bluetooth
- 4x USB 2.0 Ports, Firewire (IEEE 1394),
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- 1 Year collect and return
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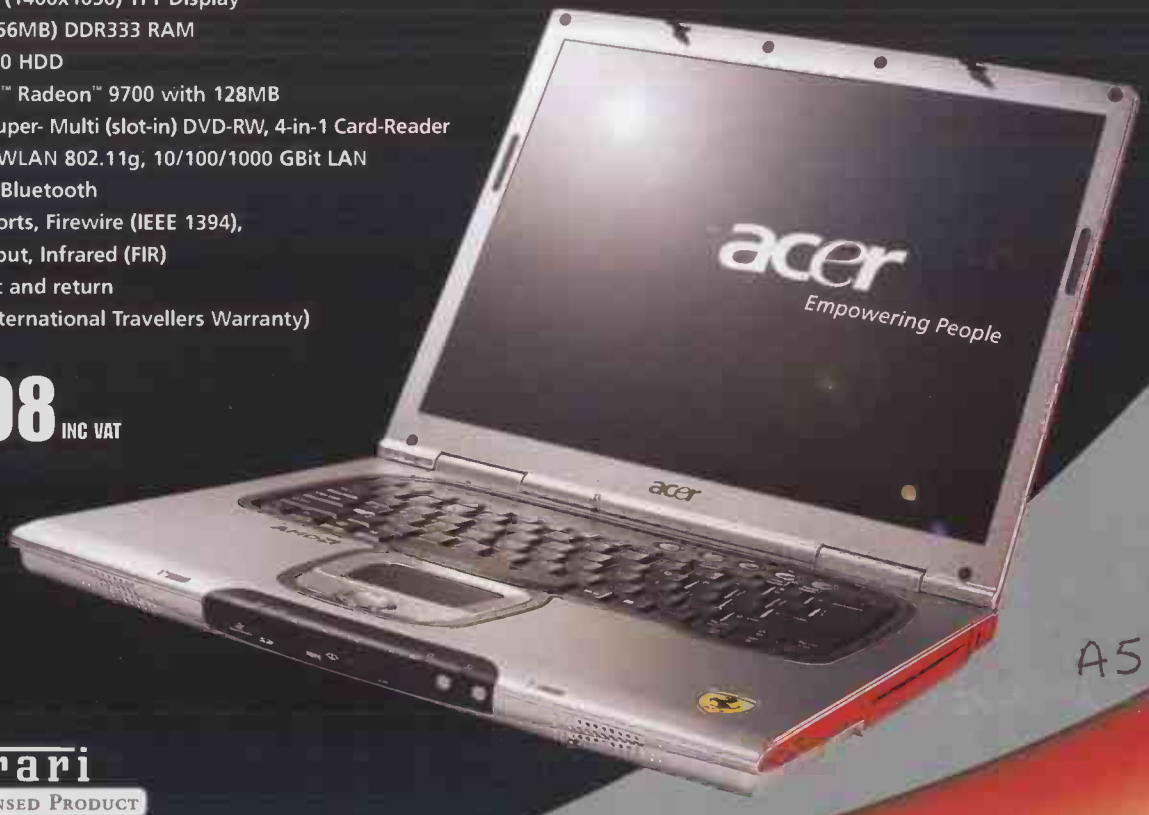

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AMD Athlon™ XP

Don't forget your Acer monitor.
See page 5

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Acer recommends Microsoft® Windows® XP.

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- Microsoft® Windows® XP Home Edition
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- 40GB ATA-100 HDD
- VGA O/B
- CD-RW+DVD Combo
- 56K Modem / LAN
- 6 in 1 Memory Card Reader
- Firewire (IEEE 1394)
- Audio O/B
- 1 Year collect and return

Acer Aspire T120

£ 410 INC VAT

£ 349 EX VAT

AMD Athlon™ XP Processor 2600+,
Microsoft® Windows® XP Home Edition,
Microsoft® Works 7.0 40GB 5400rpm, 256MB/333DDR,
CD-RW+DVD Combo, VGA O/B, LAN O/B, Speakers,
Modem, Firewire, 6 in 1 Card Reader

Acer Aspire T120

YOUR DIGITAL WORLD

Acer recommends Microsoft® Windows® XP.

- AMD Athlon™ 64 Processor 3200+
- Microsoft® Windows® XP Home Edition
- Microsoft® Works 7.0
- 512MB DDR SDRAM
- 160GB ATA-100 HDD
- Audio O/B
- DVD-RW+
- 56K Modem / LAN
- ATI® 9200SE 128MB VGA + TV Out
- Microsoft® Works 7.0
- Speakers
- 6 in 1 Memory Reader
- 1 Year collect and return

A6

Acer Aspire T130

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Microsoft® Windows® XP Home Edition,
160GB, 512DDR SDRAM, DVD-RW+, Microsoft® Works 7.0,
ATI® 9200SE 128MB VGA, VGA O/B, LAN O/B, Speakers,
Modem, Firewire, 6 in 1 Card Reader

AMD 64 Athlon

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* Denotes dependant upon configuration

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Dell Dimension 2400

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Dell™ Dimension™ 2400 2.60GHz

Superb Value

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- Microsoft® Windows® XP Home Edition
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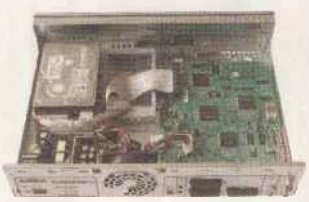

Upgrade your Tivo with the help of our Hardware column
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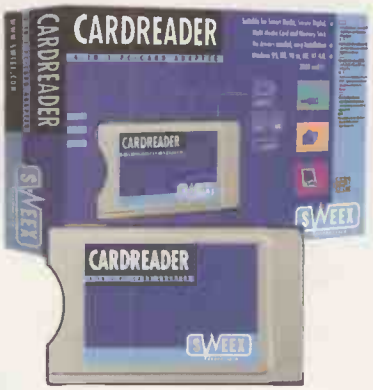

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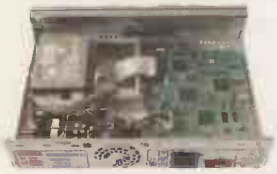
Media centres of excellence

There's no escaping the new face of today's home entertainment systems, says Rob Jones

Media Center
If Microsoft has its way, the PC will become the focal point of home entertainment - but not everyone is ready to take the plunge



Tivo upgrade
Beef up your Tivo system by following our handy tips on tweaks, upgrades and modifications

Last month the BBC phoned, asking me to comment on some independent research that claims PC enthusiasts talk to their computers and develop personal relationships with them. It is the sort of survey that paints technology enthusiasts as socially inept geeks suffering from a personality bypass. Are our readers, the Beeb asked, like that?

It's amazing how, when a keen gardener talks to their plants, or a car enthusiast names and pampers their vehicle, society smiles knowingly and describes them as a little eccentric. But be excited by technology? Then you must be a freak and, frankly, someone who the authorities should keep a close eye on, lest you unleash the pent-up anger you must be harbouring.

So, I told the BBC interviewer, 'No. Our readers are not to be feared.' They may talk to their computer occasionally, but no more than anyone talks to an inanimate object, and more often than not when it doesn't work as expected.

And as for developing a personal relationship – no. Your machine may be important to you, but why wouldn't it be when so many of life's memories and day-to-day necessities are stored on it? If your hard disk dies, or your machine is stolen, you lose (potentially) a lot of personally important stuff.

For many people – and not just enthusiasts – PCs have shifted from being used for gaming or productivity to being a lifestyle machine. Now, people want them as the system from which they store, play, record, edit, print or watch music, photos, DVDs, TV, home movies and so on. It is used to communicate with friends around the world (and soon to talk to them, once Voice over IP becomes popular in the home), play games and also used for work.

And, as PCs become lifestyle machines, other technologies and gadgets will become more important. We've already seen the rise in mp3 players, digital cameras have gone mainstream, and broadband is becoming a necessity.

Once you think of it in these terms, then a large chunk of the population appears socially inept, if we are to listen to surveys with yesterday's attitudes.

These past couple of months, we have actively focused more on the lifestyle element of technology because it comes in so many forms. Media Center may be Microsoft's latest attempt to rule the world, but I've stood in PC World and watched punters get excited at the prospect before the salesman even arrives to talk up the benefits. Now, there may be lingering doubts about trusting your PC to run your home entertainment, but first movers will try anyway, while others will look to similar or close equivalents.

We've been looking closely at a range of technologies over the past couple of months, and using them in the home rather than just in the labs to find out what they are really like to use in everyday life.

The Media Center is reviewed on page 101. We discuss the pros and cons of having one in the home, how simple it is to use, or not, and what needs to be improved. If you don't want a Media Center but would like control of how you view TV, then we've also been putting a Sky Plus box through its paces. For Tivo owners, we've looked at how to upgrade a system, installing a bigger hard drive and getting more recording hours (page 174).

Alternatively, if you believe your PC still belongs in an office or bedroom, but you do want TV capabilities, we've reviewed a range of TV tuner cards, which will come in especially handy with all the sports events that will be broadcast this summer.

Finally, here's a taster for next month: in August we'll show you how to build your own media centre, looking at the software and hardware you need, along with a step-by-step guide to put it all together and get it working.

'For many people, PCs have shifted from being used for gaming or productivity to being a lifestyle machine'

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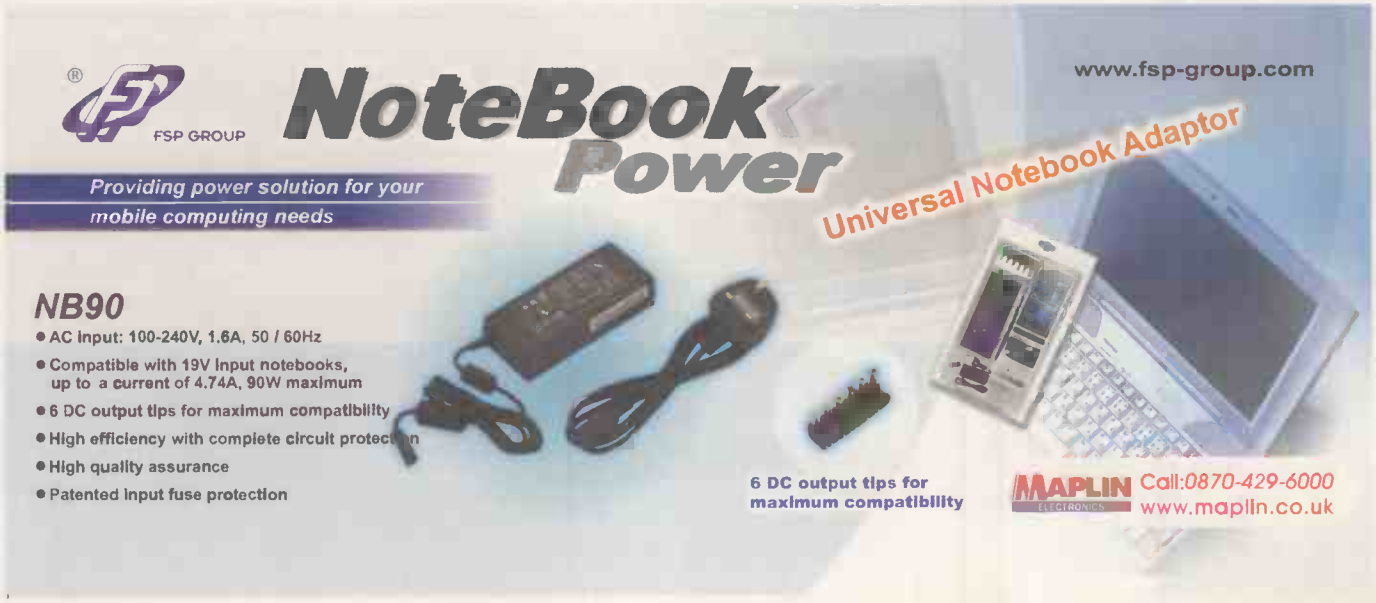
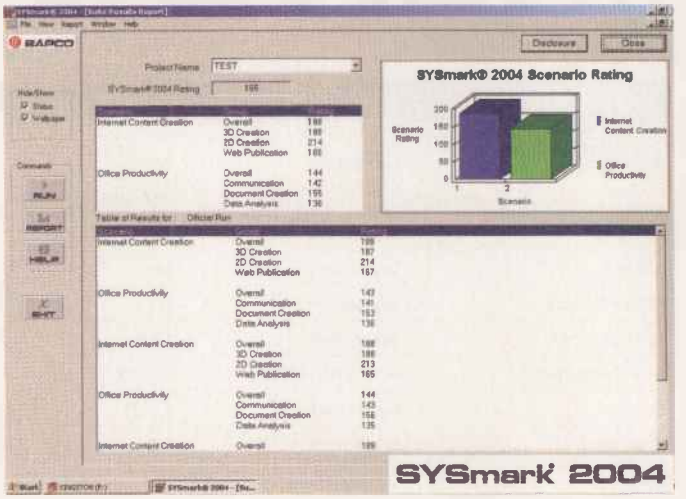


PERSONAL COMPUTER WORLD

vnu labs

PCW uses the services of VNU Labs to perform all its hardware testing. VNU Labs' highly experienced staff use industry-standard benchmarks and methodologies to generate accurate, repeatable test results. Below you'll find the details of the most frequently used benchmarks that *PCW* publishes.



Sysmark 2004 tests system performance by running popular applications

SYSMARK 2004

Sysmark 2004 is a system productivity benchmark, designed to reflect system performance when running the most popular application software in real-world scenarios with real-world workloads.

Sysmark 2004 uses 15 applications, plus anti-virus and compression software, divided into two major categories: office productivity and Internet content creation. It runs through predefined scripts which include concurrent running of applications to test multiprocessing and multithreading capabilities.

In the office productivity scenario, the user creates a marketing presentation and supporting documents. This involves, among other tasks, receiving and detaching documents and email attachments, updating a personal calendar, querying a database, graphing up the results in a spreadsheet, making a slideshow and reviewing the results in a browser.

The Internet content creation scenario includes creating a website targeted at broadband and narrowband audiences. First, a 3D model is rendered into a bitmap while web pages are being prepared. A video movie is then edited from several audio and video clips and processed, while the rendered bitmap file is modified in Adobe Photoshop. Back in the 3D modelling software, the user exports a 3D model as a vector for later use. Once the movie is finished, the user adds special effects and image files before optimising it for faster animation. The final movie is then compressed for delivery over the Internet before the system is scanned for viruses.

Scores are calculated for each of these categories based on various sub-tasks, which are also given individual scores. Individual tasks are scored based on 'response time' – the time the system takes to complete a task initiated by the user. Responsiveness to the user is always scored more highly than the total time taken to complete a number of tasks.

These scores are based on a comparison between the test system and a reference PC with a 2GHz Pentium 4 processor, an Intel D845GBV-based motherboard, 512MB of DDR266 CL2.5 Ram, a 64MB ATI Radeon 9700 Pro graphics card, an 80GB IBM 2MB cache, 7,200rpm hard drive formatted with the NTFS file system and Windows XP SP1.

A score of 100 indicates that the system has a performance equal to the reference PC, 200 indicates twice the performance and so on. We run the benchmark at a resolution of 1,024 x 768 in 16bit colour. It is run three times, rebooting between each category.

When testing PCs and notebooks, we first configure them with standard desktop settings. This includes removing all start-up programs, automatic updates, desktop wallpaper, screensavers and proprietary system tray utilities. This is done in order to ensure the repeatability of tests.

The applications within each category of Sysmark 2004 are as follows:

Office productivity

Adobe Acrobat 5.0.5, Microsoft Access 2002 SP2, Microsoft Excel 2002 SP2, Microsoft Outlook 2002 SP2, Microsoft Powerpoint 2002 SP2, Microsoft Word 2002 SP2, Microsoft Internet Explorer 6.0 SP1, Scansoft Dragon Naturally Speaking 6 Preferred, Network Associates McAfee Virus Scan 7.0, Winzip Computing Winzip 8.1.

Internet content creation

Adobe After Effects 5.5, Adobe Photoshop 7.01, Adobe Premiere 6.5, Discreet 3ds Max, Macromedia Dreamweaver MX, Macromedia Flash MX, Microsoft Windows Media Encoder 9 Series, Network Associates McAfee Virus Scan 7.0, Winzip Computing Winzip 8.1.

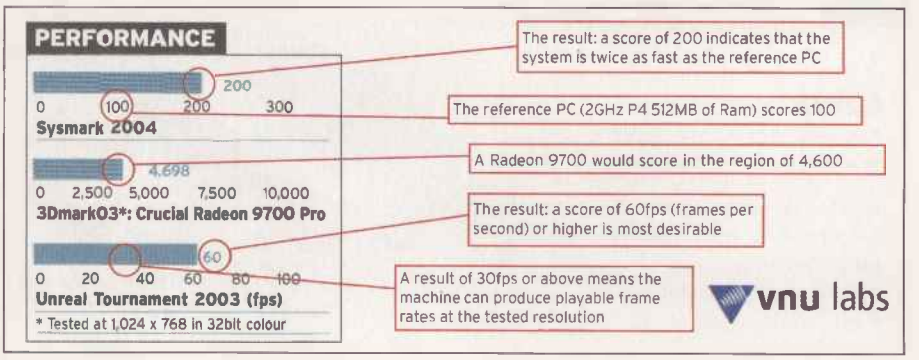
See **www.bapco.com** for pricing information and full details of testing strategies and methodologies.

3DMARK 2001

This algorithmic DirectX test runs three specially coded games, based on the Max Payne engine, at low and high detail. A fourth test only runs on cards that are fully compliant with DirectX 8. This results in higher scores being achieved by these cards than others.

The benchmark is run at its default settings of 1,024 x 768 in 32bit colour. When testing graphics cards, it is also run with full scene anti-aliasing (FSAA) and at 1,280 x 1,024, both in 32bit colour and textures, set to loop three times.

The result is calculated through a combination of the average frame rates for the first three games in both high and low detail, with greater emphasis put in the high detail. The result of the fourth test is then added to this – it has less of a bearing on the overall score.



Unreal Tournament 2003 is used to test real world DirectX performance

PCmark04 measures memory, processor, graphics and hard drive performance

3DMARK03

3Dmark03 consists of four tests. The first examines DirectX 7 performance; the following two are DirectX 8; and the final test is DirectX 9. While in theory this means that any DirectX 7 card could run at least part of the test and therefore achieve a score, none have the raw power to run at the speeds 3Dmark03 demands.

The result is calculated in the same way as in 3Dmark 2001; an average of the frame rates from the first three tests. The results from the fourth test are included, but has a lesser bearing on the final score.

This version will only fully run on DirectX 9 compliant cards. As there are still some systems without this functionality, especially notebooks, we will be retaining 3Dmark 2001 as a standard graphics test where 3Dmark 2003 will not run.

UNREAL TOURNAMENT 2003

We also test 3D gaming performance with the Unreal Tournament 2003 benchmark. The benchmark is featured in the demo version of the game (available for download at www.unrealtournament.com), but not in the full version. Once the demo is installed, the benchmark can be found in the System folder of the UT2003 Demo file.

The test is run with all the default settings and at 1,024 x 768 resolution. Once the benchmark has run, two results appear: a flyby and a botmatch result. We use the botmatch figure, as it is a better representation of frame rates that will be achieved when playing the game.

PCMARK04

Part-way between application-based and entirely synthetic benchmarks, PCmark04 uses a hybrid technology, employing portions of real applications to produce realistic performance results without the overhead of installing complete software packages.

It contains four main suites of tests for measuring memory, processor, graphics and hard drive performance, as well as that of the overall system. It is also customisable, which allows user-specified tests to be configured.

For more information on PCmark and 3Dmark, visit www.futuremark.com.

BATTERY TEST

To get a feeling for the length of time a notebook battery will last, we run a specific test. Based on a looping Excel Visual Basic application, the test opens worksheets, generates random numbers and pivot tables, then zooms, and adjusts the brightness and contrast of an image. The application also includes 2D animation and periodically halts to simulate natural human pauses. The running time is recorded to disk every 30 seconds until the battery power diminishes.

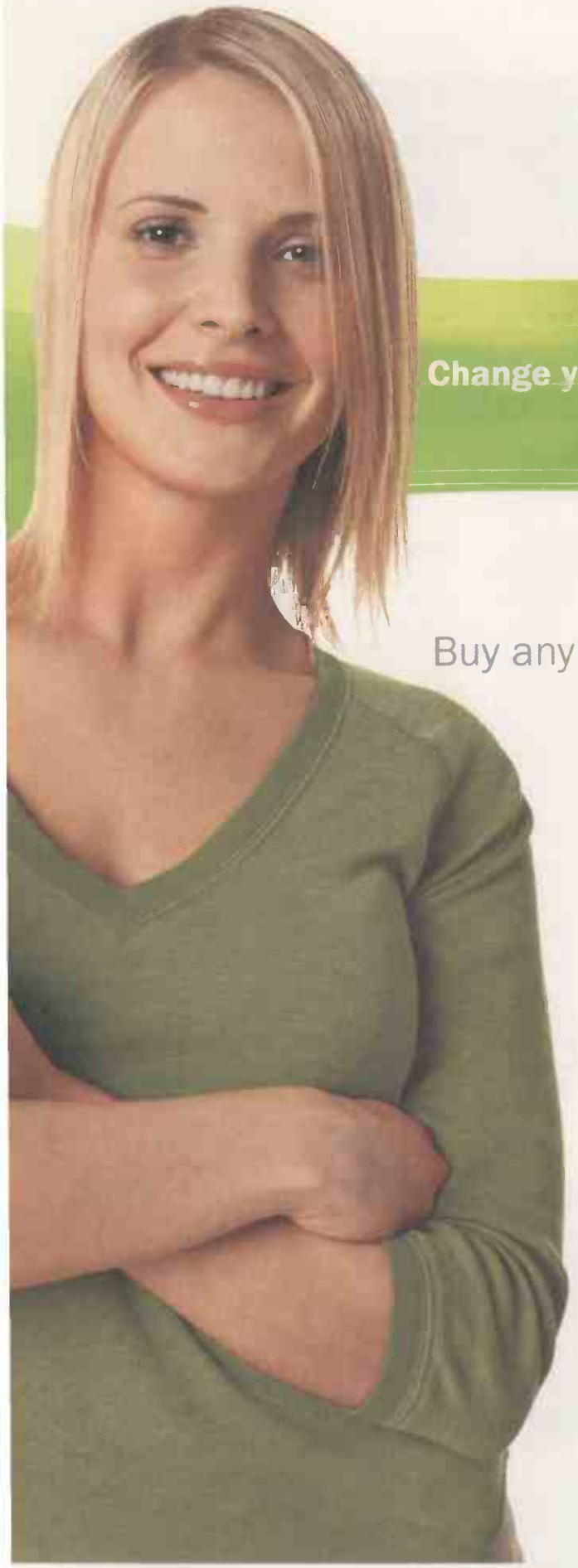
TEST BEDS

When testing graphics cards, motherboards, hard disks and optical drives, we use two test PCs. The first uses an Intel Pentium 4 3.2GHz Northwood C with an 800MHz front-side bus (FSB), the second has an AMD Athlon 3200XP+ using a 333MHz FSB. Each has two 512MB PC3200 modules of Corsair memory, a 120GB Western Digital hard drive with 8MB cache and a Crucial Radeon 9800XT Pro graphics card. Graphics and hard disk tests are primarily performed on the Intel system. A fresh image of the hard disk is applied to the PC before any tests begin, and the same image is then used each time for consistency.

3Dmark03 is so demanding it will only work on the latest cards

3Dmark 2001 tests DirectX performance

Microsoft



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EDITED BY CLIVE AKASS

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It's no joke... access points in street paraphernalia could bring access at up to 400Mbits/sec almost anywhere, a UK firm believes.

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PCW numbers

You'll see references in some stories to *PCW* numbers. To find out on these stories go to www.pcw.co.uk and put the number in the box provided.

Virus warning

Virus companies have reminded users to update their patches, firewalls and anti-virus software following the recent outbreak of the Sasser worm.

BBC open-sources archive

The BBC is promoting an open-source codec that could offer an alternative to commercial modules like Windows Media 9 for delivering high-quality video content. The ultimate aim is to provide a way of making BBC archives, which amount to a national memory bank, freely available online.

The BBC is in the process of redefining itself, with its charter due for renewal next year at a time when multichannel digital TV is changing the broadcasting landscape. One result is a recognition that BBC content should be made available as far as possible to a public that has paid for it through licence fees.

Michael Grade, speaking at the launch of BT's new Rich Media platform (see page 23) in his first public engagement since his appointment as BBC chairman, warned that there are formidable problems involving copyright and repeat fees for performers.

The new codec, called Dirac, is part of a research programme to address the technical issues; its alliance of the ideals of public-service broadcasting and collaborative open-source development contrasts with the commercial imperatives behind code such as Windows Media.

Rivals complain that the BBC offers unfair competition – few could afford the resources it puts into its website, for instance. On the other hand, the site is the most popular in Britain – while Microsoft stands accused of unfairly promoting Windows Media 9 (see box above).

Some BBC site users complain that they have to download a commercial Real Networks player to access existing video and audio content. Tim Borer, principal BBC research and development engineer, said that to format content for three or four rival players would be an expensive nightmare. 'What we really want is one format that is freely available for people to download... [Dirac] is a move towards that.'

Dirac is still experimental but an unoptimised alpha version was demonstrated at the Linux User and Developer show (though it will compile for Windows and other platforms) with a statement saying: 'The BBC would like to collaborate with the open-source community, academics and others to produce an open codec.'

Dirac is designed to provide efficient coding for resolutions as low as 180 x 144 and up to high-definition TV's 1,920 x 1,080 using standard compression techniques. Borer said the legal issues are complex and it is not yet clear whether the code uses someone's patents.

He said some of the million hours of material 'stuck in BBC archives' could not be made available for copyright and other reasons. 'Nevertheless there is a lot that we do have the right to use and we will try to make it available to as many people as possible.' **Clive Akass**

DivX maverick – see page 22.
Linux show report – see page 27.

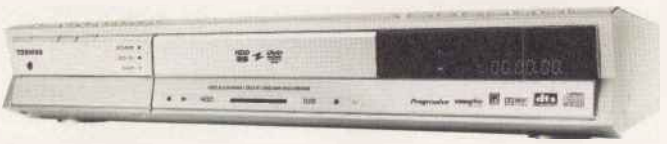
Microsoft fine 'stifles innovation'

Microsoft has issued a seven-page response to the European Commission's finding that it unfairly promoted its Windows Media Player. The company, which was fined £331m, said: 'The Commission is seeking to make a new law that will have an adverse impact on [intellectual property] rights and the ability of dominant firms to innovate.' It claimed the ruling went well beyond legal precedent 'by asserting a broad and ill-defined duty on dominant firms to share the fruits of their research and development with other companies in the same market.' It has until June to lodge an appeal.

Toshiba demonstrates the flip side of convergence

Toshiba unveiled its latest consumer electronics range last month, offering a reminder that convergence cuts both ways. On the one side you have PCs linking with TVs and hifis (see page 101) and on the other you have intelligent consumer devices pretending that they are not computers.

So you get devices such as the RD-XS32 personal video recorder (above right), which not only includes a hard-disk and a DVD burner supporting both the DVD-Ram and DVD R/W standards, but also video-editing features you'd expect only in a computer.



Toshiba's mouth-watering LCD TVs have a PC input of some kind so that they can double as a monitor; but, unlike many TV-enabled displays sold as monitors, they do not support picture-in-picture capability so you can watch TV while working.

Digital projectors straddle both markets, though some are optimised for video use. Toshiba launched its lightest yet, the 900g £1,995 ex VAT P6, almost pocketable at just 5.21 x 9.37 x 24.77cm. The S20, available soon from major stores, is craftily designed for both data and home video use and so may sell as a tax-deductible perk.

Many vendors believe that the networked home, which is essential for full-fledged convergence, is a long way off for all but the likes of *PCW* readers who understand IT.

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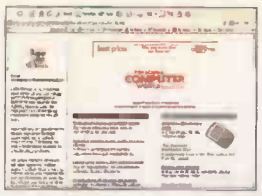


ATI Radeon X800 Pro & XT
Read our review of ATI's two new graphics cards

ATI doubles performance

This month sees ATI release its next-generation graphics chip, the Radeon X800. Based on a completely new architecture, the X800 offers a two-fold increase in performance over the previous 9800 series.

We review the X800 XT and, exclusively, its little brother, the X800 Pro, on page 45. The XT means ATI retains its crown as manufacturer of the fastest graphics card, while the Pro shows how a mid-range card should perform.

ATI has worked hard to increase visual quality as well as the speed. New features include better anti-aliasing for smoother edges and ATI's own 3Dc normal map compression. Normal maps use light vectors to make low-vector models appear more detailed. They can take up a lot of memory, which is where the 3Dc compression comes in. The results can be seen in the picture (above), which is taken from ATI's 'Ruby' demo. Pricing as we went to press was set at $499 (£285) for the R800 XT and $399 (£228) for the Pro. Street prices are likely to plummet as competition with Nvidia heats up. **David Ludlow**

Read my lips... for an idea of the photo-realism generate by the X800

Cable speeds up as BT woos business

BT stepped up its broadband-based services last month as its cable rivals boosted line speeds to 50 per cent faster than leading ADSL providers at a given price.

NTL and Telewest, which cover different franchise areas and so are not direct rivals, offer 750Kbits/sec services for £25 a month – the price many ADSL providers charge for a 500K link (see table). Some ADSL providers are cheaper: Plusnet offer 512K at £14.99 inc VAT a month, but that is capped at 1GB a month.

BT has avoided offering sub-512K services but announced in March that it will introduce flexible bandwidth, allowing users to turbocharge their links on demand (see *PCW*, June). It also announced a new Rich Media platform to deliver content to users (see page 23).

Pierre Danon, chief executive of BT Retail, said last month that, with BT committed to offering broadband to 99.6 per cent of Britain by next year, it was time to start providing content and services.

He was launching a service called Connected and Complete, in partnership with Microsoft, that will act as an IT department for small businesses. It would, for instance, give a small five-user business a broadband link with firewall and anti-virus protection, Microsoft Office Small Business Edition, and Microsoft Exchange, for £48 per person a month. Installation will be done by local authorised dealers, who will also perform six-monthly 'health checks'.

Prices vary with the size of the firm and you can buy only part of the package – perhaps Exchange, which is expensive and tricky for small firms to set up.

Office software will sit on local machines but updates and backups will be done remotely, said Mike Galvin, BT Retail's director of Internet operations.

But will firms balk at the price? 'They are getting all the services on top,' said Galvin. 'People might not bother if their Office software is not up to date, but it's quite a different matter with email, where you are buying all the protection and management. It gives you peace of mind.'

EXISTING SPEED	NEW SPEED	PRICE
NTL		
150Kbits/sec	300Kbits/sec	£17.99
600Kbits/sec	750Kbits/sec	£24.99
1Mbit/sec	1.5Mbits/sec	£37.99
TELEWEST		
256Kbits/sec	256Kbits/sec	£17.99
500Kbits/sec	750Kbits/sec	£25
1Mbit/sec	1.5Mbits/sec	£35
2Mbits/sec	3Mbits/sec	£50

Note that prices vary depending on the added TV and telephony services customers buy

Midentity parade

A UK start-up backed by US web pioneer Esther Dyson has launched a product called Midentity aimed at helping you keep contact details up to date.

A free client synchronises with Microsoft Outlook and updates details held by other Midentity users; future versions will offer handheld address books on phones and PDAs. Unlike the similar US Plaxo service, it also allows you to send SMS messages from your PC.

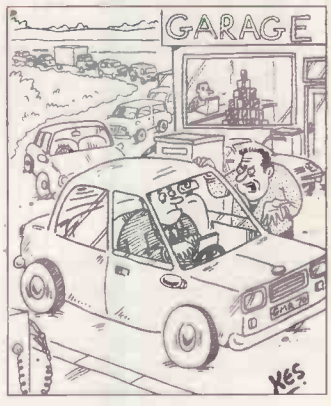
You can set up multiple groups for sharing different information or prioritising emails. Charges are from £2 a month. Text messages cost £2.50 for 30.
www.midentity.com

New Palms

Palm One has unveiled two new Zire handhelds. The Zire 72 has a 320 x 320 colour screen, a 1.2megapixel camera, an mp3 player and Bluetooth, and will cost $299 (£169). The Zire 31, offers colour, mp3, a photo viewer and revamped organiser software for $149 (£83).

Wifi pitstops

Texaco has rolled out wireless hotspots to more than 100 of its garage forecourts around the UK aimed at helping business people keep in contact with their office.
PCW number 1154605



You'll have the World Wide Wait jamming up the A65 if you sit here much longer

>> TBL award

Sir Tim Berners-Lee has won the first £667,400 Millennium Technology Prize from the Finnish Technology Award Foundation. 'Less than 15 years after he first thought of it, the web has connected millions of people all over the world,' said Professor Bill O'Riordan, who nominated him.

Berners-Lee thought of the idea in 1989 while working at Cern, the European particle physics laboratory, as a way of allowing dispersed workers to share information.

It was based on a program he had written 10 years earlier for his own use to 'keep track of all the random associations one comes across.' He called it Enquire, short for Enquire Within Upon Everything, a Victorian-era encyclopaedia.

>> School porn

Eight per cent of email received by schools is spam – 52 per cent of it pornographic, according to a company called Email Systems which has won a three-year contract for filtering and management services for up to 2,700 London schools.
www.emailsystems.com

>> Meet online

The developers of remote-access service GotomyPC, now owned by Citrix, have launched a new product to facilitate secure online meetings. A time-limited free trial of Gotomeeting is available at www.gotomeeting.com.

>> ADSL spreads

BT has set itself a deadline of summer next year to ADSL-enable 1,128 exchanges, making broadband available to 99.6 per cent of the British population. The company has scrapped trigger levels restricting upgrades to areas with sufficient number of potential subscribers.

>> 3G data cards

Vodafone is selling 3G data cards, providing access to intranets, email and office applications, at its 64 stores for between £50 and £180 depending on tariffs.

Learn to live with hackers

Two in three British businesses suffered an IT security breach last year, and the number of attacks has doubled in two years, according to research commissioned by the Department of Trade and Industry (DTI).

Viruses and misuse by staff are the most common source of problems, but unauthorised access, fraud and theft also cause problems, said the Information Security Breaches survey unveiled at the Infosecurity 2004 show.

The number of accidental breaches causing system failure or data corruption has stayed roughly steady but they are now outnumbered by malicious attacks, it says. Larger companies are hit by a virus attack once a month and 94 per cent of them had a security incident in the past year.

Stephen Timms, minister of state for ecommerce, described the research as an important wake-up call. 'This survey shows the scale of the effort business needs to make. The costs will only increase until companies follow best practice.'

Polycom claims this is the first PC monitor to include a fully secure videoconferencing system. The 17in VSX 3000 has a camera, microphone, speakers and supports AES encryption. It is integrated with Polycom's Weboffice portal, enabling users to launch video calls with a single click on a buddy list

Chris Potter, the partner at Pricewaterhousecoopers who carried out the survey of 1,000 companies, said most are not spending enough on the problem – not even one per cent of turnover. There is also a lack of skilled staff. Businesses cannot expect to avoid hackers and viruses and should concentrate on responding quickly to problems, according to senior IT executives at the show.

Paul Stimpson, global head of technology risk management service delivery at investment bank ABN Amro, warned: 'You are going to get hit so start planning for it now. It's all down to how you manage the problem. Having a solid firewall isn't going to help you any more.'

Gerhard Eschelbeck, chief technical officer for Qualys, said the time to reverse-engineer an attack in order to patch in a defence is a major problem. He urged companies to use an automated patch management system to allow them to focus resources on other areas of IT security.

John Meakin, group head of information security at Standard Chartered Bank, added: 'This is a game of catch-up. Rule number one is to manage your time and look at how best to use it on your assets.' **Iain Thompson**

Hidden perils on web pages and disks

Attacks stemming from rogue code on web pages are on the increase and may pose the next big security threat, according to a report from the Computing Technology Industry Association (Comptia).

More than one in three businesses have been hit by such attacks in the past six months, a 25 per cent increase in a year, according to the survey of nearly 900 organisations.

Web pages containing rogue code can look completely harmless but they can be used to steal information or sabotage systems.

Meanwhile, a survey by Internet service provider Earthlink and privacy specialist Webroot Software found that web-linked PCs have an average of 28 items of 'spyware'. The survey found 29.5 million instances of spyware in a scan of just over one million machines.

Matt Cobb, Earthlink's vice-president of core applications, said most were related to advertising and were relatively benign but 300,000 were more serious system monitors and trojans that could be used for identity theft or data corruption.

Typically, spyware comes with freeware or shareware, or via email or instant messaging programs, and begins reporting the next time the user goes online. Some rogue code records virtually everything a user does, including keying in passwords.
www.compta.org

One-stop check for problems

A one-stop-shop for information on vulnerabilities in software of all kinds has been set up under an open-source intiative.

The Open Source Vulnerability Database (www.osvdb.org) has been collecting data for the past two years and now plans to distribute it freely and update it with at least one new vulnerability every day.

'Getting reliable and complete information on security vulnerabilities is typically a hunt among dozens of websites and mailing lists, not to mention dealing with proprietary and copyrighted information,' said OSVDB founder Tyler Owen.

'No more. The folks at the OSVDB have been busy building a database and system to catalogue and explain thousands of vulnerabilities.'
PCW number 11540

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★★★★★ RATING IN computeractive
February 2004

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Numbers up for new chips

Intel has launched three mobile processors based on its latest 90micron Dothan architecture, using new part numbers that play down the significance of clock speeds.

The Pentium M 755, 745 and 735 clock at 2GHz, 1.8GHz and 1.7GHz respectively, and have a 400MHz front-side bus (FSB) and 2MB of Level 2 cache. By contrast, processors using the older Banias design have 130micron features, 1MB of cache and clock a maximum 1.7GHz. Prices were not available as we went to press.

Despite their higher speeds, the newer processors draw less power: 21w compared with 24.5w for the Banias designs. These are peak figures used in the thermal design of products using the chips.

The reduction is thanks in part to improved Speedstep technology that reduces clock speed and operating voltage to match the task in hand.

Centrino motherboards using the Dothans support both the 11b and faster 11g flavours of wireless networking. Intel will launch Dothans with a 533MHz FSB later this year, together with the Alviso chipset that includes Dolby 7.1 sound and support for 11b, 11g and 11a Wifi.

The move to part numbers has been greeted with some derision at AMD, which has argued for years, in face of Intel scorn, that clock speeds are a poor guide to performance. All Intel processors will now have a three-digit number beginning with 3, 5 or 7 depending on the size of the feature set.

Performance boosts are coming increasingly through parallelism – doing more tasks per cycle – rather than clock speed, which cannot be pushed up indefinitely.

MMX technology: Intel's PXA27x processor range will enable small devices to support 3D graphics and 4megapixel cameras

Intel has also launched a new range of mobile chips based on its XScale architecture, which uses cores designed by the UK chip designer ARM.

The PXA27x range, formerly known as Bulverde, draws on two technologies developed for Pentiums: Speedstep to reduce power consumption, and Multimedia Extensions (MMX) to the instruction set that boost graphics processing.

A new multimedia processor, the 2700G, supports the mpeg2 and mpeg4 video standards; 3D processing has also been boosted.

IBM opens up development of Power5

IBM is taking cues from both UK chip designer ARM and Linux developers for the launch of its next-generation 64bit Power5 processor. From ARM it takes the idea of the processor core around which licensees can build peripheral logic or complete systems-on-a-chip. IBM will also encourage open-source style development of systems and applications.

'This is a watershed in the history of computing because we are establishing the Power Architecture as an open, modular and pervasive platform,' said Nick Donofrio, IBM senior vice-president of technology and manufacturing.

Donofrio said the move would allow IBM to explore what it calls the 'community model' that will free developers from the restraints of the proprietary processor model. But he added that the basic instruction set remained 'highly controlled'.

A company statement said: 'IBM also will explore the notion of opening up our community and collaboration around Power Architecture. We will look at new governance models that will allow us to involve the community in Power Architecture's future and to help set the stage for further innovation.'

IBM's current Power4 chips are used in Apple's G5 models but the Reduced Instruction Set Computer (Risc) architecture goes back 14 years and has powered devices as diverse as the PC and Nintendo's game cube.

The Power5 is dual-core (that is, two processors in one) and supports multithreading which turns each of those cores into a virtual multiprocessor. IBM is expected to ship Linux-based blade servers using the chip later this year.

>> Voice tablet

Motion Computing has put a dual-microphone array with noise cancellation on its latest Tablet PC to allow voice input to complement the pen-driven screen. The M1400 (pictured below, with keyboard), uses Intel's 1.1GHz low-voltage Pentium M and has a wide-viewing-angle 12in LCD screen and a fingerprint scanner for secure log-in.

UK business development manager Andy Toal said: 'Voice is good for note-taking and gathering supporting information, but limitations in the microphones on laptops usually mean you need a headset.'

The system comes with 256MB of 333MHz DDR memory, expandable up to 2GB; and a 20GB, 40GB or 60GB hard disk. Prices start at £1,350 ex VAT.

>> Quick charge

NEC has developed a battery that can run a minidisc player for eight hours on one 30-second charge, giving it roughly the capacity of the nickel-hydride cells used in digital cameras. NEC says its 'organic radical battery' can also discharge quickly, making it useful for delivering large bursts of power. The company told Reuters that it did not know when it would commercialise the new battery.

PCW number 1154125

>> Paper disk

A 25GB disk for Sony's emerging Blu-Ray drives consists of paper that has been pulped and soaked with plastic. The disk, codeveloped by Sony and the Toppan Print Company, can be shredded like paper to avoid data thieves.

PCW number 1154434

>> Videostudio 8

Videostudio 8, the latest version of Ulead's video-editing package, includes new wizard-driven tools to create professional video. Watch out for a review in *PCW*.

DivX maverick back in fold

Rota... picked up Microsoft code

Jérôme Rota, better known as Gej, is a dark horse in the epic battle over the future of the movie industry. He's the man behind the DivX format widely used to distribute movies on peer-to-peer networks, that Hollywood fears will do for its sales what mp3 file 'sharing' did for music.

Now Rota has gone legitimate, forging alliances with the very movie makers who once saw him as the enemy and putting him full square in competition with Microsoft.

He admits DivX has been used illegally but says, in effect, that you can't blame the maker of a hammer if it is used to smash windows. On the matter of legitimacy, he can cite the EC's Competition Commission, which fined Microsoft £331m for alleged unfair use of Windows to promote its rival Media Player format (see page 16).

While Hollywood fights to protect revenues from movies, the IT industry is fighting for royalties from the devices that play them. Microsoft has just scored a major victory in getting the DVD Forum to provisionally approve its Media Player 9 format as mandatory for high-definition DVD players (together with mpeg2 and mpeg4, which Rota describes as a subset of DivX).

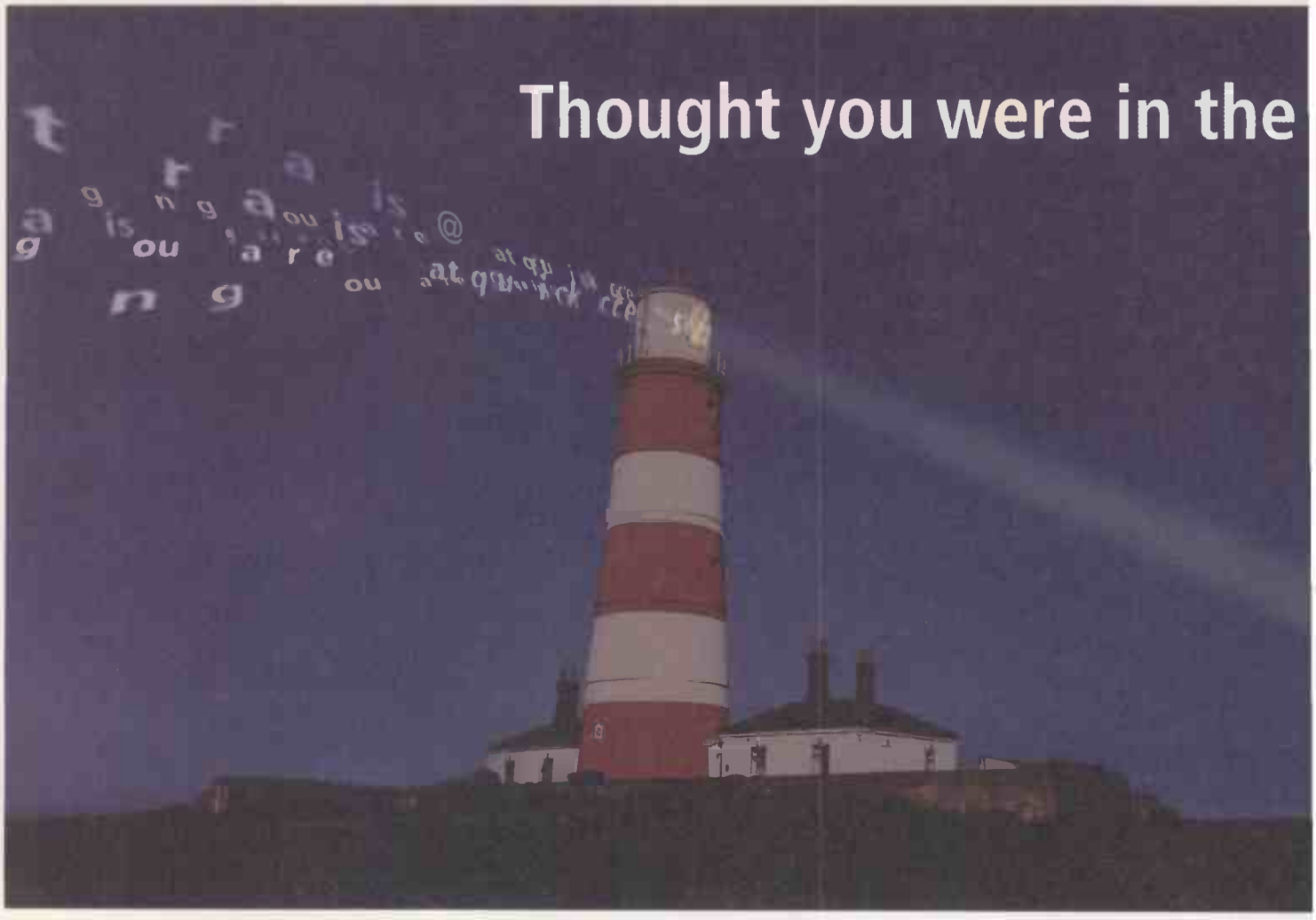
But Rota says movie moguls fear Microsoft's record of embracing technologies such as the web browser and Java, and 'extending' them with features available only with its software. 'If you give your eggs to Microsoft to distribute you don't know what will happen with them,' he said.

Ironically DivX began as Microsoft code. Montpelier-born Rota, who has degrees in electrical engineering and art history, came across it as a freelance video artist in 1999 when he used a Windows Media beta to show his portfolio.

The final version had usage restrictions so Rota extracted the codec (compression and decompression code) and used that. He named it DivX after Digital Video Express, an ill-fated 1998 scheme for selling movies online. The format quickly became the mp3 of video and caught the attention of Harvard-trained lawyer Jordan Greenhall, who co-founded a company called DivX Networks with Rota.

The original code has been rewritten to avoid legal problems and outdoes mpeg4 by packing near DVD-quality movies on one CD. For online delivery the code adjusts its buffer to ensure movies are delivered at the same quality whatever the data rate: the slower your line, the longer you wait for it to start.

Now major companies such as Toshiba are producing players supporting DivX and Rota has had to swap subculture chic for industry credibility. 'There will always be some who will not like the change. But most people... they just want to get their movies,' he said.



You too can be a TV mogul

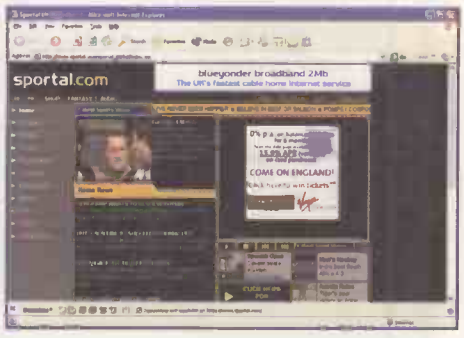
A combination of laptops, broadband and digital video cameras is about to create a new grassroots industry by taking TV out of the studio and putting into the hands of the people.

Wedding videos are already big business, but broadband is creating opportunities for small production units that can capture events such as local football matches or music gigs with potential audiences too small for the big TV companies, but large enough for a webcast to be financially viable.

Schemes such as BT's Rich Media platform, launched last month, can stream the content, protect copyright and even provide a payment mechanism.

BT envisages football clubs selling clips of match highlights to subscribers, or bands selling their music videos, creating a demand for those with the skills to produce work people will be willing to pay for. BT Rich Media, partnering with Real Networks, also provides tools to allow content to be edited remotely. Chief executive Andy Brown says it is revolutionary in encompassing both the personal market, where families and friends sharing pictures and videos and the 'small professional' market.

He added: 'Rich Media is a platform to enable thousands of content providers to reach an audience of millions.'



Live and kicking... Sportal.com uses the Rich Media platform

Peter Lewington, managing director of In The Box Media, points out that powerful laptops can do the work of an expensive editing suite. His company makes professional-class videos for sites such as www.sportal.com at a fifth of the production costs of a traditional TV unit.

www.intheboxmedia.com
www.btrichmedia.com

Now FM radio gets in the picture

Nokia has teamed up with HP over a scheme to bring to FM radio the kind of multimedia experience some believe will eventually be delivered by Digital Audio Broadcasting (DAB).

The new 'Visual Radio' scheme, aimed at phones with FM radios, will allow radio stations to augment a standard radio program with text and pictures webcast over GPRS. Initial trials will take place in Britain, Finland and Singapore.

DAB can include all types of content in its broadcast data and so would earn less money for the operator than 'visual radio', though both use the phone as a back channel to advertisers and other services.

A pilot scheme in Germany uses Digital Video Broadcasting (DVB), the TV equivalent to Dab, to send multimedia to mobile devices. www.visualradio.com

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California steaming

The world's most famous high-tech area has been going through some hard times. But it has bounced back full of ideas developed when times were slow. Tim Bajarin reports

Every half-decade or so, I get a rash of media requests for a comment about the death of Silicon Valley. They come when the area is going through one of its cyclical slumps and I always point out that their question are somewhat presumptuous. Even I had my doubts about the Valley's ability to rebound after the bust in 2001, but I need not have worried.

Remember that the Valley has well over 1,500 high-tech companies, led by heavyweights such as Hewlett-Packard, Intel, AMD, National Semiconductor, Sun Microsystems, Oracle, Siebel Systems, BEA, Google and Yahoo, as well as IBM and Xerox's thinktanks. Slowdowns are painful for companies and laid-off employees, but they focus minds on innovation and allow time for R&D projects.

Now the Valley is in an upswing again, the fruits of these labours are starting to come to light, and some key technologies are emerging that will have an impact in the very near future.

One is in the area of high-speed communications. Technology from a new company called Powerwan is one of the first powerline architectures to solve the last mile issue: how to get data down the final stretch to the office or home. Powerwan installs a modulator in a 200megawatt (or less) sub-station that uses the power grid to deliver high-speed Internet access to any electrical socket. Its ability to distribute high-speed signals to as many as 500 homes from a single modulator sets it apart from other similar technologies.

Powerline transmission in the UK has come under fire for allegedly interfering with RF broadcasts – see www.pcw.co.uk/features/1153611.

Intel is working on new chips that support Wimax, AKA 802.16, a Wifi-based technology that can deliver data as far as 30 miles instead of 200 feet and could provide low-cost links for entire cities. It could also provide Voice-over-IP phone links in remote areas and underdeveloped nations where landline phones do not reach.

OQO's Ultra Personal Computer measures just 4.9 x 3.4 x 0.9in and weighs just under 400g, yet it runs a full version of XP on its 1GHz Crusoe processor/s. It has a 20GB hard drive, 256MB of Ram, 802.11b Wifi, Bluetooth and Firewire and USB 1.1 ports

And of course Intel is making a play for the consumer market with its Entertainment PC (a digital entertainment hub similar to Microsoft's Media Center) and new Liquid Crystal on Silicon (LCOS) chips that could bring 42in displays capable of screening High Definition TV to the market as soon as 2005.

Another device causing a lot of buzz is the UPC (Ultra Portable Computer). This is being championed by chip maker Transmeta and is a handheld computer that can run Windows XP and all its applications.

The first company to bring out a UPC is OQO, also located in Silicon Valley. Microsoft co-founder Paul Allen's investment company Vulcan Ventures, and IBM offshoot Antelope, are also working on UPCs that should hit the market later this year.

The devices are larger then a PDA but much smaller then a 10in tablet. A couple of the devices will include either a virtual keyboard or one that folds out as part of the design.

Another Silicon Valley chip maker, famous for chips that drive millions of DVD players, is creating reference designs that many consumer electronics companies are using as platforms for next generation digital entertainment hubs.

Zoran, whose headquarters are in Sunnyvale CA, is working on a 'smart DVD' system that includes a hard drive, a DVD recordable drive and software that turns it into a personal video recorder while at the same time creating an environment that lets you turn any TV into a powerful digital media entertainment centre. The concept of a digital entertainment hub based on this type of smart DVD platform is gaining ground with many of the major consumer electronics companies adopting these devices as part of their digital home initiatives.

There is one other exciting technology being cooked up in Silicon Valley that is worth mentioning, although I cannot name the company behind it at this time. However, if what they have pans out and they are able to get the technology approved worldwide for use in aircraft, it could radically change the way laptops, PDAs and even cellphones are designed in the very near future.

The company appears to have created a hydrogen fuel cell that can deliver up to 20w to a laptop, and power it for as long as 15 hours on a single replaceable fuel cell. There are other hurdles to the broader use of this technology, such as creating low-cost cells that can be bought at any airport or corner store like alkaline batteries. But the technology looks promising enough to suggest that fuel cells will be powering small devices sooner rather than later.

Add to this important work at IBM's labs in Almaden that could give us hard drives that can handle terabytes of data, as well as electronic paper coming from Xerox Parc, and you begin to see that Silicon Valley is humming again and ready to help drive technology even deeper into our business and personal lives.

Lampposts talk business

Clive Akass reports on a plan to put network nodes in street paraphernalia to provide advertising-sponsored wireless web access at low cost almost anywhere in town

Low-cost high-speed wireless web access as pervasive as the mobile phone network could soon be a reality... with the aid of talking lampposts. That's the claim of a UK company called Last Mile Communications, which is being taken seriously enough for its patented technology to be included in two rival tenders for a government scheme to upgrade the data network that lines Britain's arterial roads.

This uses 63GHz radio links with frequencies an order of magnitude higher than Wifi or cellphones and a correspondingly higher data rate: between 40Mbits and 400Mbits/sec, peaking around a thousand times faster than 3G phones. More to the point, the system will have far more capacity than is needed for services envisaged by the Highways Agency, which plans to sell on the extra capacity.

The radio has a range of only around 250m so the system is built round a mesh of base stations that talk to each other as well as to passing traffic, passing on messages until a landline is reached (see box below right). Last Mile's idea is to extend this network into cities, setting up low-range nodes in lampposts and other roadside items.

The nodes would support multiple communication technologies (even including infra-red) so that at launch they would talk to passing Wifi-equipped handhelds and notebooks and move on to faster links when available.

Whether the system would be able to cope with the formidable problems of routing and handovers as users meander among picocells remains to be seen, but Last Mile chief executive Anthony Abell is confident that it will. Trials begin in Exeter this year and there could be commercial deployments as soon as 2005.

Crucially, the company thinks it has figured out a way to make the scheme profitable, which partly explains why it has such an apparently inappropriate name. 'Last mile' usually refers to the connection between the local phone exchange and the user; the company has redefined it to mean the space between the edge of the fixed network and the untethered user.

Last Mile wants to make that edge as intelligent as possible so it can deliver access and services to mobile users. 'The key is to make lampposts smarter,' said Abell, and he is not joking.

He plans to install 150,000 lamppost modules, costing around £200 each, that will have a large cache of location-based information – weather and traffic news, council forms and announcements, events, hotels, garages and so on.

Abell reckons advertising would cover the cost of each module within a few weeks. 'It's an electronic equivalent of roadside hoardings – except that it is interactive. You can contact the advertisers.' he said.

Users will get a software module called the Magicbook that will allow them to choose which information they want to receive. But not all users would be mobile. People living near the lampposts will be able to use them as Internet on-ramps that are independent of local cable or phoneline access. Abell says he could deliver access for a third of the current cost of a 512K broadband link – though cached public-service information and advertising will be free.

Last Mile would not sell access directly. That would be done by operators that would buy rights to a particular area. The scheme could face competition from digital radio (Dab), which could deliver similar localised advertising on an existing infrastructure, using the cellular network as a back channel.

Last Mile cannot be faulted for lack of imagination and a picocell architecture along these lines makes a lot of sense in cities. It is similar to the idea of a 'whispering wireless' net highlighted previously in *PCW* (see PCW number 1127685): the low transmit power maximises user density, extends battery life on client devices, and goes some way to reassure people who fear health damage from radiation.

An alternative scenario would be for all home and office Wifi nodes to have both a public and private face, subsidising personal use by providing passers-by with web access.

Ironically, Abell reckons operators that buy into his system will include cellular companies which not so long ago forked out £25b for the right to deploy 3G in Britain, and once hoped to recoup that investment partly from localised services very like those envisaged by Last Mile. 'That was the wrong technology, in the wrong place, at the wrong time,' Abell said.

Travelling the new road network

Contracts for the National Roads Telecommunications Services Project are expected to be awarded this autumn. The upgraded network will augment existing services such as breakdown assistance with emerging telematic applications, which exploit global positioning (GPS) and wireless comms to provide services to vehicles and drivers. On the plus side this will be able to warn drivers of traffic jams and accidents, even imposing instant speed limits to prevent a crash developing into multiple pile-ups.

On the minus side, at least from the point of view of fast drivers, it will be able to maintain a permanent check on vehicle speeds so that there will be no more racing between radar checks.

Nodes will be spaced further apart than the 250m range of the 63GHz telematic signal, and communicate with each other using a longer-range technology – possibly optical. Data will delivered to vehicles in bursts – a car travelling at 70mph will have a 'window' of just under eight seconds on each node.

Thin times in Soho

Low-cost thin clients that front apps sitting on another machine can make sense in small offices and homes, as well as large enterprises – but don't count on them saving you money

Thin clients are creeping back into the office, and reaching into the home, after going rapidly in and out of fashion during the network-computer craze when they were vaunted as the death of all things Microsoft.

No-one would have guessed from that hype, stirred up mainly by Sun and Oracle, that thin clients are the oldest form of desktop computer... a low-power terminal acting as a front end for applications running on a server.

A Windows terminal looks to the user just like a standard PC, except that it has no local storage (though you can also get 'fat clients' with their own disks and other facilities).

The network computer differs only in that it runs applications itself, and so may need more processing power. But, like the terminal, it lacks local storage and uses code and data sitting on a server.

In both cases, hardware costs may be lower, security is tighter, and the software is easier to maintain because it sits on a single machine. It has to be said that thin clients tend to be less popular with users in the workplace than with IT staff, who get more control over how machines are used.

Thin clients are moving into the home with the boom in Wireless networking and the convergence between consumer electronics and computing. Microsoft's Media Center Extender, which lets your TV (or some other client device) screen video or stills piped from your PC, is a thin client; so is the Smart Display, which acts as a window on a remote XP PC, although itis becoming harder to buy.

Both these products exploit a back door into Windows XP Professional called the Remote Desktop Protocol (RDP), originally designed to allow support staff to take control of a distant machine when sorting out problems. You can use RDP software, freely downloadable from Microsoft, to turn an antique PC into a powerful thin client, allowing you, for instance, to use your XP desktop workhorse from anywhere in your home via an old Wifi-equipped notebook.

Organisations, particularly in the public sector, commonly defer costly hardware upgrades by doing something similar on a large scale by configuring old PCs as thin clients. But they tend eventually to swap the PCs for 'real' thin clients to get better graphics, according to Peter Bolton, European vice-president of Neoware Systems. 'A resolution of 800 x 600 is no longer good enough for today's applications,' he said.

Neoware, a preferred thin-client supplier to IBM, has just launched a new range starting at just £129 ex VAT. You'll have to buy a monitor separately. They are targeted mainly at medium to large businesses, which can save a fortune on the cost of scores or hundreds of new PCs. But how much sense do devices like this make on a small scale? It depends on what you want to do – and be warned that you are not necessarily going to save money, said Paul Randle, Windows client product manager at Microsoft UK.

Thin clients can make sense for firms with several people using mobile devices on the road because both desktop and untethered machines will use the same central data store, facilitating synchronisation and maintenance.

Very small organisations might get away with a single server. Most, Randle says, would need one 'terminal server' interacting with the client machines, plus one server per department for running office applications. That means at least two server software licences, plus all the client licences.

You'd also need to be fairly skilled to set it up, and few very small business have trained, dedicated IT staff. 'But we have done a lot of things with Windows Server 2003 to make it easier,' said Randle.

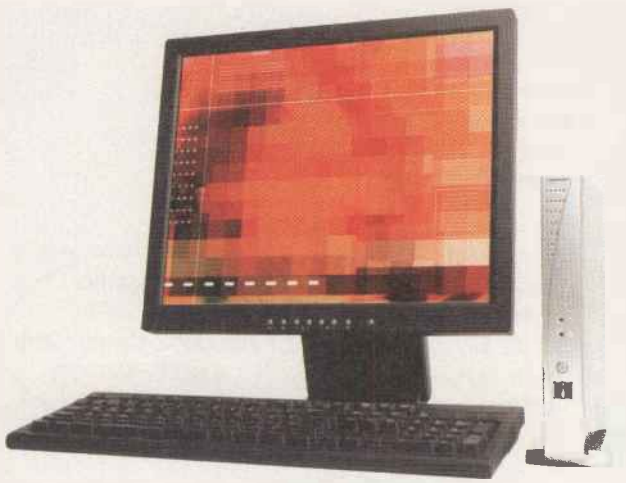
All this is off the scale for home users, though a modern PC is perfectly capable of running office applications for two or three thin clients at once. The family edition of Microsoft Office allows for three users but they have to use three PCs, because XP Pro's RDP currently supports only one user at a time.

The Service Pack 2 update of XP, due this summer (see review page 84), will allow up to five concurrent sessions of the Media Center version of XP, but only for the purposes of accessing multimedia content. You could not, for instance, have three people writing letters using Word on the same host machine. Randle agrees that this could become an issue as home clients proliferate – even TVs are beginning to sprout keyboards.

Intriguingly, the RDP client does not need to run Windows. Some Linux-based Neoware clients, for instance, can front an XP machine. So you could have a mobile Linux device that runs organiser-style applications on the move but can act as a Windows terminal at base– the kind of transitional device that may be necessary if open source is ever go truly mainstream.

Linux does not need as much processing power or memory as Windows but an open-source mobile is not necessarily cheaper to manufacture than a Microsoft-based notebook. 'Component costs on PCs are cheaper because so many are being made,' said Neoware's Bolton

One thing does seem clear: the single-user restriction on XP applications stems from a licensing rather than a technical issue. And if Microsoft does not do something about it, someone else will. **Clive Akass**



Clients going Neoware fast

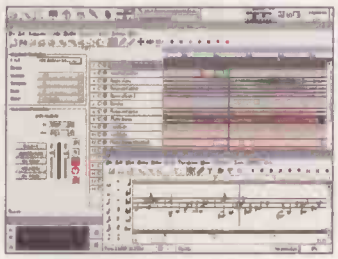
Neoware's new range of thin clients comes with management tools that ease integration with existing systems. Its entry-level Linux-based Capio One, pictured above, supports resolutions up to 1,280 x 1,024. It has two USB ports, which would seem to make it vulnerable to attacks or data theft, but Neoware said use of the ports can be controlled from the server. A new Eon e100 runs Windows CE .Net, XP Embedded or Linux and costs £239. Other models include one in the form of a flat-panel display, and pen-driven wireless e500 tablet.

Novell bounces back with Linux

Einstein once told a man who apologised for repeating questions he had asked previously: 'Don't worry. This time the answers are different.' Surjit Chana, vice-president of marketing strategy with IBM's software group, said the same could be said of Linux after a year in which it had advanced on all fronts.

He was speaking at the Linux User and Developer Expo at Olympia, where the small number of exhibitors seemed at first sight to belie this view. But they included some very big hitters: IBM, HP, Sun, the BBC (see page 16) and Novell, which bought Suse Linux in November.

Novell sounded more upbeat than at any time since the glory days when its Netware OS ruled world networks. Matt Asay, director of Linux business development, pointed out that Novell still turns over $1b a year with technologies such as identity management and Groupwise collaboration.



Site promises you a Rosegarden

This Rosegarden sequencer software was being put through its paces at the Linux User Expo by one developer, Chris Cannam, of Fervent Software (www.ferventsoftware.com). It is described as the Linux answer to Cubase and you can try it out, even if your PC runs Windows, by creating a self-booting CD with code from http://download.agnula.org/1.1/1.1.1. The CD will also include other audio utilities. Be sure to check your Bios settings so that your PC will boot from a CD

'These have been gaining market share though Microsoft killed the underlying Netware OS [with Windows NT],' he said. The Suse deal meant customers could get these features 'on top of an operating system [Linux] that they really want. They can get the best of both worlds.'

Linux has done best where it can be set up by experts to perform a narrow range of tasks, but it cannot yet compete with Windows as a general-purpose desktop OS. Asay said Linux was proving itself on handhelds.

Novell's strategy was to get Linux onto the desktop via the enterprise which tended to have a limited range of applications in a very controlled environment.

Novell's primary focus was on servers, where people were now much happier using Linux for mission-critical tasks. Asay predicted that it would match Microsoft server software feature for feature in two years.

He conceded that Apple, with Mac OSX, had put a successful graphical front end on a Unix-based OS, but said the company was 'the most proprietary on earth'. He added: 'The open-source community might take a longer time to get there but the result will be a lot better.'

See www.pcw.co.uk/Specials/1138116 for our Linux reports.

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Two Phone ports on the Vigor 'V' routers enable you to make free voice calls to other Vigor routers, existing VoIP infrastructure or other compatible clients worldwide (inc. Windows Messenger) making maximum use of your broadband connection.

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The Vigor series of routers and firewalls is available for ADSL, ISDN, Midband/Highway, cable-modem (NTL/Telewest) or any other Ethernet Internet connection. Providing shared access to the Internet from your whole LAN, the Vigor series combines thorough feature set with top performance. Visit our web site for details of the complete range.

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Iomega revs up Zip drive

Storage specialist Iomega has launched a 21st-century version of its Zip drive, which introduced 100MB cartridges costing around £10 – at a time when hard-disk capacities were still measured in megabytes and download speeds were a trickle.

The Iomega Rev drive uses 35GB cartridges costing £39 – around 100 times cheaper per megabyte than the original Zips launched in 1995. But whether it can repeat their phenomenal success is another question.

Zips sold because they offered a cheap way to take the overflow from hard disks, and became a standard way to exchange large files in publishing and graphics houses. Iomega's shares soared until Zips began to be squeezed out by CD burners, high-capacity hard disks, and broadband.

Iomega's Rev drive is much the same size as a Zip, but its cartridges store 350 times more data

Iomega is positioning the Rev as a faster, random-access alternative to tape backup, which chief executive Werner Heid described as a 'relatively fragile, slow and expensive linear-access technology'.

The Rev could also find a market among video enthusiasts and professionals, at least until high-density DVD burners hit the shelves. The device comes with software enabling users to set up automated backups.

An internal Atapi Rev drive costs £229, and an external USB2 model costs £238. A Firewire version is imminent and SCSI and Serial ATA (Sata) versions will ship in September.

Iomega says storage jukeboxes using Rev cartridges will be available from BDT, which makes autoloaders for the likes of HP, IBM, Quantum and ADIC.

Meanwhile, Fujitsu Europe launched a portable drive using removable 3.5in 1.3GB magneto-optical (MO) media. The USB2 DynaMO 1300 U2 Pocket drive weighs just 410g and fits in a jacket pocket. It costs £130.

Pointing power made easy

Interlink's Remote Point Navigator 2.4 is one of those devices that makes a virtue of doing a limited range of tasks well. It's designed to allow you to navigate Powerpoint demonstrations with just three controls: next slide, back a slide and blank display. A fourth control activates a laser pointer. The £119 ex VAT device is particularly useful for people given to waving their hands about for emphasis during demonstrations, as its radio works from any direction. It uses the same 2.4GHz band as Wifi and Bluetooth, but Interlink insists that it will cause no interference problems. www.rpnav.com

Sophos goes for double whammy

A new package from Sophos can update itself as often as every hour to protect small businesses from spam and viruses, the company says.

The Small Business Suite is the first Sophos product to include anti-spam features. Senior software consultant Graham Cluley said the two nuisances of span and viruses are now so intertwined that it made sense to tackle them together.

He said there was evidence that virus writers have sold spam companies lists of machines infected with Trojan code, providing 'back doors' for use by intruders. 'If you are sitting on a broadband connection and you have no anti-virus or firewall software, than your machine may be used to churn out adverts for Viagra,' Cluley said.

Infected PCs have also been used to launch Denial of Service attacks on anti-spam companies. 'Spam is no longer just about marketing. There are some very nasty people involved.'

Sophos has tried to make its new Small Business Suite as easy as possible to install. 'If you wish, you can just set it up and leave it running,' Cluley said. 'But there is also an easy-to-use interface to allow administrators to set or change preferences.'

A Sophos survey of 4,000 businesses found that 80 per cent reckoned spam made them less productive, yet only 23 per cent took any measures against it.

Prices for the new package start at £319 for a five-user pack, which includes a year's updates and 24-hour support. Sophos reckons it is the fourth largest anti-virus firm in the world, and with offices across different time zones, it claims to be able to able to get early warning of viruses. www.sophos.com

>> 11g gets a boost

US Robotics is boosting the peak rated speed of its 802.11g Wifi Turbo products by 25 per cent to 125Mbits/sec. People who have already bought its 11g Turbo products can upgrade them with a firmware download that will be posted on www.usr.com by early June.

Like all proprietary Wifi enhancements, the upgrade will only work with others of the same make. The 11g flavour of Wifi is rated officially at 55Mbits/sec, but several companies offer 100Mbit variants – and in all cases the true throughput is likely to be less than half the rated speed.

USR has also launched a £299 inc VAT ADSL router that includes four Ethernet, two USB2 ports and one Firewire port.

Free software will enable the USB ports to be used for printers or disks, allowing the device to act as a network print and file server. It also has a firewall with VPN support.

>> Skin up FTP

The latest version 3 of the Beyond FTP file-transfer utility has a revamped Explorer-like interface, with a choice of 'skins' to give users the look and feel that they prefer. A powerful script language allows procedures to be automated. It costs $95 (£52) from www.beyondftp.com.

>> Paper disk

A 25GB disk, for Sony's emerging Blu-Ray drives, consists of paper that has been pulped and soaked with plastic. The disk, co-developed by Sony and the Toppan Print Company, can be shredded like paper to avoid data thieves. PCW number 1154434

>> Boxed business

Evesham has launched what it describes as a 'business in a box' – a PC loaded with Microsoft Office 2003 and a fully integrated suite called Mamut, which helps manage customers, suppliers, products and projects – for £699 ex VAT. www.evesham.com

>> Double take

HP has launched its first Athlon XP-based desktop in the UK, with prices starting as low as £299 ex VAT – as rival Dell said none of its latest models support AMD chips.

The HP Business Desktop dx6050 features integrated Nvidia Geforce 4 MX graphics, DDR333) memory, integrated 3Com network interface, six USB2 ports, and a standard three-year guarantee. It is targeted at small businesses and the education market.

Dell is testing Intel's yet-to-be-launched 64bit Xeon but says it does not plan to offer machines using AMD's available 64bit PC chips. It began selling printers last year in competition with HP and now plans to sell a wider range of peripherals.

>> Free PC snag

A company offering free sponsored PCs has deferred delivery after discovering that prospective users planned to avoid viewing adverts for an agreed three minutes an hour.

Metronomy, which was due to send out the first machines in February, was also alarmed by web chat suggesting that people were applying under false names, said chief executive John Thornhill.

He said Metronomy would send out a limited number of PCs in June, but would keep a tight rein on the situation to prevent fraud. **Dinah Greek**
PCW number 1154179

>> £549 Mac

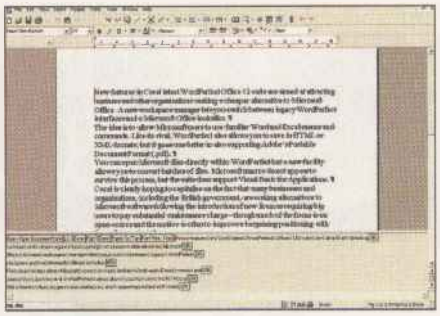
Apple has launched an Emac with a combined DVD player and CD burner, a 40GB hard disk and a 17in monitor. It is targeted at students and costs just £549 inc VAT. For £150 more you can get one with a DVD burner and 80GB disk.
www.apple.com/uk

>> Quick return

Parceline has set up a service for laptop repair companies, under which it will pick up a machine, package it in a special box called a sawpit and return it within 48 hours assuming, of course, that it has been repaired.
www.parceline.com

Wordperfect fights back

New features in Corel's latest Wordperfect Office 12 suite are aimed at attracting business and other organisations seeking a cheaper alternative to Microsoft Office. A new workspace manager lets you switch between legacy Wordperfect interfaces and a Microsoft Office lookalike.



Many Wordperfect hotkeys, known to millions in the days before Windows, still work in the latest version. So does Reveal Codes (pictured), which allows file-level editing of formats – a feature never matched in Word, where it is hard to correct text that mysteriously reverts to a cancelled format

This feature aims to give Microsoft users familiar Word and Excel menus and commands. Like its rival, Wordperfect also allows you to save in HTML or XML formats; but it goes further in supporting Adobe's Portable Document Format (pdf).

You can open Microsoft files directly within Wordperfect and a new facility lets you convert batches of files. Macros do not translate directly in this process, but the suite does support Visual Basic for Applications. Many organisations, including the British Government, are seeking alternatives to Microsoft software because of new licences requiring big users to pay maintenance charges.

Corel reckons the suite will cost companies up to 52 per cent less than implementing Microsoft Office. The standard edition costs £235 ex VAT and a lower-priced educational package is expected to follow.

Wordperfect was once the world's leading word processor, and boasted an integrated office suite long before Microsoft Office was a gleam in Bill Gates' eye. It lost ground to Word with the transition from a text-based interface to Windows – partly, legend has it, because Microsoft programmers had privileged access to secret fast hooks into the operating software.

Look out for a full review in next month's *PCW*.

Designer mice take on airs

Time was when the mouse was a modest, unpretentious little creature nestling in your hand. But designers cannot leave it alone and the mouse is beginning to adopt all kinds of airs and graces. Literally so in the case of the Air-Flo mouse (inset right), which blows air over your hand as you work.

The Perific Wireless Dual Mouse (far right) has a split personality, functioning as a standard mouse when called upon to do so, but capable of shedding its casing and clamping onto your hand while you type at the keyboard. Herman Bynke, managing director of supplier Hela, claims this versatility helps people suffering from or wishing to avoid repetitive strain injury (RSI). 'Good ergonomics is all about constantly varying the way we work,' he said. The makers say it helps combat the effects of RSI.

The Air-Flo mouse costs £29.95 from www.boysstuff.co.uk. The dual mouse costs around £100 ex VAT – see www.hela.co.uk/perific for details of distributors.

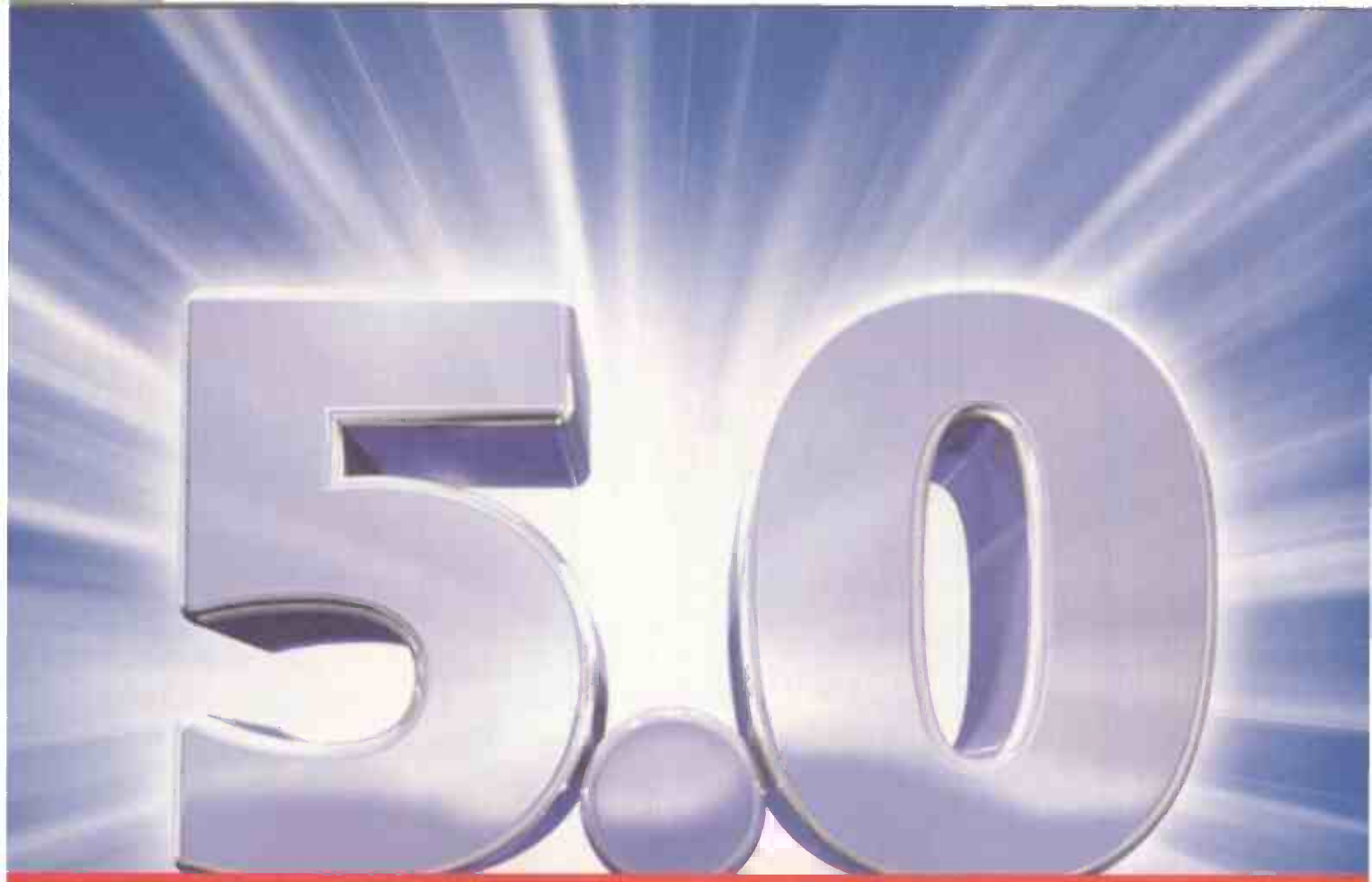
How to put Windows apps on the web

Windows applications can be used by any web-enabled device anywhere in world using a system from a Reading-based company called Appswing.

Screen rewrites from an application running on a Windows terminal server are intercepted and information required by the remote user is extracted and reformatted in dynamic HTML for a web server.

Screens can be customised for displays of all sizes, according to technical director Neil Thompson. 'We can work with most Windows applications except some Java apps that bypass the operating system,' he said.

Thompson added that the system can web-enable Windows applications at a fraction of the cost of other methods, and it does so without interfering with existing business logic or directly accessing a company database.
www.appswing.com



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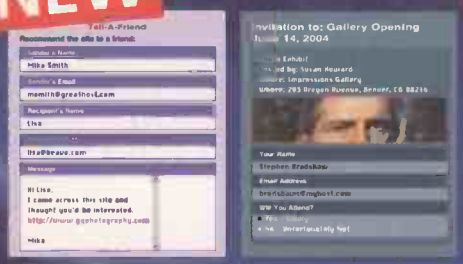

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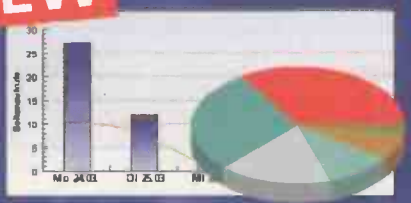

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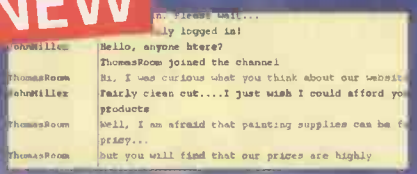

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Sub-domains	10	10
Point external domains to 1&1	50	50
WEBSITE/CONNECTIVITY		
Web space	500 MB	500 MB
FTP Access Account	1	1
Monthly traffic included	5 GB	5 GB
Protected by up-to-date Firewall	✓	✓
Daily backups	✓	✓
APPLICATIONS		
WebsiteCreator	12 pgs	12 pgs
Full Version Software worth £400	✓	✓
New 1&1 Control Panel	✓	✓
EMAIL		
POP3 email accounts	100	100
Autoresponders included	✓	✓
Email aliases	400	400
New 1&1 Webmail	✓	✓
Virus Scanning for Account	1 POP3	1 POP3
Newsletter Tool	✓	✓
WEBSITE FEATURES		
Ready-to-run CGI Libary	✓	✓
FrontPage 98/00/02, Extensions	✓	✓
Password Protection	✓	✓
Raw Logfiles	✓	✓
CRM/E-COMMERCE		
1&1 WebStatistics	✓	✓
1&1 WebElements	✓	✓
Chat Channel	1	–
Customisable Forums	✓	–
EXPRESS SUPPORT		
Free Express Support	✓	✓
Technical Email Support	✓	✓
Comprehensive FAQ's	✓	✓
Step-by-step online guides	✓	✓
Online account management	✓	✓
£ per month	4.99	5.99

BUSINESS PACKAGE

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	🐧	🪟
DOMAIN NAMES		
Sub-domains	100	100
Point external domains to 1&1	100	100
WEBSITE/CONNECTIVITY		
Web space	1.5 GB	1.5 GB
FTP Access Accounts	3	3
Monthly traffic included	10 GB	10 GB
Protected by up-to-date Firewall	✓	✓
Daily backups	✓	✓
Shared SSL or optional own SSL Certificate	✓	✓
Password protection	✓	✓
APPLICATIONS		
WebsiteCreator	25 pgs	25 pgs
Full Version Software worth £400	✓	✓
New 1&1 Control Panel	✓	✓
EMAIL		
POP3 email accounts	500	500
Autoresponders included	✓	✓
Email aliases	100	100
New 1&1 Webmail	✓	✓
Virus Scanning for Account	3 POP3	3 POP3
Newsletter Tool	✓	✓
WEBSITE FEATURES		
PHP4, Perl & Free CGI	✓	–
MySQL Database	1x100 MB	–
Access Database Supported	–	✓
ASP Scripting Supported	–	✓
Ready-to-run CGI Library	✓	✓
FrontPage 98/00/02, Extensions	✓	✓
Password Protection	✓	✓
Raw Logfiles	✓	✓
SSI	✓	✓
CRM/E-COMMERCE		
In2Site Dialogue	✓	✓
1&1 WebStatistics	✓	✓
1&1 WebElements	✓	✓
1&1 WebDatabase	✓	✓
Chat Channels	5	–
Customisable Forums	✓	–
EXPRESS SUPPORT		
Free Express Support	✓	✓
Technical Email Support	✓	✓
Comprehensive FAQ's	✓	✓
Step-by-step online guides	✓	✓
Online account management	✓	✓
£ per month	8.99	9.99

PROFESSIONAL PACKAGE

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	🐧	🪟
DOMAIN NAMES		
Sub-domains	600	600
Point external domains to 1&1	200	200
WEBSITE/CONNECTIVITY		
Web space	3 GB	3 GB
FTP Access Accounts	25	25
Monthly traffic included	40 GB	40 GB
Protected by up-to-date Firewall	✓	✓
Daily backups	✓	✓
Own SSL Certificate	1	1
SSH Access	✓	✓
Password protection	✓	✓
APPLICATIONS		
WebsiteCreator	25 pgs	25 pgs
Full Version Software worth £400 plus FrontPage 2002	✓	✓
New 1&1 Control Panel	✓	✓
E-MAIL		
POP3 email accounts	1,200	1,200
Autoresponders included	✓	✓
Unlimited email aliases	✓	✓
New 1&1 Webmail	✓	✓
Virus Scanning for Account	10 POP3	10 POP3
Newsletter Tool	✓	✓
WEBSITE FEATURES		
PHP4, Perl & Free CGI	✓	–
Advanced Developer Tools	✓	–
MySQL Database	2x100 MB	–
Access Database Support	–	✓
ASP Scripting Supported	–	✓
ASP.NET & .NET Framework	–	✓
MS SQL Database	–	✓
SQL Import	–	✓
Ready-to-run CGI Library	✓	✓
FrontPage 98/00/02, Extensions	✓	✓
Password Protection	✓	✓
Raw Logfiles	✓	✓
SSI	✓	✓
CRM/E-COMMERCE		
In2Site Dialogue	✓	✓
1&1 WebStatistics	✓	✓
1&1 WebElements	✓	✓
1&1 WebDatabase	✓	✓
Chat Channels	10	–
Customisable Forums	✓	–
Cron Jobs	✓	✓
EXPRESS SUPPORT		
Free 0800 Emergency Support	✓	✓
Technical Email Support	✓	✓
Comprehensive FAQ's	✓	✓
Step-by-step online guides	✓	✓
Online account management	✓	✓
£ per month	16.99	19.99

Total price per month + VAT. One-off set-up fee, £9.99

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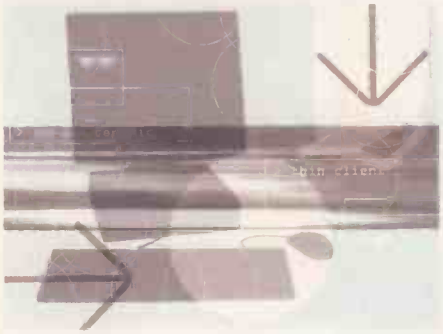
Letters



Server-based computing >

I read with great interest Alan Stevens' article on server-based computing in the Network section of *PCW* May 2004. I am the only person responsible for all the ICT in an International School in Norway, including looking after the network which spans two sites. I implemented a Windows 2000 Terminal Services network two years ago, upgrading from separate NT4 client-server networks.

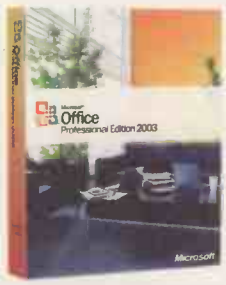
The benefits that Terminal Services has brought to the school with its 450 users has been immense, not to mention the benefit to me as network administrator. Previously I would spend a great deal of my time travelling between the two sites to deal with the various problems that users had to install/upgrade software on the PCs at both sites. Now I am pretty much able to manage the network from the comfort of my office and installing and updating software is simply a case of putting it on the three terminal servers and/or the file server and firewall.

The staff and students enjoy a much better level of support, despite the fact that I am the only support person, because I am able to remotely interact with their sessions and sort out problems or demonstrate how to they can do things in particular programs by taking control of their session. Server-based solutions may not be appropriate for every organisation but I can testify to the benefits that TS brought this organisation. And with Windows Server 2003 things look even brighter!

Michael Meszaros

Access denied >

Having read the reviews for this year's office suite releases (*PCW*, May 2004), it seemed that investing in the latest edition of Microsoft Office may be a wise idea. Although there are other programs available, Office is the software of choice for my school and, as a 16-year-old student, I qualify for Microsoft's Student/Teacher software package. However, this licence only includes Word, Excel, Outlook and Powerpoint, so there is no Access or Publisher included.



As it is almost impossible to attain any widely recognised IT qualification without creating a database or using a DTP application, I find it a highly unconvincing purchase. Alternative solutions involve purchasing both programs separately or buying the full version of Office 2003 Professional. Either option doubles the cost of a purchase, so until Microsoft offers the professional suite with an educational

WIN!

The author of the Letter of the Month will win a copy of Showcenter from Pinnacle Systems.

Connecting to your PC via either the included Ethernet cable or an optional wireless PC Card, Showcenter allows you to watch the likes of DivX movies on your TV. You can also listen to mp3s and view pictures stored on your hard drive, while the fully featured remote control means you never have to leave your armchair. To find out more about Showcenter head to www.pinnaclesys.com.

Letter of the month

The price we pay for cheap PCs >

The demise of Multivision brings to a head the issue of how much we are willing to pay for a PC – budget is one of the key parameters we all set when looking at a new system. We want the best components for the price – the best video card for gaming, large disks for photo collections and so on – but the budget limit applies.

The trouble is that similar classes of PCs contain similar components, for which the different system builders have paid almost the same prices. It is only when you get to the purchasing power of companies such as Dell that significant price reductions can be achieved. It must be one of the last manufacturers to have bespoke components made for it – others such as Acer and Fujitsu-Siemens are using standard components with branded Bios menus.

We all know Microsoft is very tight on its pricing so how can one manufacturer undercut another similar machine from someone else? The only thing available is service costs and it is fairly evident that some system builders are eating into that part of the overall cost of the machine when they reduce the margins on a specific build.

I suspect that we will see many more system builders go to the wall as they try to undercut each other in order to get more market share. Eventually only the larger organisations with economies of scale in their service departments will survive, then watch the prices rise! Let's face it, when it's cheaper for me to go into a high-street retailer and buy a ready-made branded PC than to buy the parts and build it myself as I have always done, there's something odd going on. The public, including me, have got to recognise the true cost of our systems and accept that we are going to have to pay higher prices in the future: we certainly don't now.

Alan Stewart

Kelvyn Taylor replies > You're right to point out that smaller system builders can be disadvantaged when competing on price alone. But according to analysts IDC, in the last quarter of 2003 the top two PC vendors in the UK accounted for about 37 per cent of sales – so there's still a long way to go before industry domination.

licence (as it did with Office 2000), I'm sticking with my current version.

Stuart Pradhan

Missing the Powerpoint >

I'm no great fan of Microsoft, but Steve Rymer's letter (*PCW* June) about the contents of the different versions of Office was factually inaccurate, and I'm surprised you published it without comment.

Office Small Business Edition (SBE) never used to include Powerpoint, it was only ever Word, Excel, Outlook and Publisher, plus some small business tools. This only changed with Office 2003, when SBE included Powerpoint in addition to the other apps for the first time. Presumably this was a response to the demands of users who felt that they needed Powerpoint in SBE.

Should Microsoft have left the contents of each edition unchanged, so that people will always know what they are getting? I can see the logic in that argument to some extent, but Microsoft has decided to change things, as it often does; at least it's had the decency to only add things to the editions, and not remove them – none of the current 2003 editions have 'lost' any of the core applications, they've either remained unchanged or gained applications.

Phil Stanton

Kelvyn Taylor replies > Yes, we should have spotted this, although to be totally accurate, Office for Windows 95 only came in Standard or Professional versions, both including Powerpoint. The Small Business version (minus Powerpoint) first appeared with Office 97.

Relocation, dislocation >

The feature 'Relocation made easy' (*PCW*, June 2004) on transferring data and settings was very informative, but why no mention of how to transfer Windows XP? Like most recent PC buyers, Windows XP was preinstalled on my PC. When I eventually replace this system I would like to save a few quid and transfer the operating system. But my PC only came with a restore CD which can only be run on the original manufacturer's hardware.

Microsoft won't sell me an operating system CD and if I try to transfer by creating a hard disk image, XP will detect new hardware and complain. So I have an XP licence but no practical method of transferring it to a new system. What does this licence entitle me to do? Am I entitled to use it on any PC – in which case how do I achieve this? Or have I merely bought the rights to use this operating system on this one PC? What is the legal situation?

Les Lumb

Kelvyn Taylor replies > OEM pre-installations of Windows XP are single-use licences and can't generally be transferred to another PC. According to the Microsoft licensing guidelines 'The desktop operating system product Licence that is purchased from an OEM is acquired with the computer as a single integrated product and may only be used with the computer with which it was licensed.' However, to be certain, you should read the specific end-user licence agreement (EULA) that was supplied with your PC.

Sigma replies >

I would like to make a response to Dave Howson's letter ('If the lens cap fits') in *PCW* May 2004.

Dave outlines the difficulties that can be experienced when attempting to use some early design AF lenses on later SLR cameras from Canon. He is correct in stating in principle that problems can occur when the camera design incorporates a new 'chip' for information interchange between the lens and camera body. This also applies to other major photo brands, such as Nikon.

The reason for his statement was a problem he experienced with an 'old' Sigma 105mm f/2.8 EX Macro lens matching his new Canon EOS 300D body. Current supplies have the latest chips in them.

Sigma does in fact take great care to ensure that lenses produced by ourselves of current design and availability (in general up to the past seven years or so) are able to be retrospectively 'upgraded' with a new chip as and when this becomes necessary due to the camera manufacturers changing the design of their camera bodies. The good news is that if a customer has proof of purchase, this upgrade when required is provided free of charge apart from £6 for postage and packing. Even where an item has been bought second hand or no proof of purchase is available, we do provide this service for a nominal £35 plus postage and packing.

I trust this clarifies the 'problem' as perceived by Dave, certainly in respect of what Sigma does to ensure continued compatibility of its lenses with new camera designs.

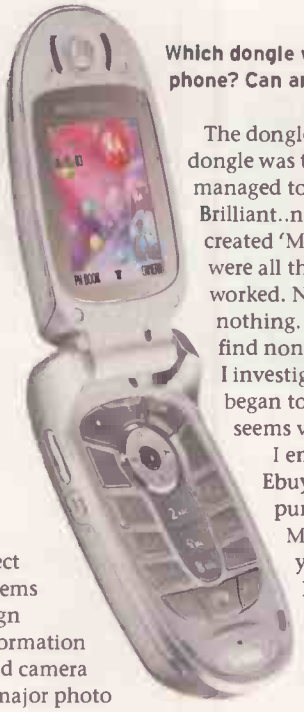
Ray Fitchett,
Sigma business development manager

PCW replies > Readers requiring help can contact Sigma on 01707 329 999 or email sales@sigma-imaging-uk.com.

Bluetooth blues >

Maybe you could do an update article on Bluetooth and have a go at how various manufacturers don't get their act together.

I have an axe to grind as I went to upgrade my old Motorola phone to the V500. I wanted to be able to take digital snaps and download them to my PC. I knew the V500 was Bluetooth enabled and just assumed that if I bought a Bluetooth dongle everything in the garden would come up roses. Not a bit of it.



Which dongle works with Motorola's V500 phone? Can anyone help?

The dongle software installed fine, the dongle was then detected by XP. I even managed to pair the phone and the PC. Brilliant..not. I went to the newly created 'My Bluetooth Places' and there were all the services. None of them worked. No file transfer, no PIM sync – nothing. Checked them out only to find none were actually connected. I investigated a few web forums and began to realise I wasn't alone. It all seems very hit and miss.

I emailed Orange, Motorola and Ebuyer (from whom I made the purchase). No help whatsoever. Motorola wants you to buy all your bits and pieces from Dextra. It just wants to flog the standard USB lead and CD for loads of money. The lead in the kit is exactly the same as the lead I received in the box with my original Motorola phone. That had a CD with it and it all worked a treat – I could sync all my contacts effortlessly. However, as you will by now suspect, the new phone doesn't work with the old software. No problem, thinks I... go on the web and pick up an updated driver (for free, of course). No chance. Motorola has it all tied up, every which way. You really do have no option (it seems) but to splurge out on the connection kit. Miserable shower.

It would be nice if someone could tell me which Bluetooth dongle works, properly, with the V500. I'm now going to sit in a dark corner and curl up into a ball and suck my thumb.

Sid Jenkinson

Kelvyn Taylor replies > Bluetooth compatibility has always been a bit of a nightmare, as there's no native support in Windows XP, leaving you reliant on vendors' own driver implementations. This is about to change with Windows XP Service Pack 2, which adds Bluetooth support (see review of the beta on page 87). It will be interesting to see whether this helps solve some of the compatibility problems. We will be looking at the final SP2 in an upcoming issue of *PCW*.

Clarification

In the Corporate anti-virus tools feature (*PCW*, June 2004), the quoted pricing of F-Secure Anti-Virus Total Suite was incorrect. It should have been £22.85 (£19.45 ex VAT) per user for 500-plus nodes.

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guyk@pcw.co.uk

Is Wimax the way forward?

Wimax is being pushed as the next big thing, but what's in it for Intel, wonders Guy Kewney

We've got a problem with PCs. They're too cheap. Of course, this isn't the sort of problem that you and I get too worried about; but it worries Intel and its rivals dreadfully and they have different ways of trying to fix this.

What would make you spend an extra 50 quid on a PC? Blue LEDs? More power? Lighter weight?

The latest triumph has been – strangely – not the 64bit chip. That's a triumph which is still developing. No, the trump card for 2003 was Intel's notebook design. By producing the Centrino package of low power, high processing speed and integrated wireless, Intel made a massive increase in its average profit per processor chip.

Nice for Intel, but what did it have up its sleeve for the next trick? The Pentium 4 M processor was what impressed me; reversing the trend of getting faster processing rates at the price of burning more electricity, it gave a more powerful machine with battery consumption back at Pentium II levels. But Intel knows that there's not a huge amount it can do to improve this.

It thinks that 'Free Internet' will be the next magic trick.

Over the next two years, Intel is going to pour a vast amount of money into a technology which, on the face of it, will not be something it can either sell or use. It's a wireless technology, which was originally designed as a 'last mile' solution to bring broadband to people without needing to dig up the road: Wimax.

The original spec said that people would have Wimax receivers in their homes, which would feed high-speed data into a local area network – wired, or wireless Lan. It would work just like a cable modem or ADSL, but without the cable; you'd have a router in your study and you'd plug things into it.

What Intel has done is to urge the Wimax group to add a new feature to it. Instead of being a box on a mast talking to a lot of antennae on the corner of house roofs, the next generation of Wimax will be built into the motherboards of mobile devices. You'll be able to get Internet, fast Internet, on the move. So, why am I left wondering what's going on?

Technically, nobody doubts that mobile Wimax is possible. The standard is still (at the time of writing) waiting for final ratification but, again, this isn't in doubt. The cost of the technology is a bit of a poser; today's designs would add £280 to the cost of a £330 PC and are not even remotely feasible for a mass market, but within three years, says Intel, the cost will be down to below £28. And within a year of that, perhaps... below £8? Possibly.

Here's my problem: I don't see what's in this for Intel. Intel makes silicon; specifically, it makes processors. Wimax is a standard, which anybody can meet and which Intel won't have an exclusive on. There's no obvious reason to suppose that if you bought a Wimax computer, it would have an Intel Wimax chip built into it, nor even that Intel's chip would be necessarily better, more powerful or use less electricity than anybody else's. So why is Intel driving this standard so hard?

Trust me, Intel really is driving it. It's been lobbying other people, setting up infrastructure outfits, such as Roampoint, ostensibly in the Wifi market, but which would be able to operate in a Wimax market too and I don't doubt that's what it is intending to do, one day. It obviously hopes to make money out of it, but how?

I think there are two coins which Intel hopes to get paid in. First, the obvious one: it thinks that people will buy more notebook PCs if they have permanent high-speed Internet.

> 'Intel thinks that Wimax is going to be a lot of big coins, which AMD isn't collecting'

Quite correctly, Intel looks at the world's telcos and regards them as dragging their feet. In a truly competitive market such as Tokyo, you can pay $25 (£14) a month for a fibre link providing 10Mbits/sec, while you can try to pay nearly twice that in London for a 500Kbits/sec DSL link and be turned down because you are too far from the exchange.

The technology isn't more expensive in London: BT just sees an opportunity to milk the old copper a bit longer. And Intel wants to stick a pin in the idle backsides of BT and its fellow telcos around the world. 'If you don't get your act together, we'll force the pace,' is the message.

But there's another message, too: Intel wants to have some game tokens. The game is 'intellectual property' and it's worth money. All the big processor silicon designers share IP with each other and get access to each other's patents. And I suspect that Intel wants a big coin to spend, so that it can force AMD to part with some of its 64bit X86 technology. Intel thinks Wimax is going to be a lot of big coins, which AMD isn't collecting.

But one thing I'm pretty sure about: Intel won't be the world's biggest Wimax producer. That's not what is going on, as you'll see over the next two years.

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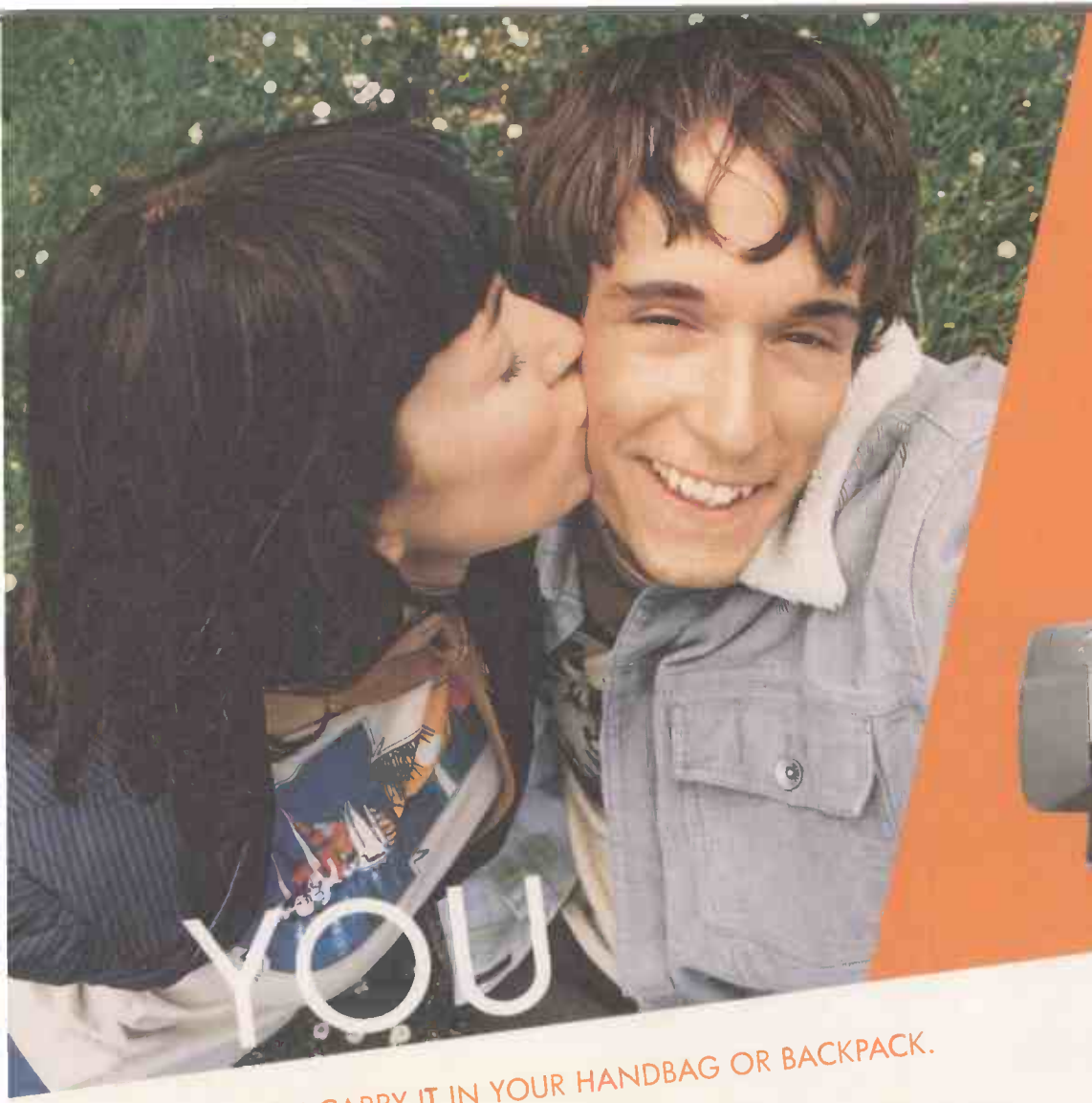

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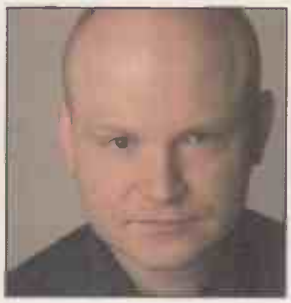


We need to keep the noise down

More megapixels may mean better quality, but they also mean an increase in image noise, says Gordon Laing

gordonl@pcw.co.uk

If you only know one thing when shopping for a new digital camera, it's the number of megapixels, right? As the figure which defines the amount of detail captured, it's become the primary measure of quality for digital cameras, but, like so many things, it's not that simple, as having more megapixels can sometimes reduce your overall picture quality.

This sounds hard to believe. After all, more megapixels means more detail and being able to make bigger enlargements or severe crops without losing quality. But take a close look at digital camera images and you'll notice numerous randomly coloured specks, especially in areas of flat colour. This is mostly due to electronic noise on the sensor and could get worse with higher resolutions.

Here's why: each sensor has a grid of light-sensitive elements which act like buckets for light. After the exposure, the amount of light captured in each element is proportionately converted into electrical charge, then amplified and digitised. Noise becomes a problem when there's insufficient light captured for a decent signal. This gets worse with smaller elements which are less sensitive.

There are two ways you can increase the resolution of a sensor: keep the elements the same size and increase the sensor area, or keep the sensor the same size and shrink the elements to squeeze more in. It's clear the latter will be susceptible to greater noise, yet due to manufacturing costs and optical designs, it's a common approach for new sensors.

The first 3megapixel cameras employed a 1/1.8in sensor which measured 8.93mm across its diagonal and kept noise reasonably under control. When 4megapixel cameras arrived, though, their sensors were almost all the same size as previous 3megapixel models, thereby employing smaller elements with higher noise levels. Fortunately when the first 5megapixel cameras were launched, the sensors were increased to the 2/3in size with an 11mm diagonal and roughly the same size elements (and therefore noise levels) of original 3megapixel sensors.

Sadly the subsequent generations of 5megapixel cameras switched to a 1/1.8in sensor identical in size to the original 3megapixel sensors. New 8megapixel all-in-ones also use the same 2/3in sensor size as the first 5megapixel models. Both cases demand smaller elements to squeeze these higher resolutions into the same space, and therefore suffer from greater potential noise. While the industry often claims superior manufacturing techniques and post-processing eliminate the problem, I'd argue new sensitivity settings reveal it as a genuine concern.

'Noise becomes a problem when there's insufficient light captured for a decent signal'

All digital cameras can increase their sensitivity, but at the cost of greater noise. Decreasing the sensitivity has the opposite effect and lowers noise levels. And what's this? Many new cameras with high resolutions and relatively small sensors now offer low sensitivity options such as 50 or 64 ISO; indeed these are present on all the new 8megapixel cameras.

Admittedly these low sensitivities seem to do the trick. I've found shooting at 50 or 64 ISO on the new 8megapixel cameras produces relatively low-noise images. Increase to 100 ISO though and noise begins to creep in – by the time you're at 200 ISO it's seriously affecting the picture.

The trouble is, it's rarely practical to shoot at 50 or 64 ISO, especially in the overcast UK, where 200 ISO is usually more appropriate. You are, of course, welcome to shoot at lower sensitivities, but you'll need more light: four times more if it's the difference between 50 and 200 ISO and if your optics can't gather it, you'll need a longer exposure which increases the risk of camera shake.

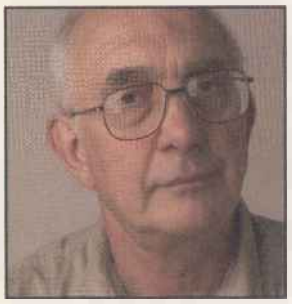
And therein lies the rub. Unless you have bright conditions, a steady hand or don't mind carrying a tripod, these low sensitivities are impractical, yet necessary to keep noise levels under check.

With noise becoming a personal issue, I upgraded to a digital SLR, which may only have 6megapixels, but features a sensor measuring 30mm across its diagonal. Compare that to the 11mm diagonal of the sensor in 8megapixel all-in-ones and difference in pixel size is monumental. At 400 ISO, this bigger sensor produces roughly the same noise levels as 8megapixel models do at 64 ISO. At lower sensitivities, the bigger sensor produces incomparably smooth pictures. This is why 6megapixels worked out better than eight. I may capture less detail, but the improvement on noise levels, not to mention flexibility of shooting at higher sensitivities is far preferable.

Of course digital SLRs are only an option at the high end of the market. Compact consumer digital cameras will always have smaller sensors and therefore noise as a greater concern, especially as resolutions increase.

While many users won't notice noise on their Images, I fear it's being compromised in favour of higher resolutions. And does the average photographer really need five or more megapixels?

Sadly, higher resolutions have become a marketing numbers game and are coming at the cost of greater noise. If you're concerned, look carefully at the sensor size of your next digital camera, as megapixels aren't the be-all and end-all of image quality. Either that or join me in a prayer for a long, bright summer.



barryf@pcw.co.uk

How will you watch videos after 2007?

As Ofcom forges ahead with plans for a digital world, Barry Fox bemoans the quango's lack of teeth

To update the old song from Li'l Abner – the country's in the very best of hands. Not. This year, like last year and the year before that, I received an invitation from a market research company. It is employed by BT to 'help gain an understanding of its reputation with key audiences', and interview 'key opinion leaders' on their 'perceptions and experience of BT'. My involvement would be a 'vital part of an important consultation process'.

Thanks for the flattery, but this year, like last year, I made what I reckon is a very reasonable suggestion. If BT wants to interview self-employed people like me, then it should make a donation to charity for the time spent.

And this year, as last year, the suggestion was rejected. The refusal came from the top, BT's executive director, Ben Verwayen. In a courteous personal reply he explained: 'We compared participation based on studies in the UK and the US between interviews with and without donations. We decided against it based on the outcome.'

So I never did get the chance to tell BT a few useful things privately. Here they are publicly.

Shortly after writing a column about the difficulties of using BT's Openzone, I went to Paddington station during the week BT was offering free Wifi access to try and arouse public interest. Intel had a demo booth on the concourse, with adverts promoting Openzone. But all Intel's laptops were running with the Swisscom Eurospot network. Why? Because there was no Openzone signal on the Paddington concourse.

'A BT manager came visiting yesterday and seemed surprised,' the frustrated Intel demonstrator told me.

I have been using BT's Phone Disc CD-Rom since the days when it cost over £2,000. The price is now down to around £40, but you need to be a detective to find out how to buy it. (The secret number is 0800 833 400). For as long as I can remember BT's software has fallen over when the PC defrags the hard disk. This moves the licence file that stops people looking up too many numbers. The latest version of Phone Disc was supposed to solve the problem.

Does it heck. BT still has to fund a helpline to help people delete the corrupted file and install a new one to get Phone Disc working again. 'Some people never have the problem.' a puzzled BT help-worker told me. 'But others have it a lot.' Yes BT, it's because some people never bother to defrag their hard disks. If the 42-digit licence code used for Office XP can survive defragging, why can't BT's software?

When Ofcom, the huge new quango that replaced dozy Oftel, the aloof ITC and secretive Radiocommunications Agency, took over, I had high hopes that we might finally get a watchdog with teeth. I had even higher hopes when Ofcom announced that there would be a Consumer Panel, to act as Ofcom's 'critical friend'.

The Consumer Panel is chaired by Collette Bowe who used to work for the DTI, and then 'as a full-time executive at the most senior levels in the fund management business, City regulation and Whitehall'.

Other members include the boss of an advertising network, the head of a management consultancy company, the managing director of a marketing development consultancy, a strategy adviser at the Communication Workers' Union, a non-executive director of the Nationwide Building Society and a venture capitalist on the Welsh Development Agency Board.

Says Bowe, when challenged on how likely her line-up is to help consumers: 'No way are we insulated from the problems of consumers: we live with them, and you can be sure we will be drawing on our personal experiences.'

The panel's first public utterance was to 'welcome' a report from 'friend' Ofcom on switching off analogue TV and giving the Government released frequencies to sell.

> 'People will have to convert their video recorders or buy new ones with integrated digital tuners'

A good way to check whether people who talk about switching off analogue TV know what they are talking about is to listen to what they say about the tens of millions of VHS VCRs which are in homes round the country. Ofcom buries this key issue in a short section deep in the 100-page report, with no mention in the summaries which are all most people will read. People will 'either have to convert their video recorders or purchase new recording devices with integrated digital tuners', said Ofcom.

How do you convert an analogue VCR so that it works with its internal timer and external mpeg decoder? With considerable difficulty! Where do you buy a VCR that internally decodes digital broadcasts or records the raw mpeg data? Ofcom admits these 'are only currently available in limited numbers' but reassures that 'more models are being released and prices are falling'.

So I asked Ofcom where I could buy a VCR with digital tuner. After five years of digital TV the only one available is from Daewoo. Few people know about it. Allegedly QVC sold it for £160, three times the price of a budget VCR. But it has now disappeared from the QVC listings.

Ofcom admits 'We have not heard of any plans by other manufacturers to follow Daewoo's lead'. Nevertheless, Ofcom is still planning for digital switchover to start in 2007, as a way of forcing people to buy digital TV hardware.

With a watchdog and critical friend like this, consumers can sleep easy in their beds. Not. ■

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The price of PC freedom

Getting compatible software and peripherals to go with your PC can be a hard task, says Kelvyn Taylor

kelvyn_taylor@vnu.co.uk

If you've read the works of the late, and sadly missed, palaeontologist Stephen Jay Gould you'll probably be familiar with the concept of Noma, or non-overlapping magisteria. But for those of you who haven't (I expect it's a sizeable number, considering the rather specialised nature of his essays), it's worth explaining a little before I get to the eventual point of my discussion. Gould proposed that there is no innate conflict between science and religion, as they each have their respective magisteria or domains of professional expertise that have no overlap; science encompasses the empirical make-up of the universe, religion the moral, ethical and spiritual side of human affairs.

Hence the non-overlapping magisteria. Problems can arise at the edges of these magisteria, where domains start to rub against each other or even encroach into each other's territories. Back on planet Earth, you're no doubt asking what all has to do with computer technology, and debating whether in fact your columnist is writing for the wrong publication. Bear with me, there is a point to be made; and one that helps explain a lot of the current problems within *PCW*'s magisterium – the world of personal computing.

From its inception, the PC has been a complex product that relies on a whole universe of specialist people to get it working – electronics engineers, industrial designers, Bios programmers, and that's just to get a working design. To manufacture it requires another football team of specialists, then there's the whole edifice of marketing, sales and end-user support.

But in the early days, the whole system was at least under the control of a single organisation – for example, if you bought an IBM PC and didn't mind being locked into their world, then IBM took responsibility for the whole shebang, including the operating system and some application software, even if it was constructed from off-the-shelf components. IBM would make sure every bit worked together, as it had to carry the can when anything went wrong.

It pretty well fitted the definition of a magisterium and it worked reasonably well, but at a price. Got a problem with your operating system? Call IBM. Serial port not working? The engineer's on his way, sir. And if you wanted to add a peripheral, it had better be IBM made or approved or you were on your own. Even if you bought an IBM clone, the manufacturer had to follow their technical standards if it was going to stand a chance of being compatible with your existing software or peripherals.

These days it's a different story, with price competition largely to blame. Most PC manufacturers, despite their protestations, are little more than assemblers of third-party components. Although the top-tier companies still try and make sure all the bits work together, when machines are built to wafer-thin margins and price points, the variety of configurations makes full compatibility testing a total nightmare. To turn Gould's concept on its head, it's a case of severely overlapping magisteria – motherboards, processors, graphics cards, memory, operating systems and every other discrete component in a modern PC is each created within its own separate magisterium.

And, as predicted by Gould, when these magisteria start to overlap, which is usually when you turn on the PC, the trouble starts. You find your particular graphics card driver has trouble with your choice of USB printer, or other bizarre interdependencies that can take an expert days or months to figure out. Take a look at some of the bug-fix lists in any peripheral driver or Bios update. You wonder how long it took someone to diagnose and fix problems such as 'The screen becomes blank or white when Korean Dos environment starts up'. A stroll through Microsoft's Knowledgebase is even more enlightening – how on earth did someone realise that enabling Hyperthreading only allows you to type the first character of an AT modem command in Hyperterminal?

'Most PC manufacturers are little more than assemblers of third party components'

The problem is that, as far as the end user is concerned, the PC still resides within the magisterium of the company they bought it from. If it won't work with their software or peripherals, they may get support from the software or PC manufacturer, but it's more likely they'll be bounced between the two. Some new peripherals come bundled with own-branded software for a reason – it may not be the best software in the world, but at least the vendor (hopefully) knows it works. Even then, they can't predict how it will interact with other packages. So it's the end user who has to suffer – but that's the price of consumer freedom.

Judging by the volume of letters to our Hands on team each month, the problem isn't getting better. Complex hardware and software, the convergence of devices – it's out of control. But what's the solution? Unfortunately, I can't see one unless manufacturers can find a way of taking back control of the entire PC environment. Would you buy an expensive, yet problem-free, computer that only allowed you to use a limited number of tested and approved hardware and software components? Somehow I doubt it. Unless, perhaps, it was a Sony? ■

• Note: Ed Henning is on holiday.

Reviews

EDITED BY DAVID LUDLOW

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

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Intel's new Dothan mobile processor makes its debut in AJP's M6000N

PAGE 62

Two 8megapixel cameras from Nikon and Canon go head to head

PAGE 76

Our new Overclocking section reviews eight cooling systems to see if they can take the heat

Back in January I said that 2004 would shape up to be an interesting year and I'm glad to say it's turning out this way. Last month we reviewed the Nvidia Geforce 6800 Ultra, which is the company's next-generation board. At double the speed of anything we'd seen before, it impressed us.

This month it's ATI's turn to fight back as it brings us X800. As you can see (opposite), it's yet another impressive card from ATI. As long as these two companies keep fighting for supremacy we can be sure that a lot of cutting-edge graphics cards will appear over the next few years.

This month is also exciting on the processor front with Intel finally releasing the Dothan. AJP sent us an M6000N notebook using the 1.8GHz version of the chip. This is the final production model and not the 1.7GHz sample with the manufacturing fault, about which you may have seen in reports elsewhere.

With wireless networks showing no decline in popularity, we have several products to gain your interest. First, we have Kcorp's wireless router, which is incredibly good value for money and packed full of high-end features.

It's likely that once you have a wireless network in place you'll want to stream music and pictures around the home. The Netgear MP101, SMC Wireless Receiver and Pinnacle Showcenter both aim to meet all your media needs.

We've introduced an Overclocking section this issue, in which all your cooling, power supply and case needs will be met. We'll review the best kit for overclocking and modding, and we've kicked it off in style with a three-page mini round-up of cooling systems.

That's not the only mini round-up, though, as we've also put some budget DV camcorders and TV tuner cards head to head. The latter will be perfect for recording England's victory (hopefully) in Euro 2004.

This is traditionally a slow month on the software front, with no major releases. Even so, we've got some interesting products including a look at Windows XP SP2, Magix Movie Edit Pro 2004 and Actinic Business Version 7, which will help give your business a face on the Internet.

Don't forget to visit the *PCW* website (www.pcw.co.uk) for some reviews that we couldn't squeeze into the magazine including Watford's £599 ex VAT Centrino notebook and Packard Bell's mp3 player.

>> **Netgear MP101**
Stream music around your home, see page 52

>> **Nvidia Geforce 6800 Ultra**
Nvidia's next-gen graphics
www.pcw.co.uk/Products/1153955

GRAPHICS CARD

PREVIEW

ATI Radeon X800 Pro & XT

We take an exclusive peek at the Pro and its big brother the XT

With only Nvidia and ATI making high-end consumer graphics cards, both companies are desperate to hold the 'world's fastest card' trophy. Last month saw Nvidia release its Geforce 6800 Ultra card, which was double the speed of anything we'd seen. This month it's ATI's turn to fight back with its Radeon X800.

We were lucky enough to get our hands on the X800 XT and take an exclusive look at the X800 Pro. Specification-wise, they're impressive bits of kit. First, they're exactly the same size as the Radeon 9800 XT (single slot) and you'd be hard pressed to tell the difference.

This is good news as the card doesn't require any more power than the previous generation. The combination of size and power is even better news for owners of small form factor (SFF) systems, as the X800 will easily make one of these its home. It's an area Nvidia has effectively given up on with the large, power-hungry 6800 Ultra.

Underneath the supermodel-thin exterior of the X800 is a powerful core. The XT runs at 520MHz with 256MB of Ram running at 560MHz. As it is GDDR3, this gives an effective 1.12GHz memory data rate.

The Pro runs the core at 475MHz and its 256MB of memory at 450MHz (900MHz). It's worth drawing attention to the GDDR3 memory. This is the next evolution of GDDR; it is faster and, surprisingly, has a lower power requirement.

The X800 XT uses 16 pixel pipes, while the Pro has 12. With six vertex shaders on both, ATI is claiming greater than 750 million vertices per second.

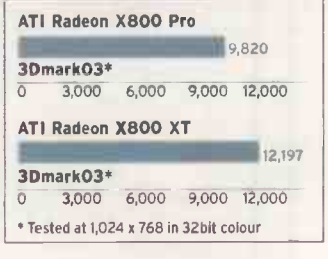
Perhaps the most interesting addition to the card is the 3Dc compression technology. This is proprietary technology that needs applications specifically written for it, but it's still good to see.

The technology is used to compress normal maps to make more efficient use of memory. Normal maps are special textures composed of light vectors rather than colours. When used on a 3D model it gives more realistic lighting and makes lower polygon models appear to have more detail. The problem with normal maps is that they can take up a huge amount of memory, hence the new compression technique. You'll have to wait for games such as Half Life 2, Doom 3 and Serious Sam 2 before you can see the results in action, however. The anti-aliasing engine has also had an upgrade and uses what ATI calls temporal anti-aliasing. Effectively, it gives double precision (2x becomes 4x, etc) with no extra overhead.

Of course, specifications are one thing, but it is real performance that counts.

Both cards are designed to run at high resolutions with lots of detail, so we tested at 1,600 x 1,200.

PERFORMANCE



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

The XT romped in with a 3Dmark03 score of 12,197, which is faster than Nvidia's 6800 Ultra.

Perhaps more impressive is the 9,820 scored by the Pro. Considering that the card will be on sale for around $400 (approx £228), this is lightning fast. Turning on 4x full scene anti-aliasing (FSAA) did little to slow the cards down. The XT gave us a score of 4,274 and the Pro 3,265 – both in the realms of playability.

To see how the cards perform in a real game we tested Far Cry, which is graphically demanding, at 1,600 x 1,200 with 4x FSAA. The XT managed a stunning 40.08 frames per second (fps), which is silky smooth. The Pro didn't let the side down and scored 28.05fps, which is still smooth enough for most gamers.

It look as though ATI has rained on Nvidia's parade. The Radeon 800 XT is the fastest card we've ever seen and, at $499 (approx £285), cheaper than the 6800 Ultra.

However, it's the 800 Pro that has really impressed us. It looks set to be cheaper than the current generation of cards and a lightning-fast performer. For those who want the best price/performance this is going to be the card to buy. We'll review the retail products soon

David Ludlow

DETAILS

RRP XT around $499 (£285)
Pro around $399 (£228)
PRODUCT INFORMATION
ATI
www.ati.com
SPECIFICATIONS
256MB GDDR3
XT: 550MHz core/1.12GHz memory
Pro: 475MHz core/900MHz memory
PROS Fast; good form factor
CONS Expensive; needs high-end kit to run
VERDICT
Good form factor and low power requirements. With the performance to match the R800 series is going to be graphics card to buy

ATHLON 64 NOTEBOOK

Tiny Mediabook64 3200+

A great offer you really can't afford to miss

Weighing 3.9kg, the Mediabook64 3200+ is quite heavy, but has a comprehensive range of multimedia features, including a 128MB ATI 9600 graphics card and a dual-format DVD recorder. There's also a four-in-one card reader and 802.11b Wifi.

An Athlon 64 3200+ mobile processor is supported by 1GB of DDR-Ram and an 80GB hard disk. The Athlon 64 uses power-saving technology, which is in operation even when the notebook is connected to the mains and returns seemingly puny benchmark scores. The Sysmark 2004 score was just 75, although a better indication of performance is the 3Dmark 2003 score of 7,395.

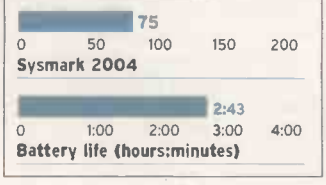
Although there was some slight springiness to the keyboard, we were satisfied with the overall build quality of the Mediabook.

The audio quality of the integrated stereo speakers, which sit immediately below the screen hinge, was surprisingly good, although they are rather quiet. We had no complaints about the quality of the 15in LCD screen, though, which is bright with fairly standard viewing angles.

The notebook is on a seven-day special offer on the Tiny.com website, available from 8 June. However, readers of *PCW* have access to the special price until 24 June – just ring the provided number and quote *PCW* and the issue (July). At £999 it's great value, but be quick to make sure you don't miss out.

Emilie Martin

PERFORMANCE



DETAILS

RRP £999 (£850.21 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Tiny 01282 777 555 www.tiny.com
SPECIFICATIONS
Windows XP • AMD Athlon 64 3200+ mobile processor • 1,024MB DDR-Ram memory • 80GB hard disk • DVD-RW • 128MB ATI Radeon 9600 • 15in SXGA screen • USB2 • Firewire • Wifi • 4-in-1 memory card reader • Microsoft Works 7 • 3.9kg • 330 x 283 x 45mm (w x d x h) • 3yrs RTB warranty
PROS Powerful; fast 3D graphics; DVD writer; card reader
CONS Integrated speakers are rather quiet
VERDICT
The well-specified Tiny packs a punch at a superb price

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

DESKTOP PC

Packard Bell Imedia 3050

A cheap system, but it's good value

At just £600 including VAT, Packard Bell is aiming its Imedia 3050 at the budget market. Some corners have had to be cut, starting with the look of the PC – the simple grey case is quite dull. The front panel houses the black DVD combo, floppy drives and two USB2 ports. The rear is quite bare with stereo sound outputs and the usual array of ports, but no Firewire.

Inside the PC, the case looks very empty, as Packard Bell has opted for a highly integrated motherboard. The only card in the case is the modem installed in the Communications and Network Riser (CNR) slot, leaving three PCI and one AGP slots free for upgrades.

The AGP slot is likely to demand attention quickly, as the onboard Sis 651 graphics are very poor. Scoring just 1,240 in 3Dmark 2001 (2003 wouldn't run), this PC is incapable of running any decent games.

As a basic workhorse, though, it will cope fine. The Intel Celeron 2.6GHz processor returned a score of 77 in Sysmark 2004. Upgrading the 256MB of DDR memory should help speed things up no end.

It's hard to forgive the 40GB hard disk, which is tiny by today's standards, but it does come preloaded with a good selection of software. The quality of the 15in TFT goes a long way, too.

Overall, as a second PC for work it's not bad, but the small hard disk, poor graphics and low memory seem a cut too far, even for this price.

David Ludlow

PERFORMANCE

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

DETAILS

RRP £599.99 (£510.63 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Packard Bell
www.packardbell.co.uk
SPECIFICATIONS
Windows XP Home • Intel Celeron 2.6GHz • 256MB DDR • 40GB hard disk • DVD combo drive • Sis 651 graphics • 15in Packard Bell TFT • Microsoft Works Suite 7
PROS TFT; software bundle
CONS Small hard disk; onboard graphics
VERDICT
Reasonable for a second work PC, but the hard disk and graphics really need upgrading to balance the system out

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

DOTHAN NOTEBOOK

AJP M6000N

Intel's new mobile processor makes a debut

After months of waiting we've finally managed to get our hands on Intel's new Pentium M, the Dothan, courtesy of AJP and its M6000N notebook. Dothan processors use a 90nm fabrication process and have a massive 2MB Level 2 cache.

Dothan also marks a debut for Intel's new naming convention where processors will be referred to by model number, not the processor speed (see also News page 21). For the M6000N we were given a 745 processor, which runs at 1.8GHz and has a 400MHz front side bus (FSB).

AJP has backed this up with 512MB of DDR Ram and, for a notebook, a large 80GB hard disk. This powered the notebook to a fast PCmark04 score of 3,552. With a 64MB mobile ATI Radeon 9600 graphics card installed, the M6000N can equally turn its hand to a bit of 3D gaming, albeit at lower resolutions and detail settings.

Both work and games look great on the 15.4in widescreen TFT running at a resolution of 1,440 x 900. Of course, the widescreen makes the notebook a little larger than average, although, at 2.5kg, it's light enough to carry around.

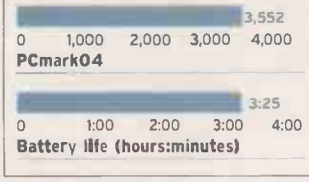
A DVD drive, 802.11g wireless and four-in-one card reader finish of the package.

Slightly disappointing was the lack of software. All you get is Windows XP Home, Roxio Easy CD and DVD Creator and Wind DVD4.

We can't complain about the price, which, when you consider what's inside, is rather good.

David Ludlow

PERFORMANCE



DETAILS

RRP £1,408.83 (£1,199 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
AJP 020 8208 9744
www.ajp.co.uk
SPECIFICATIONS
Intel Pentium M 745 (1.8GHz) • 512MB of Ram • 80GB hard disk • 64MB ATI Radeon 9600 graphics • 4 USB2 • 4-in-1 card reader • 354 x 273 x 22mm (w x d x h) • 2.5kg • 3-yr RTB warranty (12 months parts and labour, 24 months labour)
PROS Fast processor; price
CONS Software bundle
VERDICT
Dothan makes an impressive debut in an equally impressive notebook from AJP

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

CENTRINO NOTEBOOK

Mesh Dynamo

A widescreen portable offering reliability

The Mesh Dynamo is a reliable notebook, but is definitely computing's version of the Ford Focus. That's no bad thing in itself. The trusty Focus will keep you on the road and so will the Dynamo with its integrated 802.11b wireless card. At 3kg, you may even make the distance to the nearest hotspot. The inclusion of a 10/100 Ethernet port reinforces the solid and business-like feel.

You get an Intel Pentium M processor running at 1.5GHz, powering the Dynamo to a respectable 109 in Sysmark 2004. The 512MB of memory is plenty for XP and there's room to upgrade to 1GB. A 60GB hard disk is fairly generous for a machine in this class.

It seems silver has become the new beige, but the 15.4in widescreen display means your eyes won't linger too long on the outside.

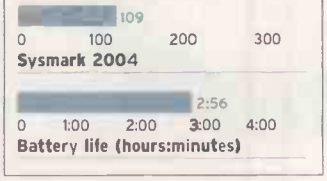
The Dynamo provides facilities for watching movies, but not burning DVDs in a CD-RW combo drive. That's the only entertainment you'll be getting though, as graphics are supplied through Intel's onboard 64MB graphics controller. Three USB2 ports and a single Firewire connection are also included.

Mesh claims that the Centrino chip's power-saving ability pushes the battery life to five hours but our tests showed two hours, 56 minutes.

The Mesh Dynamo seems built for neither comfort nor speed and it doesn't quite scrape beneath the £1,000 barrier.

Paul Allen

PERFORMANCE



DETAILS

RRP £1,056 (£899 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Mesh
0870 046 4747
www.meshcomputers.com
SPECIFICATIONS
Windows XP Home • Pentium M Centrino 1.5GHz • 512MB of Ram • DVD/CD-RW combination drive • 15.4in TFT display • 3kg • 354 x 250 x 32mm • 1yr parts and labour, 2yr labour-only warranty
PROS Solid and dependable
CONS Price
VERDICT
One for the workers but fails to stand out, although wireless is always welcome

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

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Calls across the Internet severely reduce business and

phone calls.

personal telephone charges up to 90% with our phones

Use the Internet and one of our new range of ToIP phones, and you can make FREE calls to someone else with a ToIP phone. Or use your ToIP phone to call across the Web at the lowest prices around. Forget 7.9p a minute, forget 2.4p a minute, 1.5p a minute is our charge. That's true if you are phoning in UK or to USA, Canada, Australia, France, Germany and many others. Calls to mobiles can be up to 90% less too. You just need a USB phone or an Ethernet one. Take it with you and you can call from any computer attached to the Web anywhere in the world. So now is the time to take a look at our website and buy on-line now from your dedicated ToIP specialists on the Internet at www.calls-calls.com.

What is ToIP (Talk Over Internet Protocol). Dropping the technicalities, it allows you to make phone calls to another user who has a ToIP phone directly (point-to-point) with no cost. Truly, completely free for as long as you want, as often as you want. So for the people you ring most often, you want them to have a ToIP phone.

But for the rest, if they do not have a ToIP phone, you can ring them over the net for very, very low cost - you use a ToIP phone, they pick up on their normal phone. It is so easy. Just make a visit to the Internet phone and call specialists, calls-calls.com for all the latest information, prices on the latest ToIP telephones, and call rates.

USB phone CCU10
£199.00

USB phone CCN15
£49.00

USB Keypad CCT5
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USB Desktop CCN17
£59.00

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NOTEBOOK

IBM Thinkpad R50

Great quality comes at a high price

IBM's Thinkpad R50, might have the same functional exterior as the rest of the range, but there are a couple of surprises. First is IBM's hard disk protection system, which locks the disk in place if the notebook is dropped, protecting your data.

Next, there's a light in the bezel. This might not sound like a lot, but it's enough to illuminate the keyboard in poor lighting conditions.

The 15in TFT is one of the best we've seen, with superb viewing angles and a native resolution of 1,400 x 1,050.

Under the bonnet is a traditional notebook. Built around a 1.5GHz Pentium 4 M and 512MB of DDR memory it turned in a decent Sysmark 2004 rating of 102. It's good enough for any work application but that's all, as the Radeon 9000 graphics aren't suitable for modern games.

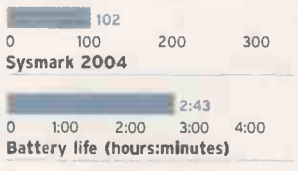
Connection-wise, we can't fault the R50. As well as 802.11b wireless Lan and Gigabit Ethernet, there are mini Firewire, two USB2 and a Type III PC Card slot.

The R50 has no Windows keys. We don't understand why they're not included, but it takes some getting used to, especially when the Windows shortcuts are so useful. Both a trackpad and trackpoint are included and feel good to use.

At 3kg it's light enough to be lugged around, however it is expensive, especially when the 40GB hard disk only has Norton Anti Virus and IBM's utilities preinstalled. We feel that it's too expensive for the average user.

David Ludlow

PERFORMANCE



DETAILS

RRP £1,526.33 (1,299 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
IBM www.ibm.co.uk
SPECIFICATIONS
1.5GHz Intel Pentium M • 512MB Ram • 40GB hard disk • 15in TFT (1,400 x 1,050) • Type III PC Card slot • DVD combo drive • Gigabit Ethernet • ATI Mobility 9000 graphics • 3kg • 332 x 40 x 269mm (w x d x h)
PROS Good construction; can use in dark lighting conditions
CONS Lack of software; Expensive
VERDICT
A well-built notebook with lots of neat features, but the price tag is a little high for the average consumer

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

CENTRINO NOTEBOOK

ACI Vision Pro

A laptop with power and portability

Despite looking a bit plain, the Vision Pro straddles the knife's edge of size and portability perfectly; it's light enough to carry, but still houses a decent 15in screen and large, easy to use keyboard.

There's a range of shortcut buttons including controls to play a CD without having to boot into Windows. Strangely, these are under the clamshell and not on the front where they would be more useful.

Fortunately, our initial good impression is more than skin deep. The TFT is very good and runs at a resolution of 1,400 x 1,050. The 1.6GHz Pentium M processor is backed up by 512MB of Ram. This produced a healthy Sysmark 2004 score of 114.

The onboard Radeon 9600 graphics aren't bad, scoring 2,502 in 3Dmark 2003. This means you can play games, although low resolutions and no advanced options are likely to be the best option.

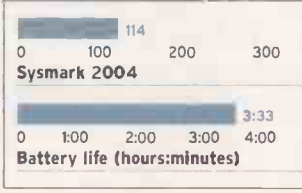
The 60GB hard disk is good for a notebook and large enough to store most files when on the move. The DVD combo drive can be used to archive old files should the disk start to look a bit full. We were pleased to see that the disk comes loaded with Microsoft Works 7.

The Vision Pro uses Centrino so there's built-in 802.11b wireless for hooking up to hotspots. With onboard modem and network ports, you won't have trouble getting connected.

The £1,400 price might sound steep, but it's surprisingly good value for a Centrino notebook, especially with the speed of the processor. If you want a powerful notebook that you can transport easily, look no further.

David Ludlow

PERFORMANCE



DETAILS

RRP £1,408.83 (£1,199 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
ACI www.aciplc.com
SPECIFICATIONS
1.6GHz Intel Pentium M • 512MB Ram • 128MB ATI Radeon 9600 • 60GB hard disk • 15in TFT (1,400 x 1,050) • 2.7kg • Windows XP Home • Microsoft Works 7
PROS Fast processor; good value
CONS CD controls in the wrong place; small touchpad
VERDICT
Good value for such a fast Pentium M and well suited if you want portability and power

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

19IN TFT

Samsung 193P

A stylish monitor with great image quality

The Samsung 193P is one of the most stylish 19in monitors we have seen. It does several things to differentiate itself from the abundance of flat-panel screens currently available, but its most unusual feature is the lack of any control buttons.

It has a touch-sensitive power switch, but the normal assortment of menu buttons are absent. Instead, Samsung has given the 193P control over its own settings via an automatic adjustment feature. Manual adjustment is possible, but only with the accompanying software. The result is a very sleek overall design, but this approach may frustrate those who prefer the immediacy of a traditional on-screen display.

The monitor is very flexible in its positioning. It has a versatile stand that is height adjustable, and the screen can be tilted to a variety of angles. Our only real criticism was that the weight of the monitor moved the position of the stand over time.

This wasn't a major issue and, thankfully, amends are made in other areas. The 193P can be used in both landscape and portrait orientations, which could come in handy if your work involves a lot of vertical scrolling.

Image quality is excellent; the picture is bright and the monitor delivered strong contrast. Images remained sharp even when viewed from acute angles and it has a good response time, which makes it ideal for watching DVD movies or playing games.

As with all other 19in TFTs, this one has a resolution of 1,280 x 1,024. For those who want to upgrade to a larger screen with a higher resolution we'd suggest looking at 20in models. For others who don't mind the lower resolution the 193P is reasonably priced and very attractive.

Rory Reid

DETAILS

RRP £599 (£494.17 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Samsung
www.samsungelectronics.co.uk
SPECIFICATIONS
19in • 0.294mm dot pitch • 1,280 x 1,024 native resolution • 24bit (16.7 million colours) colour depth • D-Sub and DVI-D inputs • 424 x 236 x 411mm (w x d x h) • 7kg
PROS Great picture and styling
CONS Stand can lose its solidity
VERDICT
Great image quality and excellent styling. Those looking for a greater resolution, though, are better off looking at 20in models instead

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

BUSINESS CARD SCANNER

Corex Cardscan 600CX

Transfer your business contacts to your PC

Business cards are great, but searching through them for a specific contact can be time-consuming. One way of solving this problem is a business card reader, such as the Corex Cardscan Executive 600CX.

This device is a miniature scanner with a motorised feeder tray. Digital captures of your business cards are taken as they are fed past the internal lens, leaving you with a database of contacts, which can be exported to handheld devices or a mail client such as Microsoft Outlook.

One of the best things about business card readers is their ability to store printed information as usable text. Accompanying optical character recognition (OCR) software means you will be able to quickly search for a particular contact by name, organisation or job title.

Unlike some products of this type, the Cardscan Executive 600CX comes with an automatic updating system called Accucard. This service sends an email to each person in your contacts list four times a year prompting them to update their existing data with any changes. This is very useful and is free to Cardscan users.

We found the performance of the 600CX to be largely comparable to that of the Iris Business Card Reader II, reviewed in our April issue (www.pcw.co.uk/Products/1154383). The quality of its images, however, was marginally better and its character recognition more accurate, despite a lower resolution.

Our only real criticism of the 600CX was its price, as £179.95 seems a lot for a device of this type, particularly as full-sized scanners retail for a fraction of that. Provided you can stomach the asking price, this is a useful device that works effectively.

Rory Reid

DETAILS

RRP £179.95 (£147.67 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Corex www.cardscan.com
SPECIFICATIONS
402g • 170 x 101 x 45 mm (w x d x h) • 300dpi resolution • 24bit colour • USB • Synchronises with Outlook 98 or above, Lotus Notes 4.6 or above, ACT 4.0 or above, and Goldmine 5.0 or above
PROS Fast; effective
CONS Size; weight
VERDICT
If you've got a large number of business cards, the 600CX is an efficient way of storing that information on your PC

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

MEDIA PLAYER

Pinnacle Showcenter

Stream media to your TV and stereo

With the Showcenter, Pinnacle has joined the growing number of manufacturers attempting to lure people away from Media Center Edition PCs. It works by hooking up to your TV and hifi, and streams media from the PC via an Ethernet or wireless connection.

The Showcenter itself is well designed and its slim silver case will sit neatly next to your TV and stereo. All the features are accessed using the remote control, which isn't the most attractive of devices. With both a bulky design and awkward keys, navigating through the menus isn't the easiest of tasks and you're often left wondering which button does what.

Before you can stream anything to your TV, you need to install the Showcenter software on your PC and search for suitable media. You can also instruct Showcenter to monitor folders and, when new media is found, you'll be alerted by a blue LED on the front of the unit.

Using the bundled crossover Ethernet cable, we had the Showcenter up and running in next to no time. The wireless setup was equally simple, but you'll find that Showcenter is only capable of using a small selection of wireless PC Cards – check the website for more details. Surprisingly, 802.11g is not supported.

In terms of performance, the Showcenter didn't disappoint. DivX movies streamed perfectly, even over a wireless connection. The 11Mbits/sec bandwidth of the 802.11b connection isn't enough to play the likes of mpeg2 videos using the wireless connection, so you'll have to stick to the Ethernet link.

Although it has a few issues such as the lack of an 802.11g option and fiddly menus, the Showcenter gets the job done and looks great.

Will Stapley

DETAILS

RRP £199 (£169.36 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Pinnacle 01895 442 003
www.pinnaclesys.com
SPECIFICATIONS
Remote control • 802.11b wireless • 100Mbit Ethernet • PC Card slot • Scart, component/composite video out, S-video • 2x RCA stereo/optical/S/PDIF out
PROS Performs well; looks stylish
CONS No 802.11g support; can be fiddly to use
VERDICT
Despite a few shortcomings, Showcenter does a good job in allowing you to stream media direct to your TV

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

WIRELESS MP3 PLAYER

Netgear MP101

Listen to music all around your home

Streaming digital music files from your PC to your TV or stereo is gaining popularity now that wireless networks are readily available and reasonably cheap. Netgear's MP101 is not only well designed but also has built-in 802.11g. There's an Ethernet port for wired networks too.

The inclusion of an LCD means you don't need a television screen to browse through your files (unlike other systems) and having a remote control allows you do everything from the sofa.

Unfortunately, while the specifications talk a good game, the implementation leaves a lot to be desired. Reading the manual leads you to believe that setting up the MP101 is as simple as installing the software, connecting the device to a stereo and activating the wireless network search option.

While the first two steps went without a hitch, it had real problems automatically detecting our wireless network. We got it working eventually but this meant delving into the advanced menus to configure the ESSID and suchlike. In essence, that's fine for network fans, but frustrating for novices.

Once up and running, it delivers the goods. It supports mp3 and wma audio formats, and is quick at accessing files when a connection is established.

Artists, albums, genres and playlists can all be browsed using the remote control, as long as your preferred songs are within the Netgear Media Server, which is installed on your PC. The Netgear software can scan for all compatible music files on your PC and the device itself can read from multiple computers, providing they are on the same network.

Despite some setup niggles, the MP101 is one of the better products and a good way to stream music round your house.

Luke Peters

DETAILS

RRP £139.24 (£118.50 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Netgear 01344 397 021
www.netgear.co.uk
SPECIFICATIONS
802.11g (128bit Wep) • Ethernet port • Supports mp3 and wma • RCA and headphone outputs • 271 x 221 x 44mm (w x d x h)
PROS 802.11g; Integrated wireless
CONS Could be tricky to set up; only phono-out sockets
VERDICT
One of the better audio streaming devices on the market but it needs a bit of knowhow to get it working

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

WIRELESS MEDIA STREAMING

SMC Wireless Receiver

Compact and stylish, but lacks features

Like Pinnacle's Showcenter (see p52), SMC's Universal Wireless Receiver is one of an increasing number of devices capable of streaming media from your computer to a stereo or television. This offering manages to stand out thanks to petite dimensions and attractive styling.

Where some of its rivals have attempted to match the design of a DVD or VHS player, the SMCWMR-AG sits upright and is only 16.5cm high. It may not match the current crop of devices in your living room, but its silver and blue colour scheme gives it a modern appearance.

Connection to your PC can be achieved via an Ethernet port, but SMC has chosen to support both 802.11a and 11g wireless standards. Whereas the Pinnacle Showcenter uses the slower 802.11b method, the SMCWMR-AG can realistically stream data at up to 20Mbits/sec, which is good for movies.

In our tests, we found the device worked smoothly over a wired connection, but we experienced a few problems with its wireless link. Audio worked perfectly, but we occasionally saw reduced frame rates in movies.

Like the Showcenter, the SMCWMR-AG package includes a remote control. We were slightly disappointed by the Pinnacle remote, but were even more dissatisfied with SMC's offering. It is more manageable, but doesn't feature basic inclusions such as volume adjustment, which means you'll need to have your hifi or TV remote control handy.

Home entertainment enthusiasts may also be disappointed by the lack of extra AV connectors. There are standard composite and RCA connectors, but there's a lack of any Scart, component, S-video or S/PDIF connectors.

The SMCWMR-AG serves its purpose but it is less flexible than its rivals and is let down in several key areas.

Rory Reid

DETAILS

RRP £199.95 (£139.36 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
SMC www.smc-europe.com
SPECIFICATIONS
Remote control • 802.11a/g wireless • 100Mbit Ethernet • Composite/RCA connectors
PROS 802.11g network adapter built in; looks stylish
CONS Remote control; lack of connectors
VERDICT
The SMCWMR-AG is a compact and attractive unit, but it lacks important features that AV enthusiasts will demand

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

WIRELESS ROUTER

Kcorp KLG_575 Gold

Fast transfer speed make this a good buy

As wireless becomes more widespread, the only thing holding it back is speed compared to a traditional wired network. The Kcorp KLG-575 Lifestyle Gold series Wireless Gateway Router redresses the balance by offering a burst mode of 108Mbits/sec (twice the speed of 802.11g).

When we tested the router in ideal conditions, we found the speed was very impressive, with a 184MB folder copied in a little less than two minutes, 40 seconds. A single 25MB file took only 10 seconds.

The rear of the device houses a four-port Fast Ethernet switch and a fifth port for the broadband connection. If you have ADSL, you'll need to get an Ethernet modem in order to use this router. Finally, the rear houses the aerial for wireless reception and mounting holes in case you want to attach the router to the wall.

It's also incredibly cheap compared to the competition, although setting it up reveals nothing of its budget origins. The web interface has been improved from the Silver series and is now even easier to use.

You can get a list of all the clients that have requested an IP, which is a good way of checking to see who has accessed the router. The setup wizard is still available and is the best way of getting started.

As you might expect, the router has a built-in firewall to protect all devices from attacks from the Internet connection. It comes with default settings, although you can manually configure it if you feel the need.

The only noticeable omission is a print server. However, as these are flaky at the best of times, we're not too concerned. Overall, it's a superb product especially when considering the low price.

Tim Smith

DETAILS

RRP £82.24 (£69.99 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Kcorp Lifestyle www.kcorplifestyle.com
SPECIFICATIONS
Four-port Ethernet switch • Ethernet Wan connection • 802.11g (108Mbits/sec burst mode) • Web management • Firewall
PROS Very fast; comprehensive browser-based setup
CONS Faster speeds limited to Kcorp clients; no print server
VERDICT
If you are setting up a wireless network and transfer speed is important to you, the Kcorp Lifestyle Gold series is an excellent product

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

MULTIFUNCTION DEVICE

HP Laserjet 3015

Affordable, but watch the consumables

Given the price of ink cartridges for inkjet printers, a laser printer can be a cost-effective option if you rarely print in colour but churn out a significant volume of mono output.

The HP Laserjet 3015 not only offers laser mono printing but also features integrated scanning, copying and fax capabilities. With a footprint of just 426 x 470mm, it won't be hard to accommodate in even the smallest home office.

A standard fax number keypad is included in the control panel on the front of the unit, along with seven programmable speed dial buttons and a phone book key. A resolution button lets you switch between standard, fine, superfine and photo-quality fax scanning settings.

Over on the right of the control panel, you'll find keys giving fast access to the copying and scanning settings. The scanner itself is a colour sheet feed device as opposed to a flatbed and scans at a maximum optical resolution of 600 x 600spi (samples per inch), while you can achieve maximum 1,200dpi effective resolution from the printer.

The 3015 lived up to HP's claims of 14 pages per minute (ppm) print speeds for text and mixed content pages and managed to churn out our test pdf at a speed of 15ppm. The quality of our test text-only printouts was good overall, with the 3015 producing characters at both ends of the font size scale well. There was some banding to areas of shading in our test pdf document, though.

More concerning is the cost of a replacement cartridge. At £50.59 for 2,000 pages, it's very expensive. Unless you have a very low page consumption, it's worth looking for a printer with lower running costs.

Emilie Martin

DETAILS

RRP £279 (£237.45 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION HP 0870 5474 747 **www.hp.com/uk**
SPECIFICATIONS
200dpi max print resolution • 600 x 600spi optical scan resolution • mono laser printer • 9.5kg • 426 x 470 x 445mm (w x d x h) • Readiris OCR software • USB2 and parallel connectivity • 1yr RTB warranty •
PROS Doesn't take up much space; fast print speeds
CONS Print quality occasionally a little patchy; expensive to run
VERDICT
Not a bad workhorse, but for heavy usage you'll pay through the nose on consumables

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

LASER PRINTER

Kyocera FS-1020D

Low running costs make this a good buy

The Kyocera FS-1020D may not be the prettiest printer around, but it is quite straightforward to use, with only two buttons and three LEDs on the front panel. Most of the printer's functions and controls are handled through the driver software.

Although Kyocera claims that it will print at 20ppm (pages per minute), the FS-1020D only managed an unremarkable 9.11ppm for text pages. It is more than redeemed by the strikingly low cost per page. Kyocera quotes toner cassette life at 7,200 pages. With cassettes costing £58.79 inc VAT, that's just 0.008p per page.

Impressively, for the price, the FS-1020D has a duplex printer built in. It comes with a 250-sheet paper tray (expandable with another 250-sheet tray), 50-sheet multi-tray, parallel and USB2 interfaces. The build quality is not hugely impressive and, while the printer is fairly sturdy and won't come apart in your hands, the paper trays and flap openings are flimsy compared with rival products.

It is a small unit and, although it's not very attractive to look at, it's not heavy or particularly bulky and it will blend in unobtrusively among other PC gear. The supplied CD includes the drivers and electronic versions of the printed manual and installation guide. The driver is simple and well laid out, making it easy to access the printer's functions. Overall, it's a capable unit with interesting features. The initial outlay is considerably more expensive than rival products, which may be offputting. However, with duplex printing and low running costs the FS-1020D will work out cheaper in the long run. For a printer this is what's really important.

Anthony Dhanendran

DETAILS

RRP £286.70 (£244 ex VAT)
Toner: £58.79 (£49.99 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Kyocera **www.kyocera.co.uk**
SPECIFICATIONS
300 sheets from two input trays • 20ppm mono • 1,200dpi • 16MB of Ram (expandable to 272MB) • Parallel/USB2 interfaces • 10.5kg including toner • 378 x 375 x 235mm • Options: paper feeder, cabinet, memory, serial interface, network cards
PROS Duplex printer; cost per page
CONS Slow; flimsy paper trays
VERDICT
It might seem more expensive than the competition, but its low running costs are a benefit

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

NAVIGATION SYSTEM

Navman GPS 4460

Navigate across Europe with your Palm PDA

Navman's GPS 4460 is a complete package for European driving. The box includes a Bluetooth GPS receiver, USB2 memory card reader, Smart ST Professional software for PalmOS and maps for western Europe.

There's also a car mount for GPS and PDA, and a car charger for the former, although we'd prefer one for the PDA, as you can put torch batteries in the GPS unit.

Using the software requires a PC to load the maps onto your PDA via the card reader. Maps are copied a country at a time and you can plot routes covering all the countries for which you have maps.

However, we did notice a couple of quirks. Namely you can't plan a route from London to Amsterdam, for example, as the software doesn't know how to route across the English channel (by boat or tunnel).

The Palm application has quick navigation buttons for popular destinations, return route and favourites, all big and chunky enough to work with your finger on the screen, rather than the stylus.

You can set a start point, by tapping on the map, rather than starting from your current location. There's a good range of points of information too, but we'd like to see a 'find my nearest' function.

Voice navigation is accurate, although a little quiet on our PDA, and instructions use feet rather than the yards , which are used for travel distances in the UK.

All in all, this is a comprehensive package; and if you add the ability to plot door-to-door routes across multiple countries it stands above the competition – but you'll probably still need to invest in a car charger for your PDA.

Nigel Whitfield

DETAILS

RRP £299 (£254.47 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Navman 01293 780 500
www.navman-europe.com
SPECIFICATIONS
Desktop: Windows 98 or later, IE 5.5, Palm Hotsync • PDA: Palm OS5.0, 4MB memory, memory card for maps • Supported models listed on Navman website
PROS Good value; cross-Europe route planning
CONS Quiet speech; no 'near me' option
VERDICT
A good value package that provides all you need to turn your PalmOS PDA into a cross-Europe guidance system

PERFORMANCE	★★★★☆
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DIGITAL CAMERA

Fujifilm Finepix F420 Zoom

Point and click with a Super CCD

Fujifilm has stuck with the familiar square design for the new Finepix F420 Zoom, the successor to the popular F410. Although it might not be the easiest camera to hold when composing shots, it'll impress those with an eye for style.

Fujifilm is sticking by its fourth-generation Super CCD, which is capable of producing 6megapixel images from the 3megapixel sensor. It does a reasonable job upping the resolution and you're unlikely to notice the difference in quality unless you look at close-ups of your photos.

Colours are well reproduced, but the F420 seems to follow in the footsteps of many other Finepix cameras by applying a little too much sharpening to photos. The lack of an auto-focus lamp also hampers focusing in low light conditions.

3megapixel images only come in at around 780KB, while the 6megapixel versions are just 1.5MB. While this means you can fit more photos on the 16MB XD memory card, the small file sizes are the result of severe compression. What's more, you can't alter this level of compression and there's no tif or raw mode either. You do, however, get a range of white balances and ISO settings to play with.

For those who want to shoot the odd movie, the F420 is capable of capturing 30 frames per second, which allows for smooth flowing video, albeit at a resolution of just 320 x 240.

With the over-application of sharpening and compression, and the lack of manual controls, the Finepix F420 won't appeal to serious photographers. However, for the point-and-click market, it's priced fairly and performs well.

Will Stapley

DETAILS

RRP £279.99 (£238.29 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Fujifilm 020 7586 1477 www.fujifilm.co.uk
SPECIFICATIONS
3.1megapixels • 2,816 x 2,120 (6mp) • 2,048 x 1,536 (3mp) • 16MB XD memory card • 3x optical zoom • 36-108mm (35mm equivalent) • 2-1/2,000 sec shutter speed • F2.8-4.8/F8 • ISO 125-800 • 30fps 320 x 240 video • 2 x AAA batteries (rechargeable) • 77 x 69 x 26.4mm (w x h x d) • 145g
PROS Easy to use; 30fps movies
CONS Lacking features; fine detail
VERDICT
A stylish digicam for the point-and-click market, but over-use of sharpening and compression hampers performance

PERFORMANCE	★★★★☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★☆☆
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DIGITAL VIDEO CAMCORDERS

DV camcorder round-up

Today's MiniDV camcorders offer more than ever before. We test six of the latest models

The Canon MVX250I is pricey, but offers a good range of features

JVC's GR-D73 has a powerful optical zoom, but the bottom-loading tape mechanism is an oversight

In a world where new formats arrive every day, it's somehow gratifying to know that, for nearly a decade now, there has been only one real standard for domestic digital video camcorders.

With its noise-free picture and high detail, MiniDV still looks great, particularly in comparison to VHS and previous home movie formats, such as Hi8 and S-VHS. Because it's digital, the tape format has opened up a whole world of possibilities for post-production. The Firewire outputs found on most DV camcorders correspond neatly with those on a PC or Mac, turning your home setup into a powerful editing studio. The fact that MiniDV has been around for so long also means that the format has had ample time to mature. Today's digital camcorders come with more features, shoot better pictures and are cheaper than ever before. This month we've rounded up six of the latest sub-£700 models to see how they compare.

Canon MVX250i

Image quality will usually rank high on the average shopper's checklist. But remember that digital doesn't automatically mean 'good quality'.

In the case of the Canon MVX250i, the admirable results achieved in our tests are probably down to a number of determining factors, with a healthy-sized (1/4.5in) CCD sensor, a decent lens and Canon's advanced Digic DV image processing all helping things along. In our indoor tests, colours were slightly muted, although detail was good and there was very little in terms of grain. Outdoors the camera performed much better, with noticeably richer colours and no over-saturation.

Quality is matched by a solid set of features, including a powerful 18x optical zoom, a front-mounted lamp for low-light filming and an 'advanced' accessory shoe that can take attachments, such as external microphones or lamps, without the need for wires. Both still photos and mini m-jpeg movies can be saved to an Secure Digital (SD) memory card (an 8MB one is provided) and, at just over 1megapixel resolution-wise, photo detail is fairly respectable for a camcorder of this price.

In terms of build quality, the MVX250i feels quite masculine. It's heavy, yet tough with a pleasantly designed metallic body and darker grey trim. A side-loading cassette mechanism gives easy access to tapes, even when mounted on a tripod. Controls are simple enough, with a selection of instant-access buttons tucked away underneath the 2.5in foldout LCD screen. Further settings are available through the menu button and three-way rocker towards the front of the unit. It's clear that the MVX250i isn't intended for the entry-level user, however. Many of its highlights, such as a 'true' anamorphic widescreen mode, analogue AV input and a DV in/out-enabled Firewire port are all features that advanced users look out for. And this is reflected in the device's cost – the MVX250i was the most expensive camcorder on test.

That said, if you can stretch to the budget, it's a decent offering with a good range of features.

JVC GR-D73

MiniDV camcorders come in many different shapes and sizes, with the 'upright' and 'lengthways' designs proving the most popular in recent years. The JVC GR-D73 doesn't quite fit into either of these categories, however, being almost square in appearance. This slightly ungainly shape is married to an equally unappealing plastic casing and awkward button placement. But the worst design element of all is the bottom-loading cassette mechanism.

Presumably invented to save space somewhere, this method of access to the tape carriage is a notorious design flaw. It's not immediately obvious quite why it's such a bad idea until you get the camera onto a tripod (or similar support device) and try to change a tape. The problem is that you can't, unless you undock your camera from the support and therefore lose your framing. Granted, this probably isn't such a sin on a low-budget model, since frequent tripod work is usually the province of advanced users.

However, it's still a silly oversight and we're frankly surprised cameras that use this loading technique exist at all. There must be a job lot of bottom-loading mechanisms in a huge warehouse somewhere in the Far East, where camcorder manufacturers go when they want to keep costs down. In the case of JVC's GR-D73, the tape carriage apparatus feels flimsy and its potential for mechanical failure may well have accounted for an error message that we received on several occasions when we attempted to insert a fresh cassette.

Build aside, the GR-D73 is an otherwise unremarkable camera. It offers barely more than a pedestrian performance with fuzzy, grainy image quality indoors and slightly oversaturated colours when used in good, even lighting conditions outdoors.

In its favour, the powerful 16x optical zoom is a bonus at the GR-D73's price point and there are a number of surprising extras. The camera's DV port, for example, works both ways (input as well as output), making it an ideal editing deck when connected to a computer. It also has an analogue AV input socket that can be used to plug in

an external source, such as a Hi8 camcorder or VHS deck, in order to make new, shiny DV copies of old analogue recordings. For standard use, though, there are much better cameras on the market.

Panasonic NV-GS120

As with digital stills cameras, one of the crucial elements governing the quality of a camcorder's recorded image is the CCD. While megapixels are ever multiplying in stills photography devices, DV video has a fixed resolution (720 x 576 pixels in Pal territories).

There are other ways of improving a digital video recording, however. One such method is to employ more sophisticated image-processing systems, such as those used in many professional video devices. Another way of improving colour reproduction and signal-to-noise ratio (SNR) is to use a physically larger CCD or, better still, three separate image sensor chips, each taking on a primary colour (red, green or blue) on its own.

Until recently, it's been rare to see three-chip camcorders for less than £1,000. It's a modern miracle, then, that Panasonic has managed to include a holy triumvirate of image sensors in a camcorder as small and cheap as the NV-GS120. The improvement in picture quality is instantly noticeable, with vivid colours, sharp lines, no fuzziness or grain both indoors and in natural light. It's at the point where it's almost embarrassing to compare the camera's performance with any of the other models on test.

The Leica Dicomar 10x optical zoom lens almost certainly colludes with the sensor array to aid quality even further and the NV-GS120 is no wimp when it comes to taking stills. Its 1.7megapixel top setting was the best of all the camcorders on test.

There are, of course, a handful of disappointments, many of which have the faint whiff of compromise about them. What looks promisingly like a focus ring, for example, is just a bit of decoration. Those wanting to focus manually will need to faff about with the control buttons normally used for fast forwarding and rewinding, which most enthusiasts will find very unsatisfactory. Meanwhile, an equally encouraging 'cinema mode' turns out to be a dodgy letterbox setting that simply crops the top and bottom off the image rather than reshaping it to a 16:9 ratio suitable for widescreen TVs. A final crushing blow is the absence of an analogue input something that will put many advanced users off an otherwise excellent camcorder.

Sharp Viewcam VL-Z5

Style isn't everything, but when you're spending several hundred pounds on a new toy, it's a consideration that may well influence your final decision, however mildly.

Sharp's brave decision to eschew current camcorder design trends and go for something completely different with its Viewcam VL-Z5 is likely to split opinion violently.

For reasons that are not entirely clear, the VL-Z5's body is divided into two segments: the cassette housing and the lens/LCD screen/battery compartment. These two sections are connected in the middle by a joint that allows rotation of the two parts just over 180° vertically. It's a distinctive design, but we're at a complete loss as to how it would ever truly benefit anyone other than those keen to film their own shoes without bending over.

Whether as a direct result of its quirky construction or some other unrelated issue, the VL-Z5 is a very noisy little brute. Ejecting a tape raises an embarrassingly loud series of mechanical squeals as the cassette carriage spews out. Much worse is the buzzing sound/vibration combo that accompanies standard operation. This low-level noise can be heard faintly on recordings, since it is clearly picked up by the front-mounted microphone.

But these faults pale into insignificance next to the VL-Z5's most obvious problem: its poor image quality. When we ran our tests, the image in the VL-Z5's LCD screen appeared inordinately fuzzy, which we initially put down to the screen itself. While this may have been partially true, we were genuinely surprised by the overall low quality of the recorded image. Both indoor and outdoor tests gave us grainy pictures and oversaturated colours. There was even some bleeding, the likes of which we hadn't seen since the glory days of analogue camcorders.

Despite the VL-Z5's undeniably unique design and some useful features, the camera's poor picture quality alone means that we would find it difficult to recommend, even when it is the second cheapest model in our round-up.

Sony Handycam DCR-HC18E

Cheap and cheerful, Sony's budget MiniDV camcorder has got a lot going for it, not least the Easy button on the side, which simplifies menus, settings and operation to the point that it really is just a case of aiming and shooting. Indeed, there are barely any buttons on the DCR-HC18E's body at all. This is because the camera uses a touchscreen allowing access to most of the unit's controls via the foldout LCD panel. There's no stylus, so it's just a case of jabbing away with your fingers, which could be a problem for those with larger digits and tends to leave the screen smeared and greasy. This is a shame, since the DCR-HC18E's LCD screen was one of the clearest in bright conditions.

The most basic of five new additions to Sony's Handycam range, the DCR-HC18E is also the smallest and neatest of the camcorders we looked at. Like the JVC GR-D73, it features that disastrous bottom-loading tape mechanism. But since it's the cheapest model on test, we're more willing to let it pass this time.

Image quality is fair, although colours are slightly muted in even, outdoor light and looked a little washed out in our internal tests, with the slightest touch of grain when filming indoors. That said, the recorded picture is leagues ahead of anything that the JVC and Sharp models could achieve. In that respect, the DCR-HC18E would be a good choice for a beginner or someone looking for a cheap way into the world of digital video.

What will disappoint many is that this budget model has clearly been stripped of features in order to squeeze it into such a competitive price point. Still photography, for example, isn't well supported here. Photo resolution is low (640 x 480 pixels) and there's no memory card to store your still shots on. They have to sit awkwardly alongside your moving images on tape, instead.

Also sorely missing is DV input. When connected to a computer for editing, a camcorder with a two-way Firewire can record a finished film back to DV cassette, effectively providing the user with a high quality

Great image quality from the Panasonic NV-GS120 makes its stand out from the crowd

The Sharp Viewcam VL-Z5 has an unusual design, but is let down by poor picture quality

The cheap Sony Handycam DCR-HC18E will appeal to those on a budget

Sony's Handycam DCR-HC40E produces lively colours and has convenient touchscreen LCD technology

digital master tape. All the camcorders we looked at, bar this one, came with bidirectional Firewire sockets.

The absence of this feature makes Sony's budget option a bad choice for those wanting to reap the benefits of MiniDV's computer connectivity.

Sony Handycam DCR-HC40E

Almost identical in outward appearance to the DCR-HC18E (reviewed above), Sony's more expensive DCR-HC40E distinguishes itself physically with a slightly classier dark grey metallic finish and a smidgen of extra weight. Tragically, the camcorder's anatomical likeness to its cheaper counterpart means it is similarly crippled by a bottom-loading tape mechanism.

It's less forgivable in this case, as the DCR-HC40E is obviously intended for advanced users who are more liable to use a tripod.

Similarities to the DCR-HC18E aren't just skin deep, either. Many of the budget camera's positive attributes also make a reappearance including the Carl Zeiss 10x optical zoom lens, Nightshot Plus setting for filming in low-lighting conditions and the convenient touchscreen LCD technology.

But the DCR-HC40E also manages to address many of the points we found lacking in the more basic model. Still photos can be taken at higher resolutions (1,152 x 864 pixels) and are stored on a Memory Stick Duo card rather than on tape.

More importantly, perhaps, for prospective desktop video editors is the inclusion of a bidirectional Firewire socket and analogue input. Interestingly, the DCR-HC40E can be used as a conduit from an analogue video source directly to your computer without having to record to DV tape. This pass-through feature will be useful for anyone looking to digitise large amounts of analogue recordings, since it won't inflict any unnecessary wear on the camcorder's moving parts.

It's not quite up there with the three-chip Panasonic model or the Canon MVX250i, but the DCR-HC40E's picture shows a marked improvement on the DCR-HC18E, with lively colours and sharp edges outdoors and only a negligible loss of detail and colour in lower, artificial lighting.

Best on test

MiniDV's continuing popularity and growth means it's still far and away the best platform to opt for when buying a new camcorder at almost any budget or experience level.

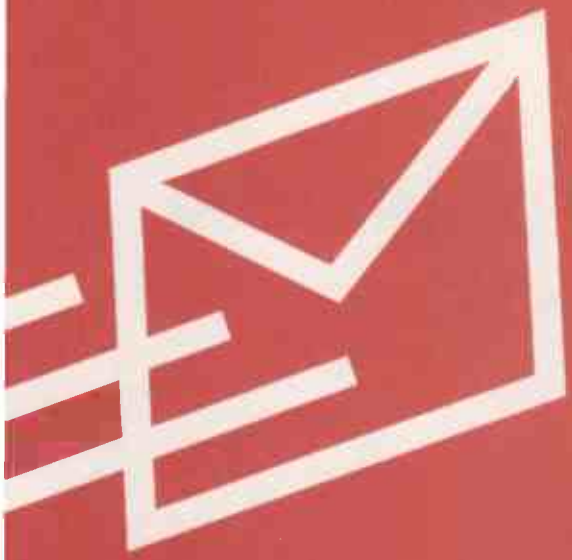
The particular models in this round-up prove there has been a enormous amount of development in the lower regions of the market, with features like megapixel-plus still photos and even three-chip CCD sensors becoming available at affordable prices.

In terms of image quality, there really isn't any competition, so the Panasonic NV-GS120 receives our Recommended award. It's just a shame there are a couple of important features missing. For these, Panasonic encourages us to step up our budget for the next model in the range (the NV-GS200 priced at around £750).

If we were to choose any runners-up, then the Canon MVX250i and the Sony DCR-HC40E both offer a diplomatic balance of picture quality and features at competitive prices. And those who are simply looking to get on the digital bandwagon as cheaply as possible could do a lot worse than opting for the frill-free Sony DCR-HC18E.

Jonathan Parkyn

MANUFACTURER	CANON	JVC	PANASONIC	SHARP	SONY	SONY
PRODUCT	MVX250I	GR-D73	NV-GS120	VIEWCAM VL-Z5	HANDYCAM DCR-HC18E	HANDYCAM DCR-HC40E
Price (ex VAT)	£568 (£483.40)	£382 (£325.11)	£540 (£459.57)	£359 (£305.53)	£320 (£272.34)	£475 (£404.26)
URL	www.canon.co.uk	www.jvc.co.uk	www.panasonic.co.uk	www.sharp.co.uk	www.sony.co.uk	www.sony.co.uk
Telephone	08705 143 723	0870 330 5000	08705 357 357	0161 205 2333	08705 111 999	08705 111 999
Zoom	18x optical, 360x digital	16x optical, 700x digital	10x optical, 500x digital	10x optical, 500x digital	10x optical, 120x digital	10x optical, 120x digital
LCD screen	2.5in colour	2.4in colour	2.5in colour	2.5in colour	2.5in colour	2.5in colour
CCD image sensor	1x 1/4.5in CCD	1x 1/6in CCD	3x 1/6in CCD	1x 1/4in CCD	1x 1/6in CCD	1x 1/5in CCD
Still max res (pixels)	1,280 x 960	1,024 x 768	1,536 x 1152	640 x 480	640 x 480	1,152 x 864
Size (w x d x h mm)	74 x 130 x 78	71 x 118 x 91	70 x 126 x 75	83 x 102 x 82	50 x 112 x 86	50 x 112 x 86
Weight (g)	490	500	450	485	380	400
Other	Remote control, analogue input, widescreen, network features	Remote control, webcam function, analogue input	Remote control, external microphone, webcam function	Remote control, analogue input	Remote control, touchscreen, Nightshot Plus	Remote control, widescreen, Nightshot Plus, analogue input, touchscreen
SCORES						
Ease of use	★★★★☆	★★★☆☆	★★★★☆	★★★☆☆	★★★★☆	★★★☆☆
Performance	★★★★☆	★★☆☆☆	★★★★★	★☆☆☆☆	★★☆☆☆	★★★★☆
Features	★★★★☆	★★★☆☆	★★★★☆	★★☆☆☆	★★☆☆☆	★★★★☆
Overall	★★★★☆	★★★☆☆	★★★★☆	★★☆☆☆	★★★☆☆	★★★☆☆



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8MEGAPIXEL PROSUMER DIGICAMS

Canon Powershot Pro1 v Nikon Coolpix 8700

How do these two 8megapixel models measure up head to head?

In terms of looks, these two cameras are fairly similar. Both mimic a digital SLR design and feature an electronic viewfinder (EVF) as opposed to a basic optical version. Canon's Pro1 also sports a useful zoom ring at the front of the lens that, thanks to the fast zoom engine, allows for quick and responsive zooming and manual focus adjustment. The design of the Coolpix 8700 from Nikon isn't quite as ergonomic and the two strap holders frequently get in the way.

When it comes to button placement and menu navigation, the Canon wins hands down. Like any prosumer digital camera, it takes a while to get to grips with the extended functions, but the large mode dial and intuitive menu system helps a great deal. On the other hand, the Coolplx 8700 can be frustratingly difficult to find your way around with functions found in places you really wouldn't expect them to be.

With the EVF, it's a different story. The high-res Nikon EVF has a fast refresh rate that mimics an SLR extremely well. Canon's EVF is acceptable, but the slow refresh rate doesn't compare well with Nikon's.

Nikon has a reputation for producing digital cameras with extra wide-angle lenses, but despite this the Coolpix 8700 only has a wide-angle of 35mm. Conversely, the Pro1 sports an impressive wide angle of 28mm.

Optical zoom ratings are similar, with the Canon achieving 7x and the Nikon 8x, but since the Nikon starts off at 35mm it has a maximum telephoto of 280mm as opposed to Canon's 200mm. In terms of aperture, the fast lens on the Pro1 has a maximum rating of F2.4, reducing to F3.5 at maximum zoom, while the Coolpix 8700 comes in slightly slower at F2.8 and F4.2 at 8x optical zoom.

As you would expect, picture quality is admirable with both of these cameras, however there are noticeable differences. While the Pro1 supplied us with glorious colourful photos, the Nikon appeared to display colours that were slightly more realistic, if a little bland.

Skin tones also seemed more lifelike on the Coolpix 8700. When shooting in Raw mode, which both cameras are capable of, the difference between the two outputs reduces further. If you take a look at the night shots on the cover disc, you'll notice that the Pro1 had some minor chromatic aberration issues – something which the Coolpix 8700 managed to avoid.

It's worth noting that the Canon's movie mode is only capable of 15 frames per second (fps), while Nikon's manages 30fps, both of which shoot at 640 x 480. Canon also ships a remote control and lens flare hood, along with a filter adapter.

When it comes to making a buying decision, image quality isn't really too much of an issue, since both are capable of taking excellent, well detailed photos. It's really more down to the features, usability and price. Nikon has elected not to supply any memory card, which is understandable since anything less than a 128MB card on this type of camera is almost worthless, whereas Canon supply a 64MB Compact Flash card. Take a look at www.pcw.co.uk/bestprices, and you'll see that the Nikon is available for just under £700 and the Canon is at around £780.

It's tough to say which is better as they've both got different strengths. The design and usability of the Pro1 was good, but the Coolpix 8700 featured the likes of a 30fps movie mode and impressive 280mm telephoto lens. If it came down to one or the other, we'd pay the little bit extra and go for the Canon, but it's well worth looking at the Nikon before parting with your money.

Will Stapley

DETAILS

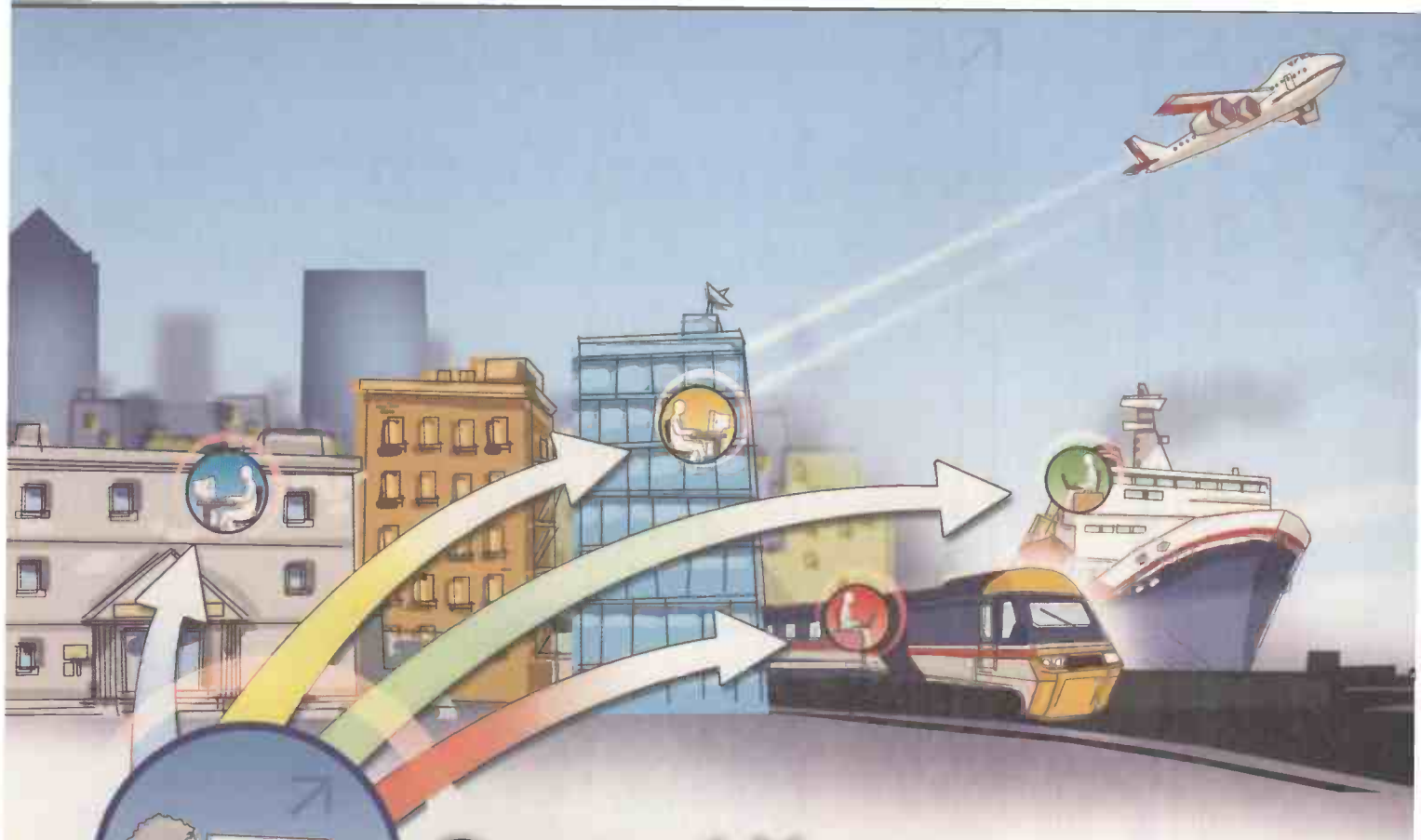
CANON POWERSHOT PRO1
RRP £999 (£850.21 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Canon 08705 143 723 www.canon.co.uk
SPECIFICATIONS
3,264 x 2,448 • 7x optical zoom (28-200mm) • F2.4-3.5/F8 • Shutter speeds: 15-1/1,400 sec • 3cm macro • ISO 50-400 • 2in LCD monitor • Lens filter and anti-flare adapters • Remote control • 117.5 x 72 x 90.3 (d x h x w) • 545g
PROS Excellent design; wide angle
CONS 15fps movies; slight chromatic aberrations
VERDICT
The Pro1 has a comfortable design and comes with a host of accessories

PERFORMANCE	★★★★★
FEATURES	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★★

DETAILS

NIKON COOLPIX 8700
RRP £799 (£680 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Nikon 0845 4500 155 www.nikon.co.uk
SPECIFICATIONS
3,264 x 2,448 • 8x optical zoom (35-280mm) • F2.8-4.2/F8-7.4 • Shutter speeds: 8-1/1,400 sec • Bulb mode • ISO 125-400 • 3cm Macro • 1.8in LCD monitor • 113 x 78 x 105 (d x h x w) • 480g
PROS Decent zoom; 30fps movies
CONS Unintuitive menu system
VERDICT
Similar in quality to the Pro1, featuring a 280mm telephoto and 30fps movies, but the awkward controls hold it back

PERFORMANCE	★★★★★
FEATURES	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½



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- 512MB DDR RAM (PC2700) 333MHz (2x256MB)
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- 128MB DDR ATI Radeon 9600 graphics with TV-out & DVI
- 17" Philips 170B4BS Pure Digital DVI TFT monitor (16ms response)
- CD-RW drive (52x24x52) with BURN-Proof technology
- 8x DVD-RW / 24X CD-RW combo drive
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- v92 56k Internet ready modem
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Computer Shopper, Sep 2003

October 2003

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Computeractive, Issue 142

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- 512MB dual channel DDR RAM (PC3200) 400MHz (2x256MB)
- 160GB 7200rpm hard drive with 8MB buffer
- 128MB DDR ATI Radeon 9600 graphics with TV-out & DVI
- 17" Philips 170B4BS Pure Digital DVI TFT monitor (16ms response)
- 16x DVD-ROM drive
- 8x DVD-RW / 24X CD-RW combo drive
- 10/100 network connection (on-board)
- v92 56k Internet ready modem
- Sound Blaster compatible 6 channel audio
- Creative Inspire P580 5.1 speakers
- Internet keyboard with rechargeable wireless optical mouse
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- FREE Microsoft Works 7.0
- Stylish tool free case - Xpider or Sleek design (435x222x495mm)
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Computer Shopper, Feb 2004

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e-CODE: AX1175-07

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- 120GB 7200rpm hard drive with 8MB buffer
- 128MB DDR ATI Radeon 9200 graphics with TV-out and DVI
- 17" (16" visible) Viewsonic E70f+SB PerfectFlat (CRT) monitor
- 16x DVD-ROM drive
- CD-RW drive (52x24x52) with BURN-proof technology
- v92 56k Internet ready modem
- Sound Blaster compatible 6 channel audio
- Creative Inspire P580 5.1 speakers
- Microsoft keyboard and optical wheel mouse (black)
- FREE Pinnacle Instant CD/DVD SE, Studio9 SE and DVD player
- FREE Microsoft Works 7.0
- Stylish tool free case - Xpider or Sleek design (435x222x495)
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- 3 year warranty (2 years on-site, 1 year RTB)

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Axis 64 A32

e-CODE: AX1176-07

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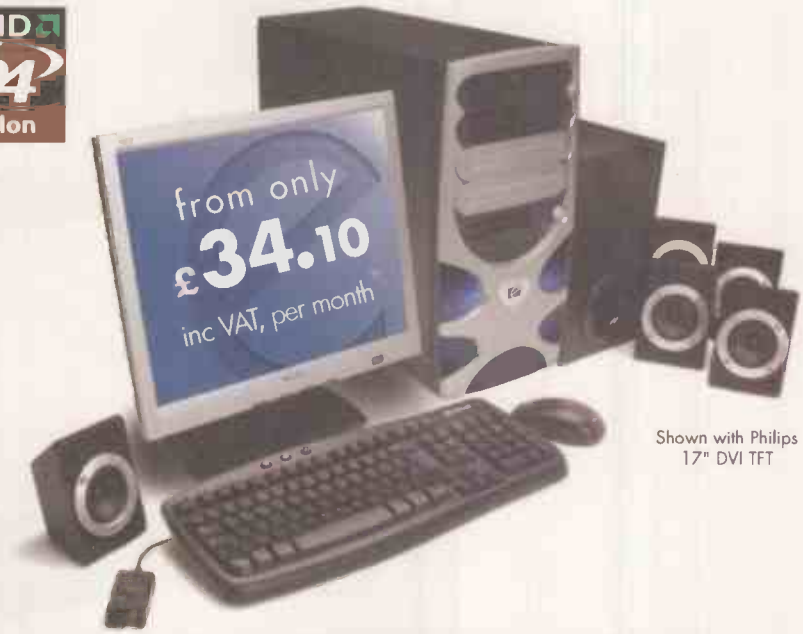
- 160GB 7200rpm hard drive with 8MB buffer
- 128MB DDR ATI Radeon 9800 Pro graphics with TV-out & DVI
- 17" (16" visible) Viewsonic E70f+SB PerfectFlat (CRT) monitor
- 16x DVD-ROM drive
- 8x Multi Format DVD writer
- Firewire port (IEEE-1394) (on-board)
- 10/100 network connection (on-board)
- v92 56k Internet ready modem
- Sound Blaster compatible 6 channel audio with S/PDIF
- Creative Inspire P580 5.1 speakers
- Microsoft keyboard and wheel optical mouse (black)
- FREE Pinnacle Instant CD/DVD SE, Studio9 SE and DVD player
- FREE Microsoft Works 7.0
- Stylish tool free case - Xpider or Sleek design (435x222x495mm)
- 6x USB2.0 (2x front mounted)



Shown with Philips 17" DVI TFT

	With 17" Viewsonic CRT monitor	With 17" Philips 16ms DVI TFT monitor
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PC Pro, Recommended & A-List, February 2004

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- ATI Mobility Radeon 9600 with 128MB dedicated graphics memory
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- 12 cell Li-Ion battery (life up to 3hrs approx.)
- Built-in smart card reader, supports MMC/SD/SM/MS
- 10/100 network card
- v90 56k Internet ready modem
- Built-in audio & speakers
- FREE Pinnacle Instant CD/DVD SE, Studio9 SE & DVD player
- FREE Microsoft® Works 7.0
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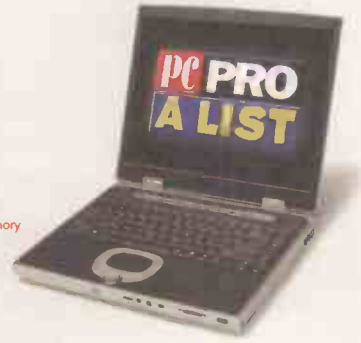
- Weight - 3.6kg
- Dimensions - 332mmx285mmx41.1mm
- 3 year warranty - 1 year on-site, 2 years RTB



"A formidable package." Voyager 64 A3200+, Trusted Reviews, Dec 2003

"Great value for money." Voyager 64 A3200+, PC Advisor, March 2004

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- 64MB ATI Mobility Radeon 9600 Pro Graphics
- DVD/CD-RW/DVD-RW combo drive
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MANAGED WIRELESS HOTSPOT

Stark Wireless Hotspot

Run a hotspot and turn a profit

Hotspots are extremely popular, but for the average business owner, getting one running can be a costly exercise.

Stark Technologies aims to change that with its hotspot service, which lets businesses make money from wireless surfers. For this review we got our hands on the kit for the wireless hotspot service. All you need is a broadband connection, which Stark can also provide.

The bundle comes with an ADSL router and the wireless box. Just plug them in and it's ready to run. We were impressed that we had a hotspot running in, literally, a matter of seconds.

Once there the service runs just like any other hotspot: new clients are redirected to a logon webpage. This can be accessed using paid-for cards or the pay-by-phone option. This currently works with O_2 and charges billing to a mobile phone.

The card options are quite flexible, though, and include one, two, four and 24-hour cards, plus 60 and 120-minute Navigator cards. The latter cost more but uses per-second billing, which lets a customer use remaining minutes in another Stark hotspot.

With installation so simple and management taken care of offsite, the most interesting thing about the package is the profit sharing. For each access card or wireless PC Card sold the owner of the location takes a percentage cut of the profits.

Exact figures are difficult to estimate but typically range between 20p and 55p per access sold, plus residuals on every access. Once you reach £100 of profit, which you can monitor online, you get paid.

This is the easiest way of adding a hotspot to a business, although you get no control over how it works and there's no guarantee of turning a profit. That's not a big caveat and it's worth investigating further.

David Ludlow

DETAILS

RRP £468.83 (£399 ex VAT)
PRODUCT INFORMATION
Stark Technologies
www.starktechnologies.com
SPECIFICATIONS
Broadband required (can be provided) • ADSL router • Managed Wireless Hotspot box
PROS Simple to install; good value for money
CONS No control over the wireless connection
VERDICT
For a small business looking to entice customers, this is a simple and easy way to get a hotspot

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

17IN TFT

ADI Microscan I700

A stylish and feature-rich flat screen

The flat-screen TFT market is saturated, so choosing the right monitor can be difficult. ADI's latest release, the Microscan I700, is a 17in panel that stands out from the crowd thanks to a number of useful additions.

Most importantly, the I700 features an interchangeable Feature Box that, in the standard bundle, houses a pair of decent-sounding speakers and a pair of USB2 ports. This box can be replaced with an alternative unit that does away with these ports in favour of a TV tuner. With this, you can access all five terrestrial channels or, if you have an appropriate set-top box, enjoy digital television through your PC display.

The I700's other main feature is its swivelling screen, which can be turned 90° on each axis. Mostly useless for the home user, this feature only really comes into play for the business market, such as trading or design, where the monitor needs to be flexible.

Image quality is fairly good, although the picture tends to worsen if you view it from severe angles. We tested the display with a variety of applications, including games, and, despite its relatively high 25ms response time, it performs well enough to appeal to the average user.

There is no digital input on the I700, so you'll have to manually adjust the display in order to get the best picture. Also, if you intend to move the screen between PCs, or if the cable becomes disconnected, you'll have to reboot or physically instruct the monitor to accept a new signal, which can be frustrating at times.

These complaints aside, the Microscan I700 is an attractive screen that provides an adequate range of features.

Rory Reid

DETAILS

RRP £299 (£254.47 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
ADI 0870 444 1895
www.adiuk.com
SPECIFICATIONS
17in TFT • 1,280 x 1,024 native resolution • 400:1 contrast ratio • 120° viewing angle (vertical and horizontal) • 16.7 million colours • Analogue input
PROS Interchangeable Feature Box; picture; height adjustable
CONS No auto-detection of image source
VERDICT
An attractive TFT with some interesting features, but it's likely to appeal to businesses that need the flexible stand, rather than home users

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

>> Online review Digital Photo Maker software
www.pcw.co.uk/Products/1154853

DVD WRITER

Iomega Super DVD

Multiformat, but reasonably bulky

Whereas some manufacturers are designing ultra-slim external DVD writers, Iomega has decided to build its latest DVD burner with functionality in mind rather than portability.

The Super DVD Writer lives up to its name in terms of its versatility, and can read and write to all discs including Ram. However, it's not capable of reading DVD-Ram discs housed in a protective cartridge.

Being able to write to DVD+R media at an impressive eight-speed, the Super DVD Writer certainly isn't sluggish, although it does drop to four-speed for DVD-R and to three-speed for DVD-Ram media.

Thanks to its USB2 connection, installation is no problem at all and you get a range of software. The package includes two Iomega titles, Hotburn Pro and Automatic Backup, along with utilities such as Sonic MyDVD and Adobe Photoshop Album 2.

External DVD writers are usually of most interest to those with notebooks, but due to its bulky size and hefty weight the Super DVD Writer isn't the most portable of devices. Although notebook users might want to look elsewhere, the Super DVD Writer would be a useful device to share among a group of desktop PCs. A pain-free installation process means it can be hot-swapped between PCs with the minimum of fuss.

Overall, the decent writing speeds of the Super DVD Writer and its capability to burn to a multitude of formats impressed us, while its robust design will ensure it's capable of taking a few knocks, unlike some of the slim top-loading DVD writers we've seen. Despite this, the fact that it weighs 1.5kg and demands a fair bit of desk space may be enough to dissuade many from parting with their cash.

Will Stapley

DETAILS

RRP £149 (£126.80 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Iomega
020 7216 0003
www.iomega-europe.com
SPECIFICATIONS
DVD+R/-R: 8x/4x • DVD+RW/-RW: 4x/2x • DVD-Ram: 3x • DVD-Rom: 12x • CD-R/-RW: 24x/16x • CD-Rom: 32x • USB2 • 235 x 162 x 58mm (w x d x h) • 1.5kg
PROS Fast; robust; multiformat
CONS Heavy and bulky
VERDICT
Not the kind of drive you'd really want to drag around with your notebook, but it's versatile and easy to use

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

DVD TOWER RECORDER

Microboards DSR DVDual

All the burning power you could ever need

The DSR DVDual Series is a multi-drive DVD+/-R/CD-R duplicator that allows you to copy multiple CD or DVDs at the touch of a button. The unit itself is a fairly uninspiring PC case with the entire front filled with DVD recorders and very little else. You can buy a tower with up to 16 recorders installed but the version we used contained eight.

To control the DSR DVDual you are provided with very basic digital display unit that would look more at home in a supermarket checkout. Your input choices are limited to two buttons mounted on the display unit, labelled Yes and No. Needless to say we were very sceptical that these limited controls would be enough to take full advantage of the unit, but we were surprised. The menu hierarchy has been very well designed.

It doesn't claim to be lightning fast but we managed eight copies of an audio CD audio disc in around two minutes and eight copies of a DVD containing mixed data in just over 15 minutes, which is quick by anyone's standards.

The hard disk allows you to store up to 10 images (default is seven DVD images and three CD images) or perform CD track extraction for CD audio compilations.

The unit is also available with Firewire connection that enables you to control it from a PC. But we were hard pushed to find a reason you would need to, given that the supplied control box works so effectively. All in all this is a very powerful product – if you work in a small business looking for a duplication product then this is definitely worth a look. The only downside is a price that would make a hefty dent in a small business budget.

Benjamin Styles

DETAILS

RRP £2,032.75 (£1,730 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Microboards 0845 230 7800
www.microboards.co.uk
SPECIFICATIONS
CDRW: 8x DVD recording, 24x CD-R • Dual format DVD • Hard disk (stores 10 disc images) • Optional Firewire interface
PROS Fast; dual format
CONS Expensive
VERDICT
For duplicating lots of CDs and DVDs it's hard to touch the DSR DVDual in terms of performance and ease of use. We just wish it wasn't so expensive

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

DVD RECORDER

TDK DVW-A080412N

DVD writing steps up a speed

As we saw during the days of the CD-RW drive, another month takes us another notch up the speed ladder.

DVD drives have now reached eight-speed and the TDK DVW-A080412N boasts the fastest writing on the market. It supports this speed for DVD+/-R, although +/-RW speeds are limited to four-speed.

Unfortunately, the speed claim didn't stand up in our tests. It took almost 25 minutes to copy 4.7GB of data from a standard DVD containing a variety of file types. It also claimed to be able to copy an entire DVD In less than eight minutes. Our tests showed that it managed well under the eight-speed maximum.

However, there is a great deal of difference in performance depending on the media used, so better results may be possible if you persevere and experiment. Not many of the other drives on the market fare much better.

On balance, the drive is dual format, so you don't need to worry about choosing the correct one. The choice of media also means that you can experiment and select the best discs for use with standalone DVD players. You're definitely future proofed with this drive.

Nero 6 DVD/CD writing software, which is an excellent utility, rounds off the package.

Nero 6 also includes Nero Showtime DVD playback software, as well as a backup utility, ideally suited to archiving data from your PC using a blank DVD.

Had the TDK DVW-A080412N lived up to its printed specifications then it would have been a fantastic piece of hardware. The reality, however, is that the hardware shows a similar performance to the other eight-speed drives on the market.

Benjamin Styles

DETAILS

RRP £150 (£126.66 exVAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
TDK
01737 771 212
www.tdk-europe.com
SPECIFICATIONS
8x write DVD +/-R • 4x write DVD +/-RW • 32x write for CD-RW • Burnproof • Nero 6 Software
PROS Dual format
CONS Expensive
VERDICT
If this drive had lived up to its speed claims it would have been a much healthier contender

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

SMALL FORM FACTOR PC

AOpen XC Cube EY65

The updates and improvements continue

The latest addition to AOpen's popular barebones XC Cube range is the Intel-based EY65. This series does away with the dropdown doors for the floppy drive/card reader and the front port bay of the original XC Cube. Instead, there's a black panel for the bay and the front ports are left open.

Installed with AOpen's UX4SG-1394 motherboard, the EY65 has most of the integrated features we've come to expect from a small form factor PC. The board uses Intel's i865G (Springdale) chipset and supports all Intel Northwood processors up to the 800MHz front-side bus (FSB) 3.2GHz P4.

However, the large processor fan is a little noisy when first turned on.

The two Dimm slots allow for a maximum of 2GB of memory (up to DDR400) to be installed using the chipset's dual-channel memory support.

The chipset also supplies the integrated Intel Extreme Graphics 2 but, thankfully, if you want to play serious games there is an 8x AGP slot. Thanks to the size of the case, it can happily seat a full-height card, as can the single PCI slot. Also integrated is a Gigabit Ethernet port, while a Realtek ALC650 controls the 5.1 audio.

Two Serial ATA (Sata) and two IDE ports are supplied and, as a result of the space restrictions inside the case, the Sata solution produces the tidiest cable arrangement. AOpen even supplies Serial ATA data and power cables with one connector angled at 90° to make fitting even easier.

Finally, the barebones PC comes with a well-written manual full of colour photos describing how to assemble the Cube. The EY65 is a stylish addition to the family and very close to beating Shuttle at its own game.

Simon Crisp

DETAILS

RRP £200 (£170.22 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
AOpen www.aopen.com
SPECIFICATIONS
Intel Pentium 4 Northwood processor • Intel i865G • 2 memory slots • AGP 8x • 5.1 audio • AGP slot • PCI slot • 2 parallel ATA slots • 2 Sata slots • 4 USB2, 2 6pin Firewire, 1 4pin Firewire, 2 PS/2, 2 optical, serial, parallel, Lan, VGA, 5 audio.
PROS Support for full-size expansion cards; build quality
CONS Processor fan a little noisy
VERDICT
Just the thing if you are limited for desk space

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

TV TUNERS

TV tuner round-up

As watching telly on a PC gets easier, the choice of devices gets wider

GTA's Black Gold Digital TV is good value at £99

WinTV's USB Nova-t took a long time to install on our system

Once limited to simply showing the action at the Wimbledon tennis championships in a window, today's TV tuners can turn your PC into a fully fledged personal video system. You can watch Ricky Gervais while tapping away in Microsoft Office, record programmes directly to your hard disk and even pause and restart live TV if the phone rings during the cricket.

As always, though, some tuners are better than others and there are plenty of choices available to make it harder to find the right one for you. Do you choose an analogue model that can also capture footage from your video or camcorder, or go for entirely digital technology compatible with Freeview or digital satellite? Then there are those that come with built-in radio facilities, remote controls and integrated media burning software, allowing you to easily create your own library of Video CD or DVD material.

To see just what's on offer, we've rounded-up six of the latest options, from plug-and-play USB boxes to PCI add-ons and standalone devices. We've finished up with a buyer's guide (also on this month's cover disc) to give you more advice on choosing the right product. With Euro 2004 and the Olympics just round the corner, it's the perfect time to tune in.

GTA Black Gold Digital TV

The first of two digital tuner cards in this round-up, Black Gold is an internal card that comes with an infra-red sensor and remote control. Usefully, it also supports hardware mpeg2 encoding and has an S-video socket for connecting a video or camcorder. As with Hauppauge's Nova-t, the card provides access to terrestrial free-to-air TV channels on the Freeview system.

Although we expected installation to be more complicated than with USB offerings, it's paramount that you install the Black Gold software before plugging in the PCI card. Put the card in first and at best it won't work, at worst you could have to re-install Windows. A small sticker provides a warning, but this needs to be spelled out in big letters on the packaging and on screen. You also need an Internet connection to enable the software.

This aside, things start to improve. Channel tuning is just a matter of following on-screen prompts, while a Media Player-style interface makes the bundled TV application more intuitive than most. The software supports recording in a variety of video and audio formats, but GTA doesn't offer digital teletext, interactive services or Now and Next information on this version. It provides timeshifting and is compatible with the net-based subscription electronic programme guide (EPG) Digiguide. You can download a 30-day trial, but manually scheduling recordings is straightforward.

Tests with both outdoor and indoor aerials were impressive, with much better performance than we expected on the latter. We'd have to say some channels didn't seem as crisp as with the Nova-t, but overall presentation was first class. GTA also provides a separate DVB radio player.

While it lacks polish in some areas, the Black Gold Digital TV is good value at £99. The hardware mpeg2 encoding for analogue video is also a major benefit.

Hauppauge WinTV USB Nova-t

The second digital tuner here, the WinTV Nova-t brings the Freeview digital terrestrial service to your PC. You can tune in to free-to-view channels including BBC3 and 4, CBeebies, ITV2 and even a crystal-clear Channel 5.

Despite being a simple plug-and-play USB2 device, the Nova-t took a surprisingly long time to install on our system. Moreover, the Teletext application must be installed separately after the main software. Eventually we were up and running and it only took a minute to select our TV region and set up the channels. The tuner picks up paid-for channels as well as free ones, but there's no way to subscribe to these at the moment.

Hauppauge's software provides everything you'd expect including instant and scheduled recording, timeshifting and Freeview's Now and Next information. You can't click on the latter to record an upcoming programme but the software supports a full EPG function that should come to life when Freeview decides to broadcast one. By the time you read this it should also come bundled with Showshifter, which supports a subscription-based online EPG.

In general it's all easy to use, but the timeshifting controls could be a little more precise and the icons aren't as intuitive as Pinnacle's. A real remote control rather than a virtual one would also be a huge plus.

One thing we weren't prepared for was the picture quality. With an outdoor aerial in line with the Crystal Palace transmitter, reception was superb, with crisp images and sparkling sound. While some of the analogue systems here offer good images, the Nova-t blew them away. The unit can also pick up a variety of DVB radio stations.

Being a purely digital product the Nova-t offers an RF aerial input only, lacking the video capture facilities found on more common analogue models.

While you can buy a dedicated Freeview box for around half the price, the added functions and image quality make the Nova-t tempting.

Hauppauge WinTV PCI-FM

As its name suggests, this low-cost PCI-FM card offers both an analogue TV tuner and FM radio capabilities. At £69.99 it's cheaper than all but Pinnacle's PCTV Stereo, but, unfortunately, it's easy to see why.

While we all try not to go on first impressions, a messy external audio link lead, poorly printed documentation and conflicting installation instructions didn't help. It didn't take long to get things going, though, and we were up and watching quite quickly.

Unlike the Nova-t, the software for the PCI-FM is split into several applications rather than one or two well-integrated packages. There are two programs to watch and record TV. The main Win2000 software is awkward and confusing, relying too much on flashy design rather than providing a clear interface. It does come with a SoftPVR utility but this just allows for one-touch mpeg1 recording – there's no timeshifting and half the functions aren't implemented.

The PCI-FM does support cable stations, scheduled recording, snapshots and Teletext, and has a handy remote – bizarre when you consider the more expensive USB Nova-t doesn't. The scheduler also works with the paid-for online TVTV EPG in Europe, but we couldn't get this to work on our system.

Picture quality was fine with a good outdoor aerial, though it lacked the sparkle of others, while the radio worked perfectly with a spot of fine tuning. The radio app is easy to use but, strangely, while the scheduler can record FM signals, there's no record function in the program.

Given the great experience we had with the Nova-t, the PCI-FM was something of a letdown.

Trust Combi TV-PC POP View

Taking a different approach from the other products here, Trust's latest gadget is neither a USB or PCI device. Instead, the oddly named Combi TV-PC POP View is a standalone unit that plugs directly into your display.

The Combi connects to your monitor via a VGA lead and doesn't require any software or drivers to work. In fact, you don't even need a PC to use it. Just stick in an aerial, plug in some speakers, connect the box to your monitor and tune in. Alternatively, you can route your PC through the box and use its picture-in-picture facilities to view TV in a window. S-video and composite inputs let you connect other devices, such as DVD player or games console, and the picture from all three sources can be scaled from 640 x 480 to 1,024 x 768.

There's not that much more to say about the Combi. On-screen menus make selecting and adjusting items such as colour and contrast easy, while a remote control means you don't even have to touch the box once it's set up. That said, not everything went to plan in our tests. Trust supplied us with a European model, which refused to give us pictures and sound simultaneously. Although both the UK and Europe use the Pal TV system, it would appear that there are slight differences. We either a got a good picture accompanied by white noise or clear sound with no image.

The easiest tuner to set up, the Combi is a hassle-free free way to get TV on your PC. Just make sure you get the UK version.

Pinnacle PCTV Deluxe

A smart blue and white box that won't spoil even the tidiest desk, Pinnacle's top-of-the-range analogue tuner is compatible with terrestrial and cable TV. The most exciting thing is the inclusion of realtime mpeg2 encoding hardware, allowing for instant 'DVD quality' recordings.

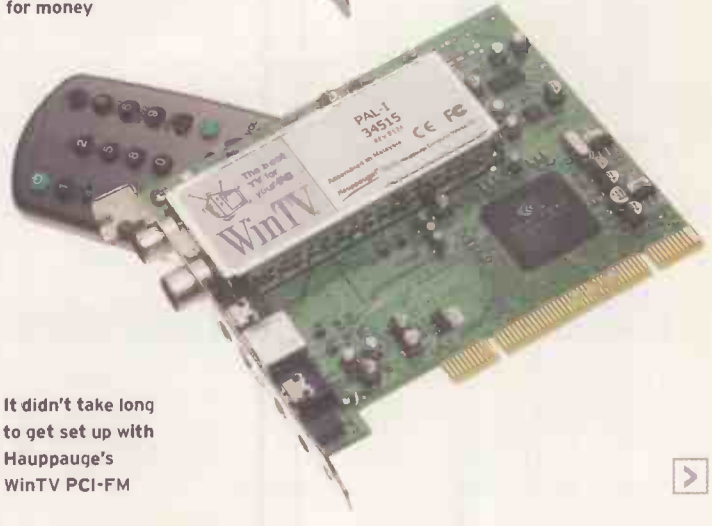
Connection via USB means the Deluxe works with both desktop and notebook PCs, but you'll need a USB2 interface to achieve the best results. Getting things running is as easy as installing the software and plugging the tuner into the mains and the relevant port. Scanning for channels is quick, but it would have been useful to see station names automatically assigned to standard channels, such as BBC1.

Pinnacle's Vision software features adjustable timeshifting options and facilities for both instant and scheduled recordings. Sadly, scheduling must be done manually as an EPG function is currently only supported in the US. Teletext can be accessed through the web

Trust's Combi TV-PC POP View plugs directly into your display

The PCTV Deluxe from Pinnacle is expensive, but worth it

Pinnacle's PCTV Stereo is the cheapest here and offers great value for money



It didn't take long to get set up with Hauppauge's WinTV PCI-FM

Buying a TV tuner card?
Turn to page 75 for an in-depth guide

in a separate application, with search options, but of course you'll need to be online.

While there was a slight lag when changing channels, in tests the picture quality was excellent on both live TV and recordings using an outdoor rooftop aerial. You can also record from a VCR or camcorder by using the S-video, composite and audio inputs at the front of the unit. Files are stored as mpeg but can be converted into a variety of formats and Pinnacle even includes integrated DVD/CD burning facilities.

The Deluxe package comes with a remote control, which works well but includes redundant buttons used on other products in the range. While it is the most expensive option on test, the PCTV Deluxe is a great little tuner.

Pinnacle PCTV Stereo

The cheapest tuner at just under £50, the PCTV Stereo sits at the entry-level end of Pinnacle's range. Still, price is no guarantee of performance and we were pleasantly surprised by this tiny PCI card.

Installation is easy, although, as with the WinTV PCI-FM, the card uses a clumsy external lead to provide audio playback through your sound card. Messler still is the sensor for the supplied remote control, which needs a free 9pin legacy serial port to work. As well as an aerial input, the card has composite, S-video and audio connectors.

The Stereo comes with the same Vision and Webtext software as the Deluxe, providing easy-to-use recording, manual scheduling and timeshifting facilities. You can also capture individual stills in standard bmp format. All captured files are neatly organised in the Gallery, while integrated burning software is provided to create your own movie discs. Strangely, the version of Vision bundled with this card also managed to name channels automatically.

One particularly interesting feature is the video capture formats. According to the packaging, the software supports mpeg1 recording but can be upgraded to mpeg2 at additional cost. Despite this, we managed to select and use the mpeg2 functions from the start without any problems. However, the burning software only supports VCD and SVCD until you upgrade.

The Stereo is compatible with cable and terrestrial broadcasts, and gave the same high-quality picture as the Deluxe when used with a good outdoor aerial. Software encoding means the quality of recording is subject to the host PC's processor speed, but all-in-all we were impressed with its performance.

Whether you're looking for a TV tuner to keep up with your favourite programmes at work, or simply want to record video on your PC, the PCTV Stereo is great value for money.

Our verdict

Most of the devices perform well, so choosing the winners boils down to ease of use, features and value for money.

Despite the arrival of Windows XP, PCI cards are still more hassle to install than USB counterparts. If you're looking for a simple plug-and-go solution, and let's face it most of us are, USB is definitely the way to go. However, you need to use a USB2 connection for the best results.

While the Hauppauge Nova-t offers the best picture quality from a USB device, thanks to its compatibility with Freeview, it can't compete with the features of the Pinnacle PCTV Deluxe. Pinnacle's software is easier to use and provides integrated DVD burning, while hardware mpeg2 encoding lets you capture high-quality sequences from a video, camcorder and DVD player as well as TV. We'd like to see an EPG available in the UK, but once you add a remote control it's easy to see why this deserves a Recommended award. The Nova-t comes a close second, though.

Pinnacle also wins in the value for money stakes with the entry-level PCTV Stereo. This provides everything most people need at just £50. The Black Gold from GTA also deserves an honourable mention for combining digital and analogue recording – we can't wait to see the next version.

Chris Cain

MANUFACTURER	GTA	TRUST	PINNACLE	PINNACLE	HAUPPAUGE	HAUPPAUGE
PRODUCT	BLACK GOLD DIGITAL TV	COMBI PC-TV POP VIEW	PCTV DELUXE	PCTV STEREO	WINTV NOVA-T	WINTV PCI-FM
Price inc VAT (ex VAT)	£99 (£84.25)	£89 (£75.74)	£150 (127.65)	£49.99 (42.54)	£109 (£92.76)	£69.99 (£53.72)
Contact	01296 733 3268	0845 609 0036	01895 442 009	01895 442 009	020 7378 1997	020 7378 1997
URL	www.gta-ltd.co.uk	www.trust.com	www.pinnaclesys.com	www.pinnaclesys.com	www.hauppauge.co.uk	www.hauppauge.co.uk
Connection	PCI	VGA	USB2	PCI	USB2	PCI
Tuner type	Digital	Analogue	Analogue	Analogue	Digital	Analogue
FM/DVB radio	✗/✓	✗/✗	✗/✗	✗/✗	✗/✓	✓/✗
Terrestrial compatible	✓	✓	✓	✓	✓	✓
Cable-ready*	✗	✓	✓	✓	✗	✓
Digital satellite option/Freeview	✗/✗	✗/✗	✗/✗	✗/✗	✗/✓	✗/✗
S-video/composite input	✓/✗	✓/✓	✓/✓	✓/✓	✗/✗	✓/✗
TV in a window/full-screen option	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓
Stereo sound	✓	✓	✓	✓	✓	✓
Timeshifting	✓	✗	✓	✓	✓	✗
Main video capture formats	mpeg1/2/4, avi, wma	N/A	mpeg1/2	mpeg1/2**	mpeg2	mpeg1/4, avi
NTSC support	✓	✗	✓	✓	✗	✓
Mpeg2 encoding hardware	✓	✗	✓	✗	N/A	✗
Teletext	✗	✗	✓***	✓	✓	✓
Integrated VCD/DVD burning	✗	✗	✓	✓	✗	✗
Remote control	✓	✓	✓	✓	✗	✓
Electronic Programme Guide	Optional subscription	✗	US only	✗	Ready	Optional subscription
Scheduled recording	✓	✗	✓	✓	✓	✓
SCORES						
Features	★★★☆☆	★★★★☆	★★★★★	★★★☆☆	★★★☆☆	★★★★☆
Performance	★★★★★	★★★☆☆	★★★★☆	★★★★☆	★★★★★	★★★☆☆
Value for money	★★★★☆	★★★☆☆	★★★☆☆	★★★★★	★★★★☆	★★★☆☆
Overall	★★★★☆	★★★☆☆	★★★★☆	★★★★☆	★★★★☆	★★☆☆☆

*actual cable tuner ** additional cost *** via Internet connection

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Turn on and tune in

Adding a TV tuner to your PC opens up a range of possibilities. Most are easy to use, but some offer more facilities than others, so it's important to consider the options before buying

Internal TV tuners require a free PCI slot, so you'll need to open your PC to install them. External options are much easier to set up, as they connect via a spare USB port, which is good for notebooks as well as desktop PCs.

Although most are backwardly compatible with USB1.1, a Hi-Speed USB2 connection is often needed to use advanced features.

Today's devices typically require Windows ME, 2000 or XP. Check specifically for Windows 98 or NT support.

Analogue or digital?

If you plan to watch terrestrial broadcasts, a digital tuner compatible with Freeview will offer the best channel choice, picture and sound.

However, results can vary if you aren't using an outdoor aerial and a traditional analogue TV tuner may provide better results using an indoor receiver. If you want to use a tuner with a cable or satellite service, don't forget to check compatibility before buying. Some areas require a wideband aerial to receive Freeview – you can enter a postcode at www.freeview.co.uk to see if you need an aerial.

Some tuners can receive radio as well TV broadcasts, but a digital tuner doesn't always mean Digital Audio Broadcasting (DAB) support. Also look out for Teletext and subtitle support.

Recording options

Digital tuners record signals straight to disk for maximum quality, while analogue signals need to be digitally encoded.

The best analogue products offer mpeg2 hardware for realtime video and audio encoding, but cheaper options rely on the PC's processor to do this in software.

Most analogue systems offer extra facilities to capture video from a VCR or camcorder. Look for composite or higher-quality S-video connectors and stereo phono inputs. A good tuner can record material in Pal, NTSC and Secam video formats.

While quality can usually be adjusted, an hour of mpeg2 video swallows up between 1 and 2GB of disk space.

Some packages will also let you burn directly to video CDs and DVDs. Dropping to VHS-quality mpeg1 will give you just over an hour on one CD.

PVRs

One of the best things about a TV card is PVR (personal video recorder) function. It turns your PC into a hard disk video recorder, working on the same principle as Sky Plus or Tivo.

Most cards let you store a rolling 30 minutes or so of live TV. It means you can pause or rewind a TV show. It's perfect for when the phone rings or the doorbell goes, as you never have to miss part of your favourite TV programme again.

EPGs

While TV tuners can often be manually set to record a programme, like a traditional video recorder, they really come into their own with an electronic programme guide (EPG).

Simply put, an EPG is like an electronic *Radio Times* for your PC. Just scroll through, select the show you want to watch and the PC will take care of recording it. You can even set it to record every episode of a series and never miss another show again.

However, not all TV tuners come with an EPG and those that do are often US based.

This doesn't mean that you're left high and dry, as third-party services exist to do the same job. Try Digiguide (www.digiguide.co.uk) for a good example.

Buyer's guide ebook on our cover disc

This guide to what to look for when buying a TV tuner card is part of our interactive Buyer's Guide ebook, available on our cover disc.

This month, the ebook also features top tips for choosing a motherboard, plus an extensive table covering 500 boards available.

We will extend the Buyer's Guide each issue, and will include links to reviews, our top products and the most popular kit within each category, building it into a comprehensive, indispensable resource that will help you compare and choose products. And once you've found what you need, our Best Prices service can take you online to find the latest prices and availability.

• Next month: digital cameras and DV camcorders.

PC COOLING

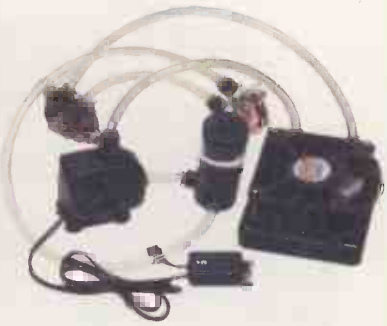
Cooling kit round-up

If your system is running hot, one of these devices could help

Arctic Cooling's Super Silent 4PROL is good for reducing noise

The VGA Silencer from Arctic is an excellent choice for overclockers

Asetek's Vapochill Extreme Edition XE is a bit of a niche product



The Waterchill CPU/VGA/Chipset Cooling Kit is an all-in-one solution

For the average user, cooling is an issue that is seldom raised. The heatsinks provided with every new PC usually provide adequate heat dissipation even in the most demanding applications. Problems do arise, however, when enthusiasts attempt to overclock their components in order to yield better performance.

This process generates substantially more heat than some devices were designed to withstand. Those of you with a fundamental knowledge of physics will know that, in most materials, as heat increases, there is a greater level of resistance and vibration in molecules: two factors that can affect the reliability and lifespan of your components.

The desire for better performance has contributed to a huge growth in the demand for PC accessories that offer more efficient cooling. Originally, computer users were more concerned with overclocking their processors, but the modern enthusiast has since developed a desire to increase the speed of a wider variety of components.

Here we take a look at nine cooling accessories designed to help keep all aspects of your system cool. Although varied in their design and levels of efficiency, most of our submissions operate along the same principle.

A heatsink provides effective cooling by maximising the surface area in contact with the affected component and the surrounding air. The base of the heatsink will invariably be flat, whereas the remainder will often be a large and complex arrangement consisting of many layers. This is because cooling efficiency is determined by the amount of material available for heat to travel through. Because air is a good conductor and can trap heat inside a heatsink, fans are often added in order to accelerate the removal of hot air in a process called convection.

Materials with good heat transfer properties also make a big difference to the efficiency of a heatsink. Diamond and silver have by far the best heat conductivity, but it won't come as much of a surprise that all of our submissions are made from aluminium or copper, which are cheaper, easier to obtain and to manufacture.

Although, for the most part, the issue of cooling can be solved with ever more efficient heatsink and fan combinations, there are other problems to contend with, notably noise. The quicker a fan spins the more sound it generates. Because of the limited space inside a PC, it is more common to find smaller fans, which need to spin faster than a larger fan to generate the same amount of cooling.

Over the following pages, we look at a variety of products designed to help cooling in a range of areas. These include basic heatsink and fan combos, water-cooling systems, graphics card coolers as well as some far more extravagant solutions that provide cooling through refrigeration.

In order to test these submissions, we looked at how effectively each one performed in comparison to a standard equivalent cooling solution. To provide a visual representation of how well some of our submissions disperse heat, we took a number of photos with a thermal imaging camera courtesy of Land Instruments (www.landinst.com). These can be found on this month's cover disc.

Arctic Cooling Super Silent 4PROL

The Arctic Cooling Super Silent 4PROL heatsink and fan is one of many replacement processor coolers on the market. This particular offering was designed to provide good cooling while being significantly quieter than the standard Intel cooler.

The unit has an attractive design with a blue neon light shining through its translucent fins. It also features a blanking plate with a switch to control the fan's rotation speed.

In low-speed mode, we managed to get the system to 48° Celsius at idle. This was the highest idle temperature of the group, but the fan ran at a near-silent 1,739rpm. We put the fan into high-speed mode to test its efficiency under load, but were slightly disappointed to see the CPU reach 60°C, which is eight degrees hotter than the standard Intel cooler. Overall, we can only recommend this as a product for reducing noise in a PC, not for overclocking.

Arctic Cooling VGA Silencer

We first encountered this graphics card cooler in our January round-up of graphics cards. Back then it was paired with an HIS Excalibur ATI Radeon 9800 Pro, which received a Highly Commended award thanks to its performance and lack of noise.

The VGA Silencer is compatible with a wide variety of graphics cards. It can be fitted to boards based on the ATI 9500 Pro, 9700 Pro, 9800 Pro, as well as Nvidia boards based on the Geforce 3 GTS. It has three main sections consisting of a rather large heatsink and fan that covers the entire front portion of the card, a small plastic cover that attaches to the rear, and a

speed-control switch on a blanking plate.

Using our thermal camera, we tested the VGA Silencer against a reference Radeon 9700 Pro cooler. Although its rear cover obstructs the GPU, it was clear that it provided substantially better cooling than the standard ATI heatsink and fan, and even the water-cooled solutions.

This is excellent news for overclockers, since the VGA Silencer retails for a fraction of the price of its rivals and is easier to install. As we said in our January issue, it is a rather large unit, but, provided you can sacrifice two or three PCI slots, it is an excellent choice.

Asetek Vapochill Extreme Edition XE

The Vapochill Extreme Edition XE is unquestionably the most extreme cooling solution in our round-up. Unlike the basic fans and heatsinks seen elsewhere, this is a comprehensive package consisting of an ATX PC case and a variety of components you wouldn't normally associate with a modern PC.

The main processor kit contains an evaporator and a rounded copper contact that sits directly on the processor die. This evaporator returns warm refrigerant gas to a compressor, where it is pressurised to the point where it produces condensation. The condenser unit lowers the temperature of the coolant and returns it to a liquid state. This liquid travels back down a capillary tube and the process repeats – exactly the same procedure your home refrigerator uses.

Though it is far less complex than its predecessor, we found assembling the latest version of the Vapochill a complicated procedure, particularly in comparison to installing standard heatsinks. If you are prepared to endure the experience, the performance gains can be significant.

We've seen the system used to overclock a 3.2GHz Pentium 4 to 3.6GHz. This may not sound like very much but we experienced rock-solid stability. If you're willing to experiment, some impressive clock speeds can be achieved. We've heard of some people overclocking 3.2GHz processors to a remarkable 4.4GHz.

As you might expect, this impressive performance is not without its negative aspects. The Vapochill is a fridge at heart and, as such, it sounds very much like one. Also, Vapochill has employed the use of non-approved R404A refrigerant, which could shorten the life of the compressor. The price of the unit could also prove prohibitively expensive for the average user, not to mention the potential complexity of assembling the finished unit.

These factors place this product firmly in the niche segment, but if you've got the money, time and patience to consider the Vapochill Extreme Edition XE, it offers the best PC cooling bar none. That is, of course, until someone manages to harness the cooling power of liquid nitrogen.

Asetek Waterchill CPU/ VGA/Chipset Cooling Kit

The Asetek Waterchill kit is a complete package for your processor, chipset and graphics card, although its constituent parts can be bought in different combinations depending on your needs or budget.

The kit consists of a number of parts, most notably the three blocks that replace your current heatsinks. The lower half of each of these blocks is built from copper, while the top half is a thick, transparent acrylic lid. The processor block has an assortment of holes that makes it compatible with current Pentium 4, Athlon and Athlon 64 motherboards that follow regulation clearance specifications. The rest of the kit consists of six feet of plastic tubing, a water reservoir, a radiator to cool the flowing water, and a pump capable of pushing 175 gallons per hour.

As daunting as it may sound, assembling the Waterchill was fairly straightforward. Unlike the original release, this version comes with full instructions for each separate peice of the kit and guidelines for the best watercooling practices.

The processor and graphics blocks, arguably the most critical parts of the kit, sit snugly atop their respective processors with the aid of screws and clamps, but we were slightly concerned that the northbridge block had to be attached with cable ties – a method that does not offer the best contact with your motherboard.

We had slightly mixed results with the Waterchill. It managed to cool our Pentium 4 3.2GHz CPU to 40°C at idle, and kept it at just 44°C under load – a respectable performance second only to the Vapochill.

We were slightly disappointed by the cooling offered by the graphics block, however. As our infra-red pictures indicate, our Radeon 9700 Pro GPU ran significantly hotter with the Waterchill VGA block than with the substantially less expensive Arctic Cooling VGA Silencer. This was probably due to the water being warmed substantially by the CPU and northbridge chips, before reaching the GPU.

Globalwin Silentstream

The Globalwin Silentstream is a budget water cooling kit compared to the Asetek Waterchill. It retails for just £66.79 and, as you'd expect, is not as comprehensively equipped as some of its rivals.

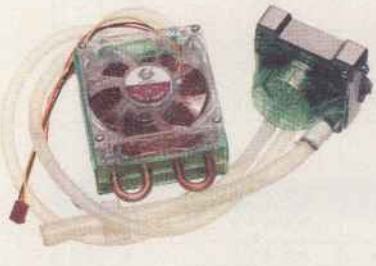
Its simplicity means the Silentstream is considerably easier to install than many others on the market. The kit includes a copper processor block, embedded pump, a small radiator and fan combination, and all the necessary tubing. The water reservoir is a simple affair that is, worryingly, located above your processor, but is very unlikely to leak. The entire system comes pre-filled with cooling fluid, which makes it slightly easier for beginners to install.

We were eager to see how the Silentstream performed against its more expensive rivals. Unfortunately, we were left slightly disappointed. It cooled our system at idle to a very respectable 42°C, but temperatures reached 52°C when the CPU was under load.

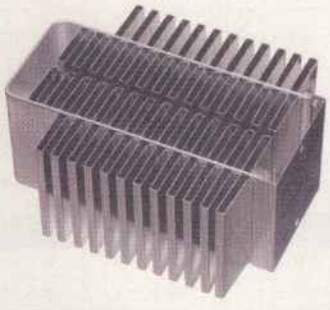
This put it on a par with the standard Intel cooler in terms of effectiveness, but it struggles to compete with the Asetek Waterchill. It is therefore difficult to recommend the Silentstream to enthusiasts. As a novelty item or an introduction to watercooling, however, it is attractive.

Scythe Heatlane Zen NCU-1000

The Zen is unusual, as it is the only passive cooler in the group. It has a very simple-looking design, but its method of cooling is quite complex. It uses what Scythe refers to as Heatlane technology, which is based on the conventional heat pipe idea. This allows it to transfer heat



Globalwin's Silentstream is cheaper than some water cooling devices



The only passive cooler in the group is Scythe's Heatlane Zen

Zalman's ZM-2HC1 produced good results in our tests

We found the lowest setting on Zalman's Flower to be very quiet

from a processor through a cycle of vaporisation, transportation and condensation.

We were unable to test the Heatlane Zen with our 3.2GHz CPU, since it is only capable of cooling Pentium 4 CPUs rated at up to 2.8GHz. While this may be hard to believe, Scythe goes to great lengths to point out that cooling is only guaranteed when performing very light computing tasks. Emailing, word processing and web surfing are recommended, but doing anything more demanding will make your processor overheat or temporarily shut down.

To us, this is a ridiculous prerequisite, as there's no point in having a fast processor and not being able to use it. Besides, doing something as simple as running a DVD could harm your PC.

It is difficult to recommend for the light user, let alone the performance enthusiast.

Zalman Hard Drive Heatpipe Cooler ZM-2HC1

Although you might not think it, hard disk drives are sensitive devices that are very susceptible to heat. Prolonged use in a system with bad airflow can cause temperatures to reach dangerous levels, which can have disastrous consequences for your data.

The Zalman Hard Drive Cooler works in the same way as a standard heatsink. A flat contact is established between the hard disk and cooler, and heat is dissipated across a number of copper cooling rods. It also helps to reduce vibration noise through the use of four plastic padded thumbscrews.

We tested the cooler on a 120GB 7,200rpm Seagate hard disk and were generally pleased with the results. Without the cooler, at idle the temperature of the disk was 38.5°C, and under load it was 41°C. With the cooler installed, this figure was reduced to 36°C at idle and 38°C under load. These figures may not seem like a much, but if you have a PC with a case that tends to get very hot, it could make a great deal of difference.

Zalman Flower CNPS7000A-Alcu

Zalman is famous for its extravagantly designed heatsinks. This model is not as audacious as some, but its looks are a far cry from the standard rectangular blocks we're used to.

Like the Arctic Cooling submission, the Zalman has a switch to adjust the fan rotation speed. We found its lowest setting to be very quiet, although not quite as impressive as the Arctic Cooling fan. Interestingly, it was louder even though it spun far more slowly – possibly indicating that it was more susceptible to vibration.

It cooled the CPU to 48°C at idle, but was not so impressive under load. Here temperatures reached 63°C – the highest temperature of the group.

Our verdict

We looked at a variety of cooling kits, each with different levels of effectiveness. Which of these is right for you depends mostly on whether you wish to overclock your PC and, more to the point, how much money you wish to spend.

If cost is not a concern and you wish to experiment with extreme cooling, the Vapochill case is the best bet. If you want an equally unusual solution, either of the water-cooling kits would do but, for true enthusiasts, the Asetek Waterchill is more efficient and provides heat dissipation for your chipset and graphics card.

The issue of heatsink and fan coolers is an interesting one. We noticed that the standard Intel Pentium 4 cooler, though very noisy, provided better cooling than either the Zalman or Arctic Cooling submissions. These alternatives work well, but are best suited to those who wish to decrease the amount of noise their system produces.

Of all our submissions, we were most impressed with the Arctic Cooling VGA Silencer. We gave this a *PCW* Recommended award because it provided exceptional cooling compared to a standard VGA heatsink and fan, was one of the quietest coolers across the board, and is ultimately a very cost-effective solution.

Rory Reid

MANUFACTURER	ARCTIC COOLING	ARCTIC COOLING	ASETEK	ASETEK	GLOBALWIN	SCYTHE	ZALMAN	ZALMAN
PRODUCT	SUPER SILENT 4PROL	VGA SILENCER	VAPOCHILL EXTREME EDITION XE	WATERCHILL CPU/CHIPSET/ VGA COOLING KIT	SILENT-STREAM	HEATLANE ZEN NCU-1000	HARD DRIVE HEATPIPE COOLER ZM-2HC1	ZALMAN FLOWER CNPS7000A-ALCU
Price inc VAT (ex VAT)	£9.38 (£7.99)	£11.73 (£9.99)	£521.70 (£444)	£198.58 (£163.82)	£66.79 (£56.84)	£29 (£23.92)	£22.91 (£19.50)	£26 (£21.45)
Sales telephone	0870 467 0753	0870 467 0753	020 8892 7555	020 8892 7555	0870 141 7161	0870 321 4622	0870 321 4622	0870 321 4622
URL	www.ebuyer.com	www.ebuyer.com	www.chillblast.com	www.chillblast.com	www.overclock.co.uk	www.quietpc.com	www.quietpc.com	www.quietpc.com
HARDWARE SPECS								
Cooler type	Heatsink and fan	Heatsink and fan	Vapour compression	Fanless heatsink	Water cooler	Fanless heatsink	Fanless heatsink	Heatsink and fan
Component type(s)	Intel Socket 478	ATI 9500 Pro, 9700 Pro, 9800 Pro	Intel Socket 478	Intel Socket 478	Intel Socket 478/ AMD Socket 462	Intel Socket 478	3.5in HDD	Intel Socket 478
Dimensions (w x d x h) mm	97 x 78 x 115	185 x 84 x 34	22 x 43 x 55	128 x 16 0 x 43	71 x 68.5 x 18.4	86 x 108 x 143	146 x 146 x 36.5	23 x 200 x 21
Fan speeds (rpm)	2,000/2,500/3,000	1,200-2,400	N/A	N/A	N/A	N/A	N/A	1,350-2,400
Noise level	18db	20-33.8db	35db	36db	17db	0db	0db	20-33.8db
Pump capacity (gallons per hour)	N/A	N/A	N/A	175	31	N/A	N/A	N/A
Weight	415g	278g	15kg	498g	330g	615g	260g	445g
Idle temperature (P4 3.2GHz)	48°C	N/A	N/A	40°C	42°C	N/A	36°C (7,200rpm HD)	48°C
Load temperature (P4 3.2GHz)	60°C	N/A	N/A	44°C	52°C	N/A	38°C (7,200rpm HD)	63°C
SCORES								
Features	★★★☆☆	★★★★★	★★★☆☆	★★★☆☆	★★★★☆	★☆☆☆☆	★★★★☆	★★★★★
Performance	★★★☆☆	★★★★★	★★★★★	★★★★☆	★★★☆☆	★☆☆☆☆	★★★☆☆	★★★☆☆
Value for money	★★★★☆	★★★★★	★★★☆☆	★★★☆☆	★★☆☆☆	★☆☆☆☆	★★★☆☆	★★★☆☆
Overall score	★★★☆☆	★★★★★	★★★☆☆	★★★☆☆	★★★☆☆	★☆☆☆☆	★★★☆☆	★★★★☆

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- Integrated Serial-ATA interface with RAID 0,1 function
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- Integrated T.I. IEEE 1394b FireWire interface

IEEE 1394b | IDE RAID | Dual LAN | USB 2.0 | DualBIOS™ | 8-Channel Audio with UAJ | EasyTune™ 4 | Q-Flash™ | @BIOS™

K8 Triton™ series
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- Enhance system performance with DDR400 memory
- Integrated Serial-ATA interface with RAID 0,1 function
- Integrated GigaRAID IDE RAID Interface
- Integrated 8-channel AC'97 audio with Universal Audio Jack
- Integrated Gigabit LAN Ethernet controller
- Provides 3 IEEE 1394 FireWire ports

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Actinic Business 7

An improved interface has benefited this shopping system

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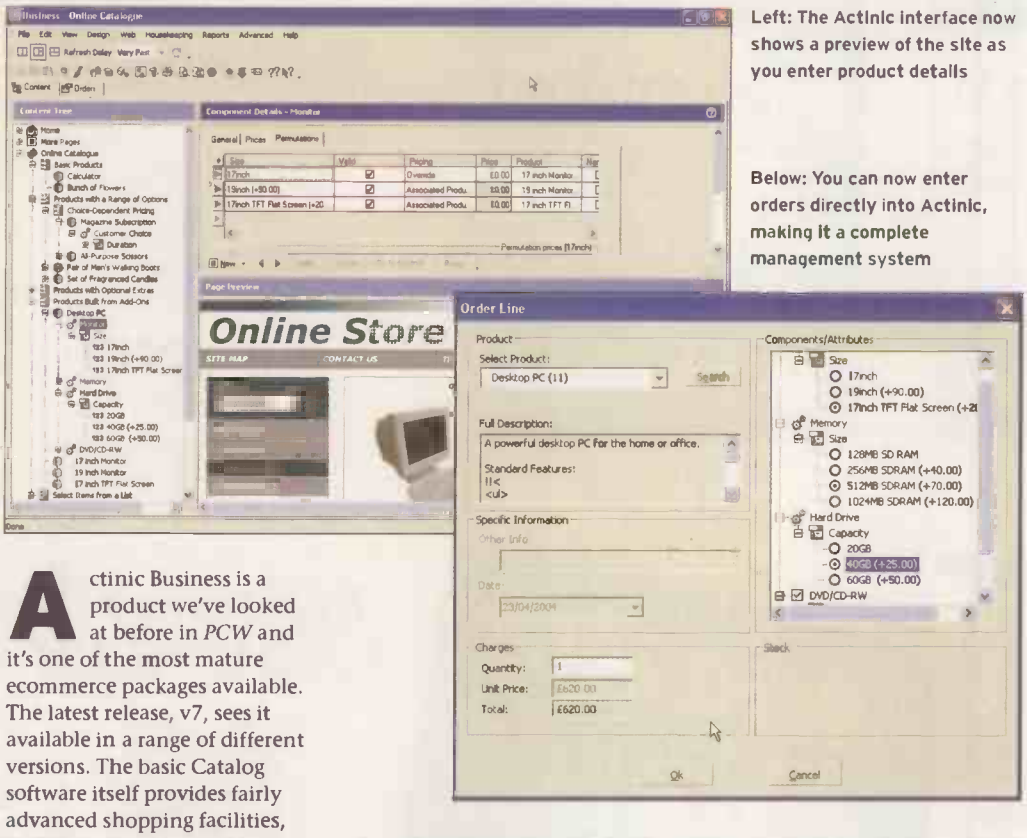

Left: The Actinic interface now shows a preview of the site as you enter product details

Below: You can now enter orders directly into Actinic, making it a complete management system

Actinic Business is a product we've looked at before in *PCW* and it's one of the most mature ecommerce packages available. The latest release, v7, sees it available in a range of different versions. The basic Catalog software itself provides fairly advanced shopping facilities, including order management. Actinic Business, reviewed here, adds a range of extra features, while Actinic Developer adds support for multiple sites.

Actinic's interface has changed a little from the previous versions. By default, the main interface is now a three-pane view. At the left there's a collapsible tree, showing the layout of your site; to the right are the details of the object you're working with at the moment, and below is a preview of the website.

The latter view is new to this version and means you have a much clearer idea of what the finished result will be. It's also easier now to create a whole website in Actinic's software, albeit without the degree of design flexibility you'll find in a dedicated website design package.

Although the interface change is the most noticeable thing, there are some powerful new shopping options, but not all are available in the basic Catalog version.

These include the ability to add optional extras, such as a memory card when you buy a digital camera or create products out of a range of components, such as the way PCs can be purchased with different amounts of memory. Some of these options are quite straightforward and we found it very easy to add an optional extra memory card to a digital camera product that we created.

Others do take a bit of work to get your head around and, though the manual does explain how to set it up, a clear overview of the technique would have helped make it easier, we felt. That's particularly true in the case of a product such as a PC, where it's necessary to create some products representing options such as monitors, but then hide them from the site, while using them to help construct pricing of the main product.

However, the results are well worth it, for the sheer flexibility the new version brings. There are options to provide vouchers for discounts or special pricing and, if you create customer login IDs, then you can also offer preferential pricing to certain customers as well. Stock tracking is included and the software can link to Quickbooks and Sage software.

Also new and useful, especially for small businesses that might not already have an order management system, is the ability to enter orders directly into Actinic, so you no longer need to keep track of web sales and other channels, such as post or telephone, separately.

For those who've not used Actinic before, one of the other great selling points is the sheer ease of configuration. For many, setting up an online shop seems a daunting prospect, with potential nightmares of server configuration or expensive fees at a consultancy.

Point Actinic's software at a web server and it'll sniff around, work out where to upload files, how to configure scripts and do the whole job for you. It was neat the first time we looked at the software and it's still amazing to watch.

A wide range of payment processing services is available including Paypal, Nochex and services like Worldpay and Secpay. All in all, it's a worthy upgrade and, at £799 (the Catalog version, lacking some of the more complex product pricing options comes in at £379) for an online shop configured on your server, it compares pretty favourably with paying someone to do manual configuration. To make the most of the options, it's worth studying the sample shop carefully and we felt the documentation could be better, but overall, this is still one of the best ways for small businesses to sell online.

Nigel Whitfield

DETAILS

RRP £938.83 (£799 ex VAT) for Business version
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Actinic 0845 129 4800
www.actinic.co.uk
SYSTEM REQUIREMENTS
Windows 98 or above • 64MB memory (128MB preferred) • 100MB disk space • IE5 or higher
PROS Preview of website; good range of marketing options
CONS Documentation could be better
VERDICT
A better interface and wide range of options make Actinic's shopping system a great choice for anyone selling online

EASE OF USE	★★★★☆
FEATURES	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

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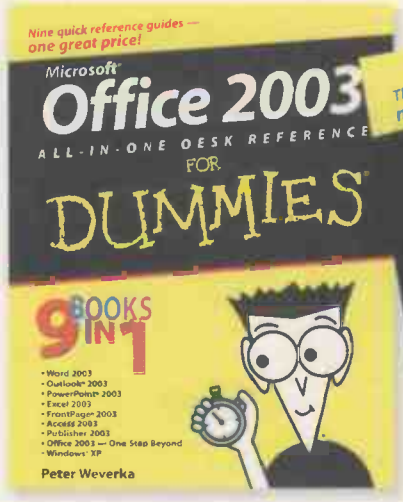

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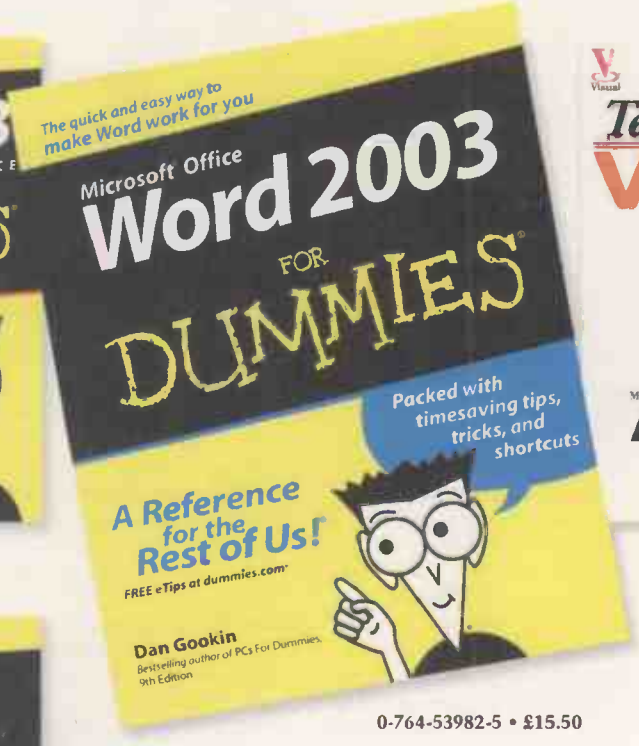

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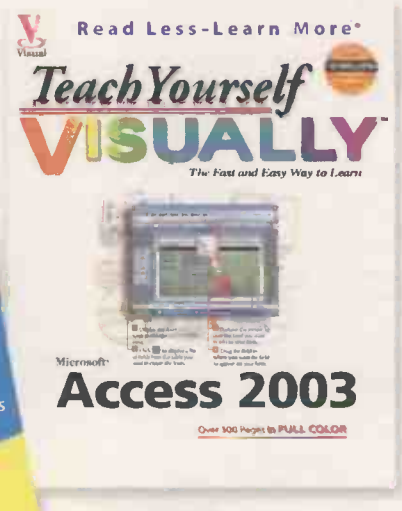

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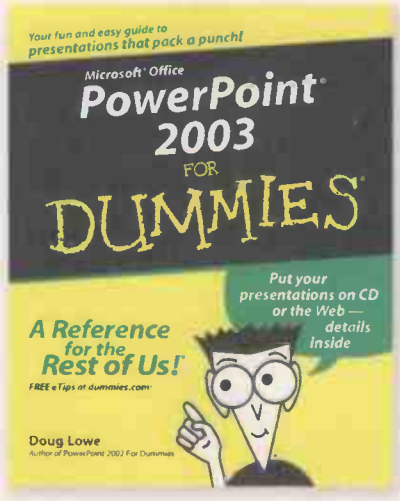

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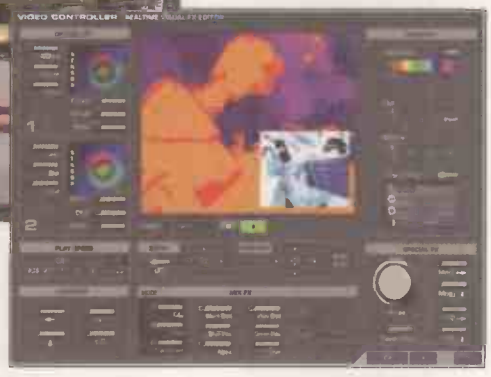
VIDEO EDITING

Magix Movie Edit Pro 2004

A video-editing suite with some interesting features for the creatively minded

Left: With an easy-to-use 16-track timeline editor, the creative possibilities are good



Below: The Video Controller offers a wide range of realtime video effects, including compositing and multiple picture within picture

It was in our video-editing group test in February that we last saw what relative newcomer Magix had to offer. We were keen to see how its latest foray into digital video would fare and, on first impressions, there's little to distinguish Movie Edit Pro 2004 from its predecessors.

The interface looks identical and, while this isn't necessarily a bad thing, there appears to have been little improvement in its usability, with wizards still missing. Indeed, we were left scratching our heads and wondering just how to import digital footage. There's a useful tutorial and introductory video, though, which soon got us up to speed on the basics.

The interface is businesslike, with its overall dark grey theme alleviated only by colourful, illuminated buttons. The layout is standard fare for the genre, with the editing space occupying the bottom half and the video preview and browser-like media pool at the top. Those with dual-monitor setups will find provision for the video preview and controls to be transferred to the secondary display.

From the capture window, digital and analogue video can be imported with ease and, when working with analogue footage, there's a handy utility designed to automatically detect scene breaks. Audio clips and images can be imported from here too, with the sound clips created by the audio commentary facility found on many digital cameras also carried across.

In storyboard mode, there's little to distinguish Movie Edit Pro from the competition. Captured digital video is split into scenes and placed into the storyboard ready for titles, transitions and additional audio. Previous concerns regarding the placement of transitions have been addressed and they can now be added via drag and drop, or via the transition box in between adjacent clips.

It's in timeline mode though, that Movie Edit Pro really comes into its own and video, audio and images can be dragged and dropped here and moved around at will. Cross-fades can be generated by overlaying clips, and more than 170 transitions are provided, some of which are of more use than others.

Curiously, the total number of timeline tracks has been halved to 16, but this ought to be enough for most purposes and we weren't unduly concerned. Handles on the clips provide access to basic editing shortcuts and fades, while right-clicking opens up further options including advanced transition editing, panning and image stabilisation. The latter is impressive, as it analyses a user-defined region of the footage and shifts it around to compensate for camera shake.

Another feature rarely seen outside much more expensive video editors is compositing. The so-called 'Blue Screen' technique, along with other advanced effects, such as picture in picture, can be configured in the Realtime Video FX Editor where much fun can be had exploring the creative possibilities.

Audio is also well catered for and, as well as the separate 16-track mixer, there are a number of virtual effects racks from where a range of equalisation, compression and echo effects can be added.

A wide array of output options for finished projects are available and, apart from the usual DVD, Mini DVD and VCD, movies can also be exported in Quicktime, Realmedia and Windows Media streaming formats. Also on the new feature list is support for hard disk TV recording, for those with a compatible TV card installed.

Video clips and animated backgrounds can be used within DVD menus and, while we've seen much of the associated menu artwork before in previous Magix products, most layout aspects are customisable to a large degree.

An obligatory second disk packed with additional transitions, sounds effects and copyright-free video clips is also included, as is Magix's own Media Manager application.

Usability issues aside, there is still much to recommend in Movie Edit Pro. The video effects look very promising and those using the timeline should find it most rewarding. With a new version of our current favourite, Ulead's Videostudio, hot on its heels, though, the recommended retail price of £50 does seem a little high.

Andy Gibbons

DETAILS

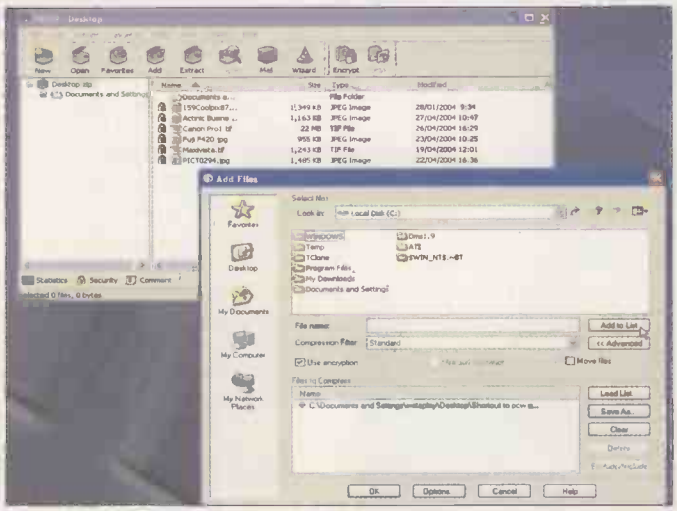
RRP £49.99 (£42.55 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Fasttrak 01923 495 496
www.fasttrak.co.uk
SYSTEM REQUIREMENTS
Windows 98 and above • 450MHz processor • 128MB of Ram • 600MB of hard disk space • 800 x 600 16bit graphics with DirectX 8a support • 16bit sound card • Firewire port or Directshow-compliant video capture device
PROS Easy-to-use timeline editing; good audio features
CONS DVD menu creator could be more intuitive; no wizards
VERDICT
A few grumbles aside, it's a good choice for those with some basic video-editing experience

EASE OF USE	★★★☆☆
FEATURES	★★★★★
VALUE FOR MONEY	★★☆☆☆
OVERALL	★★★☆☆

SECURE COMPRESSION

PKware Securezip v8

Simple compression, advanced encryption



It's easy to use Securezip – you can either drag and drop files to compress them or use the supplied wizard

Used across the world to quickly compress and send large amounts of data, you'd be hard pushed to find a PC without a single zip file stored on it. The problem with the standard PKzip application for Windows is that, while its password protection option offers suitable security for the average home user, for corporate purposes it's not quite up to the job and can leave your data vulnerable.

PKware's Securezip 8 aims to provide businesses with the security they need without the headaches that are usually associated with data encryption software. Built around RSA Security's Bsafe technology, Securezip boasts some advanced encryption techniques. Zip files can either be password protected or encrypted for a list of recipients using their digital certificates – for maximum security you can use both methods. If required, it's also possible to hide the name of the zip file itself.

In terms of usability, Securezip is about as simple as it gets. As with Pkzip, you can either use standard drag-and-drop to create a zip file or, alternatively, put the wizard into action. Securezip also links up with Outlook and is able to attach your zip to a new email if required.

Of course, for most home users this sort of encryption is a little over the top and you'd be better off using the standard PKzip application, which is also a fair bit cheaper than Securezip. Nevertheless, if you often email sensitive information around, Securezip will ensure it never gets into the wrong hands. What's more, unlike many other encryption utilities, Securezip is incredibly easy to set up and use.

Will Stapley

DETAILS

RRP $79.95 (£44.78)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION PKware 0118 979 9909 www.pkware.co.uk
SYSTEM REQUIREMENTS
Windows 98/ME/2000/NT/XP • 128MB Ram • 12MB hard disk space
PROS Secure; easy to use
CONS Overkill for home users
VERDICT
If you want to ensure your data is protected when you transport it, Sercurezip gets the job done

EASE OF USE	★★★★★
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

WINDOWS UPDATE

BETA

Windows XP SP2

This service pack offers extra security

Windows Service Packs (SPs) usually provide a list of bug fixes. With SP2, though, Microsoft has also overhauled the security settings. We've looked at the Beta Release Candidate 1 (RC1) to see what these features do.

After a lengthy installation period and the obligatory reboot the first noticeable change is a big friendly looking wizard asking if you want to turn on automatic updates. For advanced users it may be overkill, but by forcing the issue it should help cut down the number of people affected by viruses that have been in the wild for a long time.

Get beyond this and the Windows Firewall has had a major overhaul. The original Windows XP version was basic, to say the least, and turned off by default. The new version is automatically turned on and can now track and block individual applications.

It's not as accomplished or as easy to use as its competition, but it's a lot better than the previous incarnation. After a fresh install of Windows and SP2, it will at least mean that your PC is protected while you go online to download drivers and the like.

On the Control Panel is the Windows Security Center, with shortcuts to Internet Options, Firewall, System Properties and Microsoft's security update website. Aside from the website, the options are more useful for beginners. And Internet Explorer finally has a pop-up blocker.

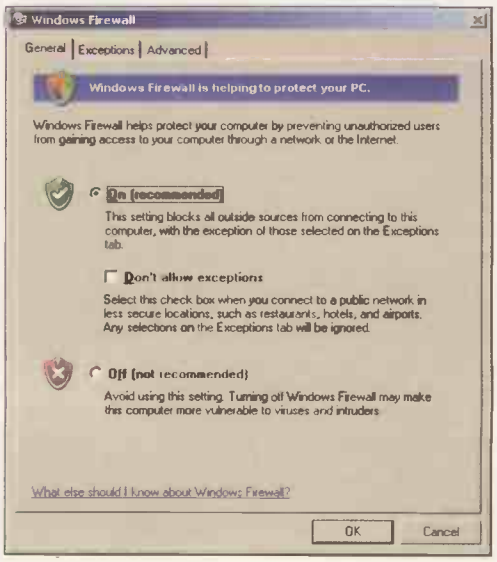
It's good to see Microsoft tackle Internet security more seriously. We'll be covering this interesting release in detail when it's launched in June or July.

David Ludlow

DETAILS

RRP Free
PRODUCT INFORMATION
Microsoft
www.microsoft.com/uk
SYSTEM REQUIREMENTS
Windows XP
PROS Free; updates Internet security
CONS Behind the times compared to other tools
VERDICT
It's good to see Microsoft implement better security features, but we'll have to wait for the full version to see how good the tools really are

EASE OF USE	★★★★☆
FEATURES	★★★★☆
OVERALL	★★★★☆



After a major overhaul, the Firewall is now automatically turned on and can track and block individual applications

SECURITY GUARD

Name: Panda Software

The Virus and Intrusion Prevention Specialist.
Offering global solutions that adapt perfectly
to the range of threats faced by Internet users.

- Technical Support 24h/365d
- Simple to Use; 'Install & Forget'
- Automatic Updates; Up-to-the-minute protection
- Innovative Technology; Latest generation products

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Converting PDF files and scanned documents into text just became simpler. FineReader 7.0 offers advanced features to handle a variety of document conversion needs:

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DVD AUTHORING

DVD X Maker Deluxe

A basic way to transform home movies

The simulator in DVD X Maker Deluxe allows the finished project to be fully tested before committing to DVD media

With DVD and hard disk video recorders signalling the beginning of the end for VHS, the problem remains of how to digitally preserve those treasured memories currently on videotape. DVD X Maker Deluxe, from the makers of DVD X Copy, claims to have the answer, with the promise of Hollywood-style DVD movies from grainy old home movies.

Despite these grand claims, it's actually little more than a cut-down video editor and there's a complete absence of any meaningful editing possibilities with which to create such studio-quality productions. There are no scene transitions or audio-mixing facilities for example and not even a frame advance feature. At least it's a simple matter to break up long sequences with chapter markers.

There's precious little scope for creativity when putting together the DVD menu system either, with a woefully limited selection of themes and layout customisation options. Automatically generated DVD or jewel case inserts and disc labels are equally uninspiring.

Wizards can guide the inexperienced through the process, but if you stray from these the interface offers very little in the way of clues.

DVD X Maker Deluxe is far too limited for even the most undemanding user. It may just about pull all of the required elements into one package but practically any entry-level video-editing package can do all of this and a whole lot more.

Andy Gibbons

DETAILS

RRP £29.99 (£25.52 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
321 Studios 0845 166 2973
www.321studios.com
SYSTEM REQUIREMENTS
Windows 98 and above • 500MHz processor • 128MB Ram • 250MB hard disk space for program installation • Firewire or analogue capture device
PROS Wizards make process relatively simple; supports both analogue and digital capture
CONS Lacks even basic editing tools; far too limited overall
VERDICT
Does what it aims to but a basic video-editing package would be a much safer bet

EASE OF USE	★★☆☆☆
FEATURES	★☆☆☆☆
VALUE FOR MONEY	★★☆☆☆
OVERALL	★★☆☆☆

PHOTO EDITING

Roxio Photosuite 7 Platinum

Photo editing made simple

Roxio is well known for producing easy-to-use software for the beginner. Photosuite is no different and provides a basic range of photo-editing features for newcomers to digital photography.

While the program has a useful range of features, the interface isn't as tidy as it could be. When you first launch Photosuite it simply presents you with a list of tasks, such as importing and editing files, or creating a slideshow. Each item in the list has to be loaded as a separate module, with its own layout and its own set of tools. Newcomers to editing work may find this approach a bit disconcerting and a more uniform interface design would be easier to get to grips with.

However, the individual sets of tools do work quite well. The main editing screen has a simple series of buttons running down the left-hand side, which allow you to perform specific tasks, such as adding text, special effects, or repairing damaged photos. Clicking any of these buttons leads to a sub-menu containing additional tools and options. Most tools have an auto option that will attempt to fix your photos for you, which is ideal for the beginner. If you're feeling a bit more adventurous, though, you can experiment with the tool settings yourself.

At £60, Photosuite seems to be reasonably priced, but it's very much an entry-level application. With more powerful applications, such as Photoshop Elements and Microsoft Digital Image Suite, available for less, it's hard to see where this appeals.

Cliff Joseph

DETAILS

RRP £59.99 (£51.06 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Roxio 01908 278 100 www.roxio.co.uk
SYSTEM REQUIREMENTS
1.2GHz processor • Windows 2000 or XP • 256MB of Ram • 1GB of hard disk space
PROS Easy-to-use photo-editing tools
CONS Basic; cheaper, better alternatives available
VERDICT
A competent photo-editing tool, but doesn't really stand out from its many rivals

EASE OF USE	★★★☆☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★☆☆☆
OVERALL	★★★☆☆

You can experiment with Photosuite's editing tools if you're feeling adventurous, or simply allow them work automatically

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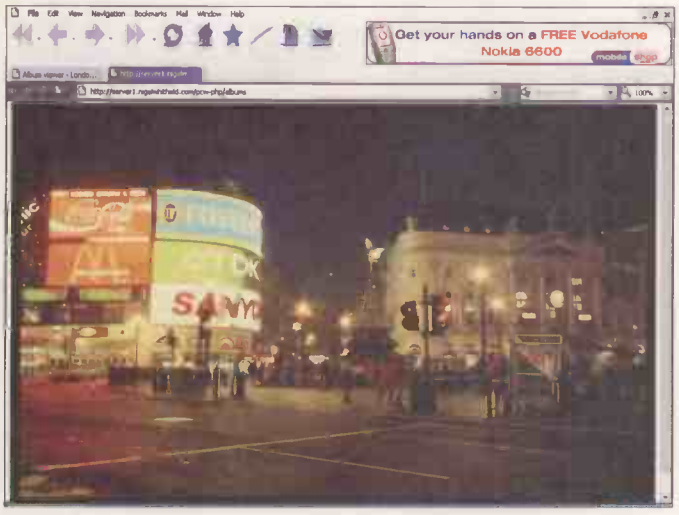
to spend your money on
epinx.com
for all things bright & digital

INTERNET ACCELERATION

Onspeed

EXCLUSIVE

Turbocharge your dial-up connection



Onspeed lets you choose the compression level when you download images, although at the highest speed setting, images lose a lot of detail

Not everyone can access broadband and people on the move often have to use a GPRS connection. The new version of Onspeed claims to speed up Internet access. Unlike some that simply tweak a few Registry settings, it's based around an annual subscription to a web proxy service. The web proxy compresses the documents you request and there's also a transparent email proxy for Pop3 and SMTP connections, which is new to this version.

Setup is straightforward and you only need to enter your subscription information. IE-based browsers will be configured automatically. For others, such as Opera, you simply configure a proxy server as localhost, port 5400.

Performance depends on what you're doing. The setup screens allow you to bypass the proxy for certain sites and a system tray icon lets you turn it off completely. You can also separately disable email speed-up and pop-ups and choose the compression level for images. At moderate compression, a gallery of photographs downloaded over the modem in one minute, instead of five minutes and 30 seconds without. However, we noticed a lot of artefacts. This gets considerably worse as the compression level is increased.

Onspeed is also less effective when dealing with files that are already compressed, such as zip. If you understand those limitations and the trade-off between image quality and speed on web browsing, it's a good package. Mobile phone users will probably save more than the monthly subscription.

Nigel Whitfield

DETAILS

RRP £24.99 per year (£21.27 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Onspeed 08707 585 859
www.onspeed.com
SYSTEM REQUIREMENTS
Windows 98, ME, 2000 or XP • 25MB of disk space • 64MB of memory
PROS Speeds up browsing considerably; includes pop-up blocker
CONS No Imap support; compression artefacts on images
VERDICT
A good-value tool for dial-up users, as long as you don't mind some loss of image quality

EASE OF USE	★★★★☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

DISPLAY SOFTWARE

Maxivista

A cheap way to extend your Desktop

Maxivista aims to help out those who have a second PC, for example a notebook or Tablet, and want to extend their Windows Desktop onto this device.

With Maxivista installed on both your PCs, you can extend the Desktop via a local network connection, a suitable USB cable or anything that's capable of using TCP/IP. Once the program is installed on the primary PC, you only need to copy the 256KB Maxivista Viewer file on to the secondary PC.

Using the configuration tool, it's possible to rotate the display, which is of particular use to those with Tablet PCs. You can also set whether you want the extended Desktop to appear in a window on the secondary PC or take up the entire screen.

Since Maxivista creates a virtual display adapter, you'll be able to see your new display listed in the Windows Display Properties window. This means that you can treat it just like any other secondary monitor, including adjusting the resolution and colour depth. If you've already got a dual-head card with two monitors attached to it, Maxivista allows your notebook or Tablet to act as a third display.

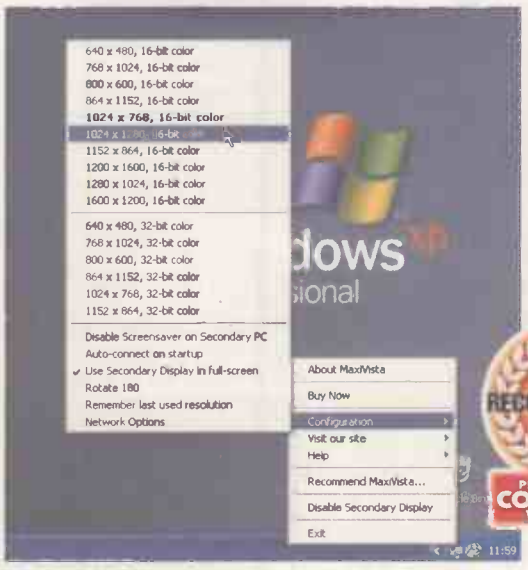
Maxivista impressed us the most with its sheer simplicity. There are no confusing menus to get lost in and the entire program is run from the system tray. What's more, at £26.46 it's a cheap way to use a notebook when you're in front of a PC and cheaper than a dual-head graphics card.

Wil Stapley

DETAILS

RRP £26.46 (£22.52 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Maxivista www.maxivista.com
SYSTEM REQUIREMENTS
Windows 2000/XP for primary PC • Windows 98 or higher for secondary PC • 3MB of hard disk space for Primary PC • TCP/IP connection
PROS Easy to use; cheap alternative to dual-head card
CONS Primary PC requires Windows XP or 2000
VERDICT
If you've got a notebook, Tablet, or desktop PC, Maxivista will effortlessly turn it into an extended display for your primary PC

EASE OF USE	★★★★★
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



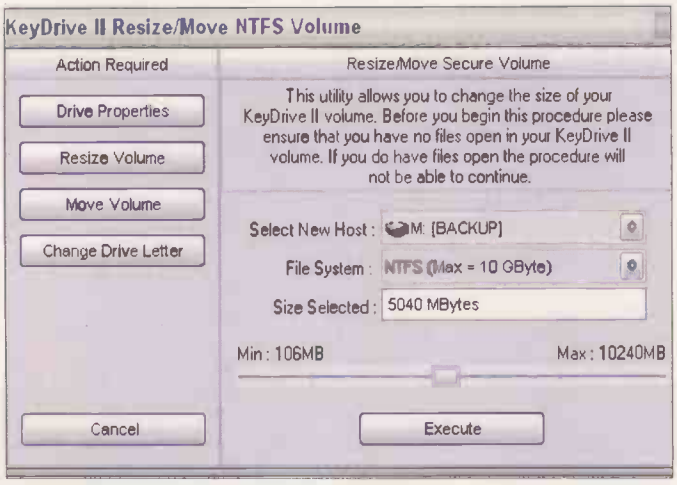
The virtual display adapter can be treated just like any secondary monitor – right down to changing the resolution and colour depth to suit your needs

RECOMMENDED
PERSONAL COMPUTER WORLD

DATA SECURITY

Guildsoft Keydrive II

A foolproof way to hide sensitive data



The encrypted volume can be resized up to a maximum of 10GB with no loss of data

The theft of a computer can be inconvenient enough, but when the machine in question contains sensitive personal or work data, the loss can have much greater consequences. Keydrive II from the Secure Technology Group can alleviate this concern by rendering such files invisible with a combination of encryption and a USB key.

It works by creating a virtual encrypted volume – up to 10GB in size – on the largest partition to act as a secure container for important files. Without the USB key, it's doubtful that a casual thief would even be aware of the drive's presence and there's even less chance of them cracking the encryption.

Setup is straightforward and requires the insertion of the key into a free USB port together with a password, which also acts as part of the failsafe procedure in the event of a lost key. A four-digit Pin is then assigned which should be changed right away.

The virtual drive remains completely invisible until the key is inserted and the Pin entered. Remove the key and the drive disappears. It's completely integrated into the Windows shell and there's no noticeable encryption lag when accessing files. The key also provides 4KB of onboard memory for the safe storage of passwords and there's a secure logon and screen lock facility under Windows XP and 2000.

Keydrive may not be as polished overall as the rival Deslock system but it is less expensive and just as effective at keeping data secure.

Andy Gibbons

DETAILS

RRP £74.90 (£63.74 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Guildsoft 01752 895 100
www.guildsoft.co.uk
SYSTEM REQUIREMENTS
Windows 98 or higher (Windows XP or 2000 for authenticated logon) • Pentium processor equivalent • 128MB Ram • 30MB hard disk space • USB port
PROS Seamless operation; lost key safeguards built in
CONS Virtual disk limited to 10GB
VERDICT
Effective and easy-to-use data security which could prove invaluable for mobile users transporting sensitive data

EASE OF USE	★★★★☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

DIGITAL MEDIA MANAGEMENT

Serif Mediaplus 2

Organise your photos and videos

There is no shortage of media management programs available these days, so Serif has thrown quite a few extra bells and whistles into Mediaplus 2 in order to make it stand out. While most applications of this ilk focus on managing digital photos, Mediaplus also works with audio and video files. It also provides many different ways of distributing those files so you can share them with friends or colleagues.

Version 2 allows you to save a set of files as a slideshow that can run as a standalone application. You can also burn collections of photos and video clips onto CD using the Video CD format. These Video CDs can then be played on domestic DVD players, although, strangely, there's no DVD support.

Budding web designers are well catered for with a wide variety of HTML templates that can be used to automatically create photo galleries for use on the Internet. These include a page of thumbnail previews that are linked to full-size versions of each image. We also liked the new batch conversion option, which lets you simultaneously convert multiple images into any format you specify.

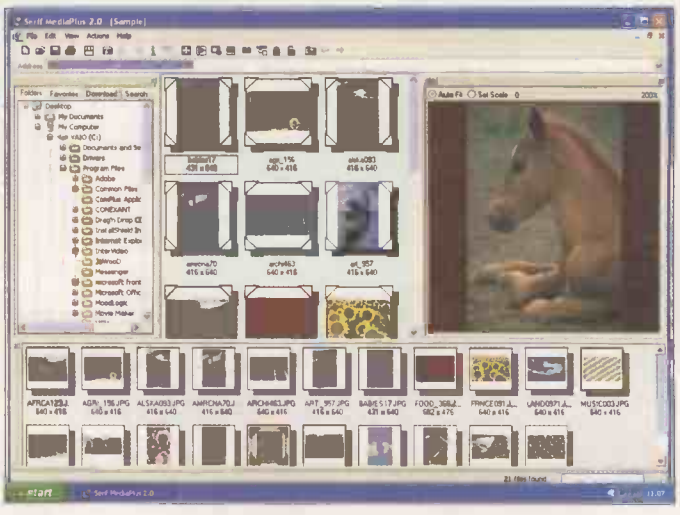
Most image-editing programs now include some sort of browser or file-management option, so you may not need Mediaplus if your main interest is just in working with digital photos. However, if you also have large collections of audio and video clips, you'll find that it is a useful tool for managing all those different files.

Cliff Joseph

DETAILS

RRP £59.99 (£51.06 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Serif 0800 376 7070
www.serif.com
SYSTEM REQUIREMENTS
200MHz processor • Windows 98 or later • 64MB of Ram • 30MB hard disk space
PROS Wide range of features for managing and distributing media files
CONS No DVD support
VERDICT
A useful utility for organising large collections of photographs, videos and sound files

EASE OF USE	★★★☆☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆



The tidy interface of Serif Mediaplus 2 makes it easy to organise and manage your digital photos and audio and video clips

KOMPLETT.co.uk
-SAVE TIME AND MONEY

£388

Canon

Canon PowerShot G5 5.0MP

For serious pics without sacrificing serious fun, this is the snapper for you. This is so packed full of features you may just decide to quit your day job and become a food chain dredging paparazzi !!!

SKU: 123124

£33

OR

Ortek Wireless OfficeMedia Pro

No messy tangled cables and no limits on where you want to sit! Plus you'll get many extra keyboard buttons for quick and easy access to the most popular Microsoft office commands and shortcuts. with the new Clipboard Hot keys, Task Pane and Office Hot keys you can take full advantage of the new features found in Office XP.

£666

£69

LG

LG Projektor RD-JT51
1500 ANSI Lumen

Ok....plug this into the Euro 2004 coverage, project it onto your slimscreen. Buy a kit and a football and badabing....play one two with your favourite players. You won't get their pay and you may lose your friends\partner\self respect...but who needs them!?!

SKU: 122201

MEDION

Medion MP3-Player
256MB LCD

MP3 Player and 256MB memory stick - the stylish alternative to the Walkman and the floppy disk in one!

SKU: 124284

£88

Altec Lansing Speakers
ACS621

Euro 2004...oh yes oh yes. Some rich people and some fanatics will be in Portugal for the games....most of us will just stick to the minute footage on terrestrial TV :-(Stuff them all, start your favourite footy sim on your PC, set up a game such as England vs Brazil, you know, a nice easy one....
Then, crank up these babies and bo#¤%x to the lot of em, you are THERE!!!

SKU: 119322

£1.150

MEDION

Medion 15.4" Laptop

ATI Radeon 9700, WIN XP Home Ed., 80GB hard drive, 512MB memory, 1.6GHz Intel processor, DVD+R/RW, WLAN.

SKU: 123892

Prices and specifications are subject to availability and change without prior notice, see www.komplett.co.uk or www.komplett.ie for updated prices. Prices are correct at the time of going to press. Pictures are representative only. See website for Terms and Conditions. Komplett are not responsible for errors or omissions in the information published. We reserve the right to cancel any orders. An Order Cosfirmation is a confirmation that we have received your order and is not a binding contract.

KOMPLETT.co.uk

HP iPAQ Pocket PC H1940

SKU: 124511

The slim, affordable HP iPAQ Pocket PC h1940 with integrated Bluetooth has great features and functionality at an incredible value to meet your handheld computing needs. The slim and sleek design fits into almost any pocket or purse and conveniently includes SD slot for flexibility in expansion and storage. With integrated Bluetooth, connect wirelessly to other Bluetooth devices. Stay productive with the combination of popular applications, features and storage capabilities.

£199 Inc. VAT

GRAPHIC CARDS 128MB

SKU	Product name	Price inc. VAT
120245	Sapphire Radeon 9200SE Retail	£32
123286	Gainward GeForce FX5200 Retail	£42
120318	PowerColor Radeon 9600PRO Retail	£79
121927	MSI GeFroce FX5700 TD128 Retail	£98
121630	Sapphire Radeon 9600XT Retail	£105
122901	Sapphire Radeon 9800PRO Lite-Retail	£140
119628	Sapphire Radeon 9800PRO Ultimate Ed.	£197
120477	Creative 3Dblas. GeForce FX5900 Retail	£197

GRAPHIC CARDS 256MB

SKU	Product name	Price inc. VAT
120323	PowerColor Radeon 9200 Retail	£52
118630	Gainward GeForce FX5200 PRO680TV Retail	£66
119625	Sapphire Radeon 9600 Atlantis Full-Retail	£74
117671	Gainward GeForce FX5600 Ultra 780TV Retail	£86
123639	MSI GeForce FX5700 VTD256 Retail	£122
121502	PowerColor Radeon 9600XT Bravo Retail	£166
119629	Sapphire Radeon 9800 PRO Ultimate Ed.	£273
121500	PowerColor Radeon 9800XT Retail	£276

MSI CD recorder CR52M

52x/32x/52x Retail

SKU: 119289

MSI

£22 Inc. VAT

The CR52-M CD-R/RW writer represents MSI's efforts to meet home and business consumer demands for super-quiet operation and faster reading and recording performance.

HANDHELD PCs

SKU	Product name	Price inc. VAT
121106	Palm Tungsten E 126MHz,SDIO,32MB	£150
119284	HP IPAQ H2210 PXA255-400MHz 64MB	£279
121913	Fujitsu Siemens LOOX 610BT Bluetoth 64MB	£299
121628	HP IPAQ H4150 400MHz Bluetooth,WLAN	£376

MAINBOARD (INTEL CPU)

SKU	Product name	Price inc. VAT
121602	EpoX EP-P4Mki 533MHz VGA,LAN	£27
121244	Abit AI7 SATA, DualDDR, Firewire, Raid	£81
119311	Asus P4C800-E DELUXE DualDDR, Raid	£126
119657	Abit IC7-MAX3 SATA GbLAN,DualDDR Firewire	£141

MAINBOARD (AMD CPU)

SKU	Product name	Price inc. VAT
121703	EpoX EP-8K9A7I KT400A ATX, USB2.0 LAN	£34
119677	MSI KT6 DELTA-FISR KT600 S-ATA Firewire	£59
124862	Abit KV8 K8T800 SATA ATX Raid GbLAN	£82
300050	MSI K8N NEO Platinum Edition nForce3	£94
121241	Abit KV8-MAX3 K8T800 SATA LAN Firewire	£117

Sapphire Radeon 9800

Atlantis PRO Lite Retail

SKU: 122901

The "Big Bang" creation of your virtual world erupts from the RADEON 9800 ATLANTIS PRO's SMARTSHADER 2.1 and SMOOTHVISION 2.1 technologies. Delivering full acceleration of DirectX 9.0 and OpenGL 2.0, your only limitation is your own imagination!

SAPPHIRE

£140 Inc. VAT

DVD

SKU	Product name	Price inc. VAT
121371	Verbatim DVD-R media 7,7GB 5 pack	£7
120533	Plextor DVD drive 16x/48x black	£32
120556	MSI DVD recorder DR4 DVD+R+RW, DVD-R/-RW	£61
122609	NEC DVD recorder ND-2500 all -,+ formats	£88
122140	Plextor DVD recorder PX-708A OEM	£128

CD

SKU	Product name	Price inc. VAT
117543	Verbatim CD-RW media 80min	£8
122619	Sony CD recorder CRX230 52x/32x/52	£29
122688	LG CD recorder GCE-8525BB OEM	£30
116098	NEC CD recorder 48x/24x/48x Retail	£41
118028	Plextor CD recorder PREMIUMT3B	£81

CASES

SKU	Product name	Price inc. VAT
121478	Q-Tec Midi tower TL-MD Silver w/o psu	£41
122072	AC Ryan Acrylic Case Clear Midi w/o psu	£73
117756	Chieftec BX Tower Black and Silver w/360W	£82
124666	Diabolic Midi Tower Red 400W psu - evil case	£85
122753	Thermaltake Xaserlll Super Tower Silver V2000A	£131

NETWORKING

SKU	Product name	Price inc. VAT
117793	SMC EZ Connect Wireless G 54Mbps 802.11g	£36
117047	3Com OfficeConnect Gateway 10/100 switch	£42
122870	3Com Wireless Access Point 54 Mbps 802.11	£90
123445	SMC Barricade Wireless G 54Mbps 802.11g	£94
120045	Cnet Switch Gigabit Ethernet 4P w/VLAN	£134

Eizo 15" LCD FlexScan L367 TCO-03

SKU: 115960

EIZO

The new range of design and performance features introduced by the FlexScan L367 clearly establish EIZO's next generation MultiEdge series as the high-end choice of display for today's business, back office and administrative users. The inclusion of EIZO original functions such as Fine Contrast, gamma correction, and DesktopViewer, as well as support for Seiko Epson Corporation's PRINT Image Matching (P.I.M.) II technology deliver the high-precision image control required by complex text and graphics-based applications.

£255 Inc. VAT

MONITORS

SKU	Product name	Price inc. VAT
111918	Samsung 17" CRT Syncmaster 753DFX	£104
122529	Hansol 19" CRT 930D FLAT INVAR	£140
120139	Samsung 15" Syncmaster 152V Silver	£252
115115	LG 17" LCD L1710S Silver TCO-99	£304
119067	Eizo 17" FlexScan L557 TCO-03 Grey	£374
113354	Samsung 17" LCD Syncmaster 172T Silver	£386
120143	Samsung 19" LCD Syncmaster 192V Silver	£457
117989	Eizo 19" LCD FlexScan 767K TCO-99 Black	£598
119179	Samsung 21" LCD Syncmaster 213T TCO-03	£918

BAREBONE

SKU	Product name	Price inc. VAT
114495	Shuttle SS51G VGA/LAN/Firewire/Audio	£123
124456	Abit DiGiDice Mini Sound,Firewire,LAN	£170
124525	EpoX eX5-300S Sound,SATA,LAN, Firewire	£176
120647	Shuttle SB51G LAN,Firerwire ,Audio,AGP	£176
118356	MSI MEGA sound, LAN, Radio, VGA	£199
124077	Shuttle SB65G2 Black SATA,Wireless Lan	£219
300046	MSI MEGA 865 Deluxe with 6in 1 card reader	£240

PROJECTORS

SKU	Product name	Price inc. VAT
116147	Infocus X1 1000 Ansi Lumen/SVGA	£763
119990	ASK Projector C40 1000Ansi Lumen	£829
118365	LG Projector RD-JT30 1400 Ansi Lumen	£1139
123116	Panasonic PT-AE500E 850 Ansi Lumen	£1116
114741	ASK Projector C50 1100 Ansi Lumen SVGA	£1173

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AMD Athlon 64 BOXED

SKU: 122811

You live at the forefront of technology, and you won't settle for less from your favorite software. That's why AMD is proud to bring you the AMD Athlon 64 processor, with AMD64 technology for dramatically higher performance and built-in support for future 64-bit applications - even running 32- and 64-bit software at the same time. Maximize system efficiency and stay ahead of the curve with the technically superior PC processor, packed with advances such as HyperTransport technology and an integrated DDR memory controller. Whether it is for business, school or play, with the AMD Athlon 64 processor, you can address your current and future computing needs.

£150 Inc. VAT

AMD PROCESSORS

SKU	Product name	Price Inc. VAT
116244	Athlon XP2500+ 1.833GHz Barton OEM	£50
116245	Athlon XP2800+ 2.083GHz Barton OEM	£65
116242	Athlon XP3000+ 2.167GHz Barton OEM	£94
120919	Athlon 64 3200+ 2.0GHz 1MB cache BOXED	£189
123016	Athlon 64 3400+ 2.2GHz 1MB cache BOXED	£295

INTEL PROCESSORS

SKU	Product name	Price Inc. VAT
117138	Celeron 2.4GHz Boxed PC400 128kB cache	£47
118900	Celeron 2.6GHz Boxed PC400 128kB cache	£55
117321	Pentium 4 2.8GHz Boxed PC800	£120
117322	Penitum 4 3.0GHz Boxed PC800	£150
118901	Pentium 4 3.2GHz Boxed PC800	£181
123629	Penitum 4 3.4GHz Boxed PC800	£290

CPU FANS

SKU	Product name	Price Inc. VAT
116402	Spire CPU-fan WhisperRock IV SocketA	£7
117894	Cooler Master AERO 7+ AMD	£26
114614	GlacialTech CPU fan Socket 478 Igloo	£7
120136	Cooler Master AERO 4 INTEL Pure Copper	£26

Trust 1600P 2.1 Soundforce Speaker System

SKU: 122761

Powerful subwoofer speaker set with 1600 Watt output; Realistic sound effects and high quality music; Separate control unit to place at any convenient location; Excellent deep bass provided by separate wooden subwoofer; Controls for power, bass, treble and master volume adjustment; Attractive design

£22 Inc. VAT

DIGITAL CAMERAS

SKU	Product name	Price Inc. VAT
122242	Fujifilm Q1 Digital Black 2.0MP	£68
122425	Kodak EasyShare CX6230 Zoom 2.0MP	£97
116644	Mustek MDC4000 Zoom 3.1MP 16MB	£122
123110	Sony CyberShot DSC-P72 3.2MP 16MB	£164
119503	Canon PowerShot S50 5MP 32 MB	£336
122461	Nikon Coolpix 5700 5.0MP 16MB	£511

CAMERA MEMORY

SKU	Product name	Price Inc. VAT
112897	TwinMOS Memory Stick 32MB	£10
111368	TwinMOS Secure Digital 64MB	£17
103081	TwinMOS Compact Flash 128MB	£21
111838	TwinMOS Multimedia Card 128MB	£24
112460	Crucial CompactFlash 512MB	£76
121854	Sony Memory Stick 256MB	£84

MEMORYCARD READERS

SKU	Product name	Price Inc. VAT
113749	eMagic PC-Card Adapter for CF card reader	£5
119605	Datafab USB2.0 6 in 2 card reader Firewire	£16
113721	eMagic USB 6in 2 combo card reader	£18
119145	eMagic USB2.0 6 in 1 card reader black	£23
120884	USB2.0 all in one card reader	£25
116711	eMagic USB2.0 6 in 2 combo card reader	£31

MP3 PLAYERS

SKU	Product name	Price Inc. VAT
120171	MSI MEGA Stick 128fMB USB,FM,Voice rec.	£58
122644	JazPiper Ubit-3 128MB USB,FM,Voice rec.	£81
119520	JOS MP110 256MB Dictaphone,FM radio	£135
115808	iRiver IFP195TC 512MB Dictaphone,FM radio	£223
122310	Creative Nomad Jukebox Zen NX 60GB	£287
121447	iRiver iHP-120 dictaphone,FM 20GB	£307

PEN-DRIVE/USB MEMORY

SKU	Product name	Price Inc. VAT
121606	Verbatim USB2.0 Store`N`Go 32MB	£17
121754	TwinMOS USB2.0 Mobile Disk III 128MB	£24
121755	TwinMOS USB2.0 Monile Disk III 256MB	£41
116567	TwinMOS USB2.0 Mobile Disk I512MB	£97
121610	Verbatim USB2.0 Store`N`Go 512MB	£122
122470	TwinMOS USB2.0 Mobile Disk III 1024MB	£168

DDR-DIMM MEMORY

SKU	Product name	Price Inc. VAT
112665	DDR-DIMM PC3200 256MB CL2.5	£38
116452	Crucial PC3200 512MB CL3.5ns	£79
117211	Corsair Value S. PC2700 512MB CL2.5	£85
119647	Corsair TWINX512-4000 2 matched memories	£129
118498	TwinMOS PC3200 1024MB Dual Pack	£164
112164	Curcial PC2100 1024MB 400MHz	£213
122785	Corsair TWINX-3200 2048MB Kit	£411

SPEAKERS

SKU	Product name	Price Inc. VAT
122764	Trust SP-6018 300W Stereo Desktop	£4
124416	Logitech X-120 Stereo Desktop 5W	£18
124420	Logitech Z-3 Speakers 2.1 40W	£70
119322	Altec Lansing ACS621 Speaker System	£89
124422	Logitech Z-5300 5.1 Speaker System	£129
114063	Logitech Z-680 5.1 450W Speaker System	£263

Logitech QuickCam Sphere Webcamera

SKU: 121025

You've never seen anything like the unique combination of form and function of the QuickCam Sphere. It features a black, ball-shaped camera that sits atop a nine-inch-high stand at your eye level. Why? So that you'll get optimal face time during your video calls or video instant messaging (IM) sessions. And when you move, it actually follows you around! The QuickCam Sphere mechanically and automatically turns left and right for almost a 180-degree horizontal view or up and down for almost 90-degree top-to-bottom view. So your smiling face will always stay in the picture.

Logitech

£80 Inc. VAT

Lexar Jump Drive MP3-Player 128MB

SKU: 124859

LEXAR

JumpDrive Music can be used to easily store, carry and transfer data files, while also serving as a full-featured MP3 player. It is ideal for students and mobile professionals who need to transport valuable document files, but also enjoy traveling with their favorite music.

£33 Inc. VAT

HARD DRIVES

SKU	Product name	Price Inc. VAT
115425	Maxtor DiamondMax Plus 9 80GB	£44
118031	Seagate Barracuda 120GB 8MB cache	£58
122853	Seagate Momentus 20GB 5400RPM ATA/100	£59
115561	Maxtor DiamondMax Plus 9 160GB S-ATA	£80
112810	Western Digital Caviar 200GB IDE SE	£97

KEYBOARDS

SKU	Product name	Price Inc. VAT
120535	Trust Power Plus PS/2 Retail	£5
121556	Logitech Cordless Desktop Precision	£37
121543	Logitech Cordless Desktop Comfort	£55
121552	Logitech Cordless Dekstop MX Bluetooth	£119

MICE

SKU	Product name	Price Inc. VAT
118264	Labtec 3-Button Mouse PS/2 Retail	£3
121624	Microsoft IntelliMouse Explorer 4.0	£29
124147	Logitech MX510 Optical Mouse	£32
121020	Logitech MX900 Bluetooth wireless optical	£64

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Processors

Part.		ExVat(£)	IncVAT(£)
1574	AMD Duron 1600 (266FSB)	21.62	25.40
613	AMD Athlon XP 2000+ (266FSB)	32.48	38.16
11	AMD Athlon XP 2400+ (266FSB)	39.10	45.94
1413	AMD Athlon XP 2800+ (333FSB)	67.95	79.84
1859	AMD Athlon 64 3200 S754	175.00	205.63
1523	Intel Celeron 2.4Ghz S478	40.95	48.12
41	Intel P4 - 2.8 Ghz 533FSB S478	89.99	105.74
1456	Intel P4 - 3.0 Ghz 800FSB S478	125.99	148.04

Broadband / ADSL

Part.		ExVat(£)	IncVAT(£)
1628	Dlink DSL-504T Modem+4 ports Router	62.05	72.91
1344	ADSL External Modem + 4 Ports router	35.90	42.18
1340	Belkin DSL 4 ports Cable Router	33.52	39.39
1346	ADSL External USB Modem	20.19	23.72
732	ADSL Filter	2.25	2.64

Barebone

Part.		ExVat(£)	IncVAT(£)
1467	ASUS Pundit PIV 400/533	83.00	97.53
1465	ASUS Terminator PIV 400/533 Black	74.00	86.95
1251	ASUS Terminator AMD DDR100/133	69.74	81.94
1578	Shuttle XPC SK41G for AMD Processors	107.00	125.73

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- 1.44 Floppy Drive
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- 12 months complete Warranty

AMD Duron 1600 System	£199 ex VAT	£233.82 inc VAT
AMD XP 2000 System	£209 ex VAT	£245.57 inc VAT
AMD XP 2400 System	£219 ex VAT	£257.32 inc VAT

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- Latest Motherboard with Sound and LAN onboard
- 256Mb PC2100 DDR memory
- Separate AGP 32Mb Graphics
- 40Gb 7200 UDMA Hard Disk
- 1.44 Floppy Drive
- 2 x Serial 1 x Printer Port USB Ports
- PS2 Keyboard
- Mouse and Mouse Mat
- Fully Upgradeable
- 12 months complete Warranty

AMD XP 2000	£244 ex VAT	£286.70 inc VAT
AMD XP 2400	£252 ex VAT	£296.10 inc VAT
AMD XP 3000	£299 ex VAT	£351.32 inc VAT
Intel Celeron 2.4	£249 ex VAT	£292.57 inc VAT
Intel P4 2.8/800	£313 ex VAT	£367.77 inc VAT
Intel P4 3.0/800	£340 ex VAT	£399.50 inc VAT

System Extras

	Ex Vat(£)	Inc Vat(£)		Ex Vat(£)	Inc Vat(£)
56.6k Fax/Modem Int	6.95	8.17	52/32/52 CDRW	19.00	22.33
52 Speed CD Rom	8.99	10.56	4x +/-DVDRW	49.00	57.58
16x DVD ROM	14.99	17.61	8x +/-DVDRW	59.00	69.33
120gb Hard Disk	20.00	23.50	MS Windows 98 CD	59.99	69.33
19" Monitor	45.00	52.88	MS Windows 2000	82.50	96.94
15" Flat Panel TFT	129.00	151.58	MS Windows XP Home	49.99	57.58
17" Flat Panel TFT	179.00	210.33	MS Windows XP Pro	81.30	95.53
512Mb Ram Total	25.00	29.38			

Hard Drives

Part.		ExVat(£)	IncVAT(£)
55	40 Gb IDE 7200 Hard Drive	27.95	32.84
57	60 Gb IDE 7200 Hard Drive	29.99	35.24
56	80 Gb IDE 7200 Hard Drive	36.85	43.30
615	120 Gb IDE 7200 2Mb Cache Hard Drive	49.50	58.16
1407	160 Gb IDE 7200 Hard Drive	57.80	67.92
1469	Serial ATA 80 Gb IDE 7200 Hard Drive	46.75	54.93

Memory

Part.		ExVat(£)	IncVAT(£)
80	256 Mb DDR PC2100 Memory	29.99	35.24
1275	512 Mb DDR 333 Memory	53.90	63.33
1409	256 Mb DDR 400 Memory	34.95	41.07
1410	512 Mb DDR 400 Memory	59.99	70.49
91	Light, Compact Flash Drive, USB, 128MB	19.09	22.43
1319	Light, Compact Flash Drive, USB, 256MB	36.96	43.43

Networking

Part.		ExVat(£)	IncVAT(£)
1021	1M Patch lead	0.48	0.56
1017	305M Reel Solid Grey - Cat 5E	21.09	24.78
923	PCI 10/100 Fast Network card	3.52	4.14
1601	Dlink DFE-530TX	6.36	7.47
930	Intel Pro 100 PCI Adapter	19.22	22.58
927	Switches-8 Port 10/100 Switch	9.80	11.52
1698	D-Link DES-1005D 5-port 10/100	14.18	16.66
1700	D-Link DES-1016D 16-port 10/100	60.44	71.02

Optical-DVD/DVDRW & CD/CDRW

Part.		ExVat(£)	IncVAT(£)
270	16x DVD IDE	14.95	17.57
1138	Samsung 52/24/52 16x Combi	30.25	35.54
1585	Liteon 8x Dual DVD +/-R/RW IDE	58.50	68.74
1861	NEC ND-2500A 8x8x +/-RW bare Black	55.95	65.74
1568	NEC ND-2500A 8x8x +/-RW bare Beige	55.95	65.74
1879	Pioneer DVR-107D	63.00	74.03
277	52x IDE CD Rom	8.99	10.56
656	Aopen 52/32/52+two free bezel	17.20	20.21
1541	Optorite 52/32/52	16.70	19.62
301	Samsung 52/32/52	17.41	20.46
664	Sony 52/24/52	17.68	20.77

Monitors

Part.		ExVat(£)	IncVAT(£)
754	17inch Relysis OEM CRT 3Yr DS Warranty	54.50	64.04
856	19inch AOC	104.09	122.31
1890	NEC AccuSync LCD 51V-BK	179.00	210.33
816	XIOD Samsung UK 15 TFT Sil/Blk M/Media	199.00	233.83
767	AOC 17" TFT	236.52	277.91

Graphic Cards

Part.		ExVat(£)	IncVAT(£)
1163	Nvidia-Gforce 4 MX440 64 DDR TV-1163	23.52	27.64
1402	Nvidia-Gforce 4 MX440 128 DDR TV-1163	29.68	34.87
1840	Abit GeForce FX5200 128	41.00	48.18
1493	N-VIDIA FX5700, 8X AGP, 256MB DDR TV-OUT, DVI	95.00	111.63

Motherboards

Part.		ExVat(£)	IncVAT(£)
628	Matsonic MS8188E Socket A MATX S/V/L	30.24	35.53
1552	Matsonic MS9158E+ P4 MATX S/V/L	29.42	34.57
1594	Matsonic MS8147C+ Socket A S/L	27.25	32.02
1875	Matsonic MS9097C P4/800 S/L Prescott	34.75	40.83
1389	Gigabyte-GA 7DXE	32.90	38.66
1396	Gigabyte-GA 7VA	35.72	41.97
1390	Gigabyte-GA 7VKMP	36.50	42.89

Wireless

Part.		ExVat(£)	IncVAT(£)
1644	D-Link DWL-610 PCMCIA 11Mbps	16.05	18.86
1645	D-Link DWL-510 PCI Bus 11Mbps	18.48	21.71
1646	D-Link DWL-122 USB 1.1 11Mbps	19.95	23.44
1647	D-Link DWL-700AP Access Point11Mbps	35.46	41.67

Cases

Part.		ExVat(£)	IncVAT(£)
94	H312 300watt Mini ATX	13.01	15.29
1589	A319 300watt Midi ATX	18.95	22.27
99	2001 ATX Desktop Case	19.34	22.72
1591	A617 bundle Silver/Beige Tower Case	19.00	22.33
1471	KM G3 Midi ATX 300w (with flap) in Black	18.58	21.83
1472	KM G3 Midi ATX 300w case in Black/silver	18.58	21.83

Printers

Part.		ExVat(£)	IncVAT(£)
860838	Epson Stylus C64 17ppmBlack 9ppmCol	49.99	58.74
1547	Epson Stylus C84	77.00	90.48
846310	HP DeskJet 3550 Photo Quality Print	40.38	47.45
848349	HPDeskJet 3650 Photo Quality Print	49.18	57.79
1584	Epson Stylus CX3200 Printer/Scan/Copy	72.00	84.60

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BUDGET PC

Packard Bell Imedia 3050

REVIEW July 2004, p46 **RRP** £599
(£510.63 ex VAT) **PRODUCT INFORMATION**
Packard Bell www.packardbell.co.uk

If you're after high performance you'll have to look elsewhere and pay extra, but at £600 this Celeron 2.6GHz model works well as a home office PC and comes with 256MB of Ram and a 15in TFT monitor.

GAMERS' PC

Alienware Area 51 Extreme

REVIEW June 2004, p41 **RRP** £2,737.75
(£2,271 ex VAT) **PRODUCT INFORMATION**
Alienware 0800 279 9751 www.alienware.co.uk

With Intel's 3.4GHz Extreme Edition P4 processor beating away at its heart, this stylish PC from Alienware features an Nvidia FX5950 Ultra, and is perfect for those who want to play the latest games.

HIGH-END PC

Evesham Axis 64 FX-53

REVIEW June 2004, p42 **RRP** £2,231.33
(£1,899 ex VAT) **PRODUCT INFORMATION**
Evesham 08701 609 500 www.evesham.com

Featuring the brand new Athlon 64 FX-53 processor from Intel, this system from Evesham certainly packs a punch. Considering the components, the large price tag isn't unexpected.

FULLY FEATURED NOTEBOOK

Tiny Mediabook64 3200+

REVIEW July 2004, p46 **RRP** £999
(£850.21 ex VAT) **PRODUCT INFORMATION**
Tiny 01282 777 555 www.tiny.com

Powered by a powerful AMD Athlon 64 3200+ processor and fitted with 1GB of Ram, this notebook from Tiny serves well as a desktop replacement and comes at a very respectable price.

CENTRINO NOTEBOOK

Hi-Grade C7000

REVIEW July 2004, p116 **RRP** £998.75 (£850 ex VAT)
PRODUCT INFORMATION Hi-Grade
020 8532 6115 www.higrade.com

Modelled around the Intel Centrino platform, the C7000 from Hi-Grade houses a decent Pentium M processor clocked at 1.5GHz along 512MB of Ram and a Radeon Mobility 9600 Series graphics card.

BUDGET NOTEBOOK

NEC Versa M500

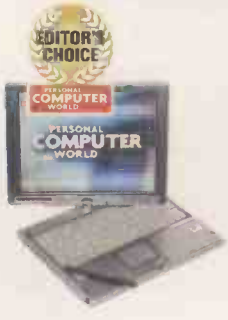
REVIEW July 2004, p120 **RRP** £799
(£680 ex VAT) **PRODUCT INFORMATION**
NEC 0870 010 6329 www.nec.co.uk

If you're not bothered about playing games, but want to be able to make use of wireless technology and stray from the mains for over three hours, the NEC Versa M500 is well worth a look.

TABLET PC

Fujitsu-Siemens Lifebook T-3010

REVIEW April 2004, p129 **RRP** £1,467
(£1,210 ex VAT) **PRODUCT INFORMATION** Fujitsu-Siemens 08706 066 677 www.fujitsu-siemens.co.uk



This tablet PC is one of the best we've seen. It offers great features, flexibility and performance, and comes in at under £1,500. The graphic-sperformance isn't the greatest, however.

PROJECTOR

HP MP 3130

REVIEW June 2004, p55 **RRP** £1,899.98
(£1,617 ex VAT) **PRODUCT INFORMATION**
HP 0845 270 4222 www.hp.co.uk

Although it's not the cheapest projector around, this DLP model from HP can produce a bright display even in a well-lit room. It also features automatic vertical keystone correction and a host of input options.

17IN FLAT-PANEL MONITOR

Philips 170B4BB

REVIEW December 2003, p135 **RRP** £374
(£318.30 ex VAT) **PRODUCT INFORMATION**
Philips 020 8781 8372 www.consumer.philips.com

Giving excellent results with the Windows default colour profiles, the Philips 170B4BB flat-panel monitor automatically detects whether it is connected to an analogue or digital input.

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PDA

Palm Tungsten E

REVIEW January 2004, p60 **RRP** £149
(£126.81 ex VAT) **PRODUCT INFORMATION**
Palm 0118 974 2700 www.palmone.com/uk

With a low price, we didn't expect the Tungsten E to perform so well. It doesn't sport the features of more expensive handhelds, but it's superb value for money.

POCKET PC

HP Ipaq 1940

REVIEW November 2003, p140 **RRP** £269
(£228.94 ex VAT) **PRODUCT INFORMATION**
HP 0845 270 4222 www.hp.co.uk

The 1940 runs the latest Pocket PC 2003 Pro but keeps the excellent screen of its predecessor. Integrated Bluetooth and an SD/MMC slot are a bonus, as is the low-power Samsung processor.

MULTIFUNCTION DEVICE

Lexmark X5150

REVIEW October 2003, p122 **RRP** £149
(£126.81 ex VAT) **PRODUCT INFORMATION**
Lexmark 0870 444 0044 www.lexmark.co.uk

Good software and easy setup make this a very attractive device. Photo quality is excellent with no graininess. Print speeds are a little slow but a good control panel makes up for this.

SCANNER

Canon Canoscan 3000F

REVIEW November 2003, p70 **RRP** £69.32
(£59 ex VAT) **PRODUCT INFORMATION**
Canon 08705 143 723 www.canon.co.uk/canoscan

Clearly the best sub-£100 scanner on the market, the 3000F produces great results with photos and transparencies. It also comes with Canoscan software and gives OCR support.

LASER PRINTER

Oki B4300N

REVIEW February 2004, p124 **RRP** £349
(£297.02 ex VAT) **PRODUCT INFORMATION**
Oki 01753 819 819 www.oki.co.uk

Bursting with features while being able to cruise along at an impressive speed, the very reasonably priced B3400N from Oki is capable of producing some excellent quality printouts.

INKJET PRINTER

Canon i470D

REVIEW September 2003, p126 **RRP** £149
(£126.80 ex VAT) **PRODUCT INFORMATION**
Canon 0870 514 3723 www.canon.co.uk

This printer offers borderless printing and the ability to read four different Flash cards, along with very fast high-quality printing for an inkjet. Ideal for the business user.

MP3 PLAYER

Philips HDD060

REVIEW May 2004, p48 **RRP** £169
(£143.83 ex VAT) **PRODUCT INFORMATION**
Philips 0870 900 9070 www.philips.co.uk

Stylish and small, this mp3 player has a 1.5GB hard disk and can keep going for up to 10 hours. The only drawback is that you have to use the Philips Java utility to transfer music to it.

SPEAKERS

Creative Gigaworks S750

REVIEW April 2004, p48 **RRP** £330
(£280.77 ex VAT) **PRODUCT INFORMATION**
Creative www.creative.com

Coming with a wireless remote control, 210w sub-woofer and seven satellites at 70w each, these THX-certified speakers from Creative can completely immerse you in sound.

SOUND CARD

Creative Audigy 2 Platinum EX

REVIEW May 2003, p76 **RRP** £189
(£160.85 ex VAT) **PRODUCT INFORMATION**
Creative http://europe.creative.com

This feature-filled card and external unit provides 24/96 recording, 6.1 sound and loads of software, including Cubasis VST 4.0 CE for music makers, and Ulead Videostudio SE DV for movie buffs.

ATHLON MOTHERBOARD

Biostar K8VHA-Pro

REVIEW July 2004, p131 **RRP** £61.49
(£52.34 ex VAT) **PRODUCT INFORMATION**
Biostar 01952 461 141 www.biostar.com.tw

It might lack the bells and whistles of the more expensive Athlon 64 boards, but if you're building a powerful AMD system on a budget, it represents great value for money and gets the job done.

PENTIUM 4 MOTHERBOARD

Chaintech Zenith 9CJS

REVIEW June 2004, p107 **RRP** £139.96
(£119.13 ex VAT) **PRODUCT INFORMATION** Holly Computers 01375 397 220 www.hollycomputers.co.uk

This Prescott-ready board has a dual Lan feature that allows it to function as a network router with Lan support. Despite the high price, it's great value for money and comes with remote control.

GRAPHICS CARD

Gigabyte FX 5900XT

REVIEW April 2004, p67 **RRP** £134.80
(£158.39 ex VAT) **PRODUCT INFORMATION**
Gigabyte 01908 362 700 www.gbt-tech.co.uk

Based on the super-fast Nvidia Geforce FX 5900 Ultra graphics card, this latest card from Gigabyte delivers fast performance but, unlike most high-quality cards, won't cost an arm and a leg.

DIGITAL VIDEO CAMERA

Panasonic NV-GS120

REVIEW July 2004, p59 **RRP** £540 (£459.57 ex VAT)
PRODUCT INFORMATION Panasonic 08705 357 357
www.panasonic.co.uk

Not only does the NV-GS210 shoot some stunning videos and house a 10x optical zoom, but it also has a still shot resolution of 1,536 x 1,152 allowing you to take some decent photos as well.

DIGITAL CAMERA

Kodak Easyshare DX6490

REVIEW January 2004, p144 **RRP** £399
(£340.42 ex VAT) **PRODUCT INFORMATION**
Kodak 0870 243 0270 www.kodak.co.uk

With a 4megapixel CCD and 10x zoom, the Easyshare DX6490 delivers quality results with the minimum of fuss. Perfect for beginner and intermediate digital photographers.

HIGH-END DIGITAL CAMERA

Canon Powershot Pro1

REVIEW July 2004, p62 **RRP** £999
(£850.21 ex VAT) **PRODUCT INFORMATION**
Canon 08705 143 723 www.canon.co.uk

This well-designed 8megapixel prosumer digital camera is loaded with features, including a 7x optical zoom and remote control. It's also capable of taking stunning photos.

DVD-RW

Teac DV-W50DK

REVIEW April 2004, p66 **RRP** £97.51
(82.99 ex VAT) **PRODUCT INFORMATION**
Microwarehouse 020 8906 9111 www.teac.co.uk

It might not be the fastest available, but with a low price tag and the ability to burn both DVD+R and DVD-R formats this DVD-RW will suit those who aren't bothered about speed.

MEDIA CREATION SOFTWARE

Roxio Creator 7

REVIEW June 2004, p73 **RRP** £69.99
(£59.57 ex VAT) **PRODUCT INFORMATION**
Roxio www.roxio.co.uk

With the ability to edit photos, create home movies and burn CDs, Roxio Creator 7 houses a wealth of features and is also very easy to use. What's more, it comes at a very competitive price.

PC SECURITY SOFTWARE

McAfee Internet Security Suite 2004

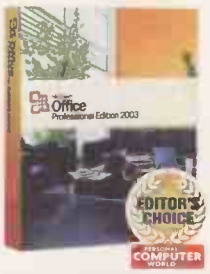
REVIEW April 2004, p69 **RRP** £49.98
(£42.54 ex VAT) **PRODUCT INFORMATION**
McAfee 01753 217 500 www.mcafee.co.uk

While the interface could do with a bit of attention, McAfee Internet Security Suite 2004 holds all the utilities to ensure your PC is protected from anything the Internet can hurl at it.

OFFICE SOFTWARE

Microsoft Office Professional 2003

REVIEW May 2004, p150 **RRP** £459 (£390.64 ex VAT)
PRODUCT INFORMATION Microsoft 0870 501 0100
www.microsoft.com

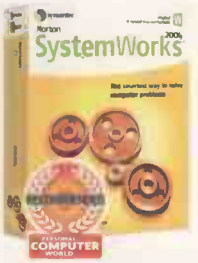


This office suite includes a host of features, including a revamped version of Outlook. There are cheaper options available, but Microsoft's Office 2003 is the clear market leader.

PC MAINTENANCE SOFTWARE

Norton Systemworks 2004

REVIEW March 2004, p68 **RRP** £64.99
(£55.31 ex VAT) **PRODUCT INFORMATION**
Symantec 01628 592 222 www.symantec.co.uk



If you want to keep your PC healthy and safe from harm, Norton Systemworks 2004 certainly gets the job done, and at the reasonable price of a penny short of £65 to boot.

WEB-EDITING SOFTWARE

Actinic Business 7

REVIEW July 2004, p81 **RRP** £938.83
(£799 ex VAT) **PRODUCT INFORMATION**
Actinic 0845 129 4800 www.actinic.co.uk

If you're looking to set up an ecommerce site, Actinic Business is definitely worth a look. With a wide range of advanced features and an easy-to-understand interface, its high price tag is justified.

IMAGE-EDITING SOFTWARE

Corel Draw 12 Graphics Suite

REVIEW May 2004, p81 **RRP** £421.82
(£359 ex VAT) **PRODUCT INFORMATION**
Corel 01628 589 800 www.corel.co.uk

Available as a £210 upgrade to the previous version, the latest release in the Corel Draw series is still the best all-round business graphics editor and includes a wide range of vector and animation tools.

VIDEO-EDITING SOFTWARE

Ulead Videostudio 7

REVIEW February 2004, p145 **RRP** £60
(£51.06 ex VAT) **PRODUCT INFORMATION**
Ulead 01327 844 880 www.ulead.co.uk

With a comprehensive feature set, powerful tools and full DVD authoring capabilities, Videostudio 7 is the perfect choice for both beginners and advanced users.

MUSIC CREATION SOFTWARE

Steinberg Cubasis VST 5

REVIEW March 2004, p67 **PRICE** £59.95
(£51.02 ex VAT) **PRODUCT INFORMATION**
Pinnacle Systems www.pinnaclesys.com

This sound-editing tool takes a bit of getting used to, but with a huge range of plug-in effects and a decent collection of virtual instruments, you'd be hard pushed to find a better package at this price.

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WORDS: DAVID LUDLOW ILLUSTRATION: SIMON PEMBERTON

Living with Media Center

Media Center has not taken home entertainment by storm, but Microsoft has not lost hope. We look at the latest attempts to put the PC in the living room

When Microsoft launched its Media Center Edition of Windows XP it was hoping it would finally put the PC into the living room. The computer would then become the centre of home entertainment, recording TV, displaying pictures and videos, as well as playing back music.

However, it hasn't quite gone the way the company hoped and I remain just as sceptical as before. From the outset it looked as though Media Center was just Windows XP with a fluffy menu slapped on top.

This image wasn't helped by many of the first Media Center releases, which used a standard PC case. Who would want an ordinary tower dominating the living the room? With high costs to OEMs, in addition to the cost of the PCs it looked like Media Center was just a gimmick. Enthusiasts were also locked out of using it and were denied the opportunity to buy the OS as a standalone package to build their own PC. Microsoft currently has no plans to change this, stating that the strict hardware requirements means it can't guarantee it will work with all hardware configurations.

But with companies like Elonex and Hi-Grade releasing attractive, hifi inspired products, it looked like the Media Center wasn't quite so dead in the water. To see what Microsoft is making, we thought it was time to use one in the home for a few months. To this end, I was presented with a new Elonex Exentia. Time to hook it up to the TV, plug in the cable set-top box and see what, if anything, Media Center can do.

Getting started

Opening the box, the first thing that struck me about the Exentia is the all-in-one design. It is well designed, making it perfect for a small room or bedroom. However, it's not ideal for a lounge. I've already got a TV bigger than its built-in 17in screen and would prefer a box that looks more like a hifi component.

That said, the Exentia was very simple to get working. All I had to do was connect the power cable, network cable (802.11g is also available), composite video and audio cables to the NTL digital set-top box, and connect the IR transmitter used to change cable channels. If, unlike me, you have an aerial you can also connect this and use the Media Center's tuner. At this point I didn't connect any of the video outputs such as S-video to the TV, as the Exentia's own screen is easier to use for configuring Windows.

Like other Microsoft products, Media Center uses a wizard for configuration. Windows XP Pro users will recognise the first couple of steps, as they're identical right down to having the option of joining the PC to a domain.

I don't have a domain at home, so I skipped this step and created a new user for myself, followed the rest of the wizard steps and booted into Windows. At this point it looks exactly like any other PC, until you hit the Media Center button on the supplied remote control.

This starts up the Media Center menu, which is entirely controlled by the remote. It was now time to configure the PC to work with my setup. At first, this is pretty simple: the Exentia correctly detected that the composite input was to be used and that there was no aerial connected to the analogue tuner.

So far so good, but now it was time for the altogether more challenging task of getting Media Center to work with a set-top box. The wizard tried to detect my set-top box by getting me to point the NTL remote at the PC and press keys when prompted. As hard as I tried it refused to work and, in failing, stopped its own remote from working.

Giving up on the automatic option I manually selected my box (a Pace model) from the provided list. After a bit of trial and error I chose the correct IR profile, but the job wasn't over yet, as the transmit speed has to be set. In my case, the set-top box wouldn't respond to anything other than slow, which made changing channels quite tedious.

Finally, the TV guide was updated over my broadband connection, although it's capable of using dial-up too. This process is very slick and, as guide updates are free, much better than on rival products.

With everything in place, it was time to get it hooked up to a TV, which proved more than a little difficult. With the S-video out connected to an AV amplifier, getting a picture on screen was achieved by simply extending the Windows desktop onto the TV using Windows' Display Properties.

I could even make the TV the primary display, where the Media Center front end was very easy to read and use. However,

For best results, Media Center needs to be connected to a TV

TV under control

If you like the sound of a Media Center, but don't want to go through the expense just yet, there are alternatives that offer some of the facilities or functionality.

The most obvious is to add a TV tuner card into your PC, or use one of the Freeview set-top boxes that will plug either into your TV or via USB into your computer (such as the Hauppauge DEC 2000-t). You'll then have your all photos, music and TV on one machine.

If all you want is the ability to record and control TV more intelligently, then Sky Plus (or Tivo, although this is harder to buy now – see our Hands on Hardware column this month, page 174), could be the answer.

The Sky Plus box costs £199 and no longer comes with an additional fee, provided you subscribe to two premium channels. It is incredibly simple to use – a lot of software manufacturers could learn from the interface's ease of use – and will record about 20 hours of programmes on its 40GB hard disk.

But its best features are its ability to pause live TV, rewind up to one hour of live TV, depending on your settings; and the fact that it can record two programmes simultaneously. While recording two programmes you can't watch another Sky channel, but you can watch terrestrial TV or a previously recorded programme. You can also quickly set up a series link so it will automatically record future episodes.

Our Sky system crashed twice in the first few days of use, but otherwise it worked without a hitch. Sky believes a 40GB hard disk provides plenty of recording space, but we found it did begin to fill up quite quickly. Also – obviously – it only works if you subscribe to Sky.

Upgrades are due in the coming months, including the ability to record the interactive feeds and to remotely record programmes via a text message sent to Sky.

If you want to control how you watch TV, Sky Plus is definitely worth considering, especially if you are an existing subscriber.

there was the problem of the Exentia's own display. Disabling it in the display properties left the TV as the sole display. However, it also killed the Media Center menu. The mouse cursor would appear on an otherwise blank screen, but I couldn't do anything else. In the end, I had to resort to setting the Windows background to black and dropping the brightness and contrast on the Media Center to give the impression that it was turned off.

Finally, I ran into a little trouble with the sound. Running an optical cable into the AV amplifier doesn't disable the internal speakers, while turning the volume down affects all outputs. The only answer is to plug a mini-jack into the headphone socket.

Despite these niggly little problems, the Exentia was now ready to run. I started off using it for TV where, for the most part, it's very good. Media Center buffers a rolling 30 minutes of each TV station, which means you can rewind and pause live television. It's perfect for those times when the doorbell goes or something starts to bubble over in the kitchen. I got quite used to having this ability.

'I got used to having a Media Center in the house – it meant I never had to miss a favourite TV programme'

The slideshow option is impressive

The TV guide is equally good and, as it's stored locally, is incredibly fast to browse. TV shows can be recorded on a one-off basis, all episodes or just new episodes. There's no need to forget to record a TV show, and Media Center even takes care of changing channels on set-top boxes or through its own tuner.

But it's not perfect. I found that at times the NTL box wouldn't let Media Center change its channel. The only solution is to disconnect the power for a few seconds and power it up again. I blame the firmware on the set-top box for this flaw, as it's notoriously flaky and prone to crashing.

However, the way that channels are changed is not the fault of the box. It's very slow to switch between channels

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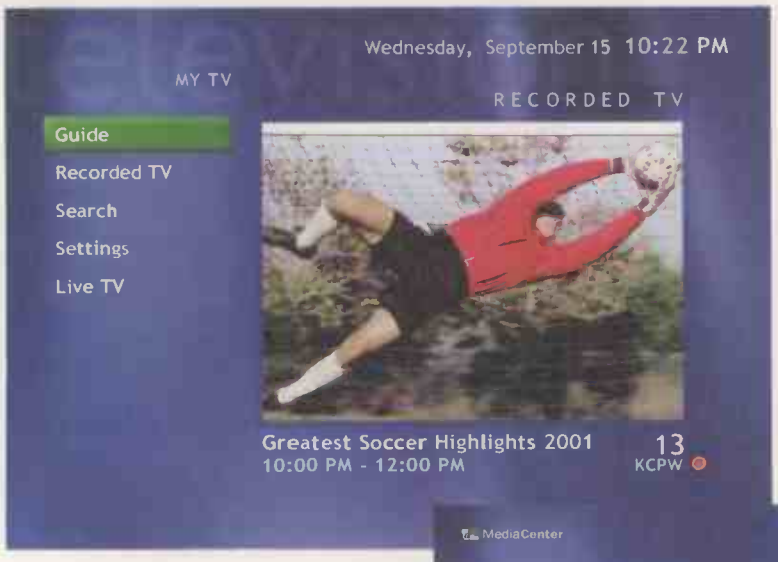


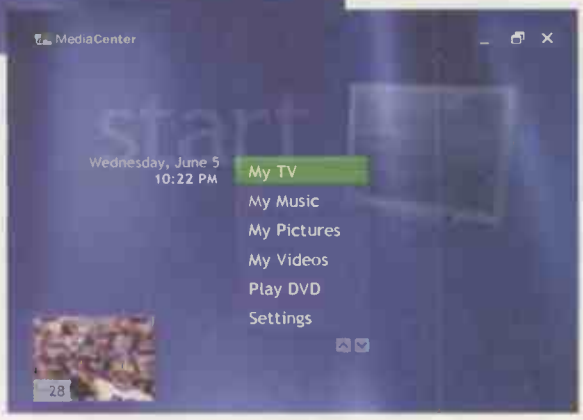
Pausing live TV and using the guide to record shows works really well

thanks to the IR transmitter being set to the slow speed. It's also annoying that the order of cable or Sky channels can't be rearranged to create a list of favourites, although this ability is there for channels received through the TV card. I also learned – the hard way – to keep well away from the NTL remote, as pressing the mute button might seem like a good idea, but it cuts all sound from your recordings.

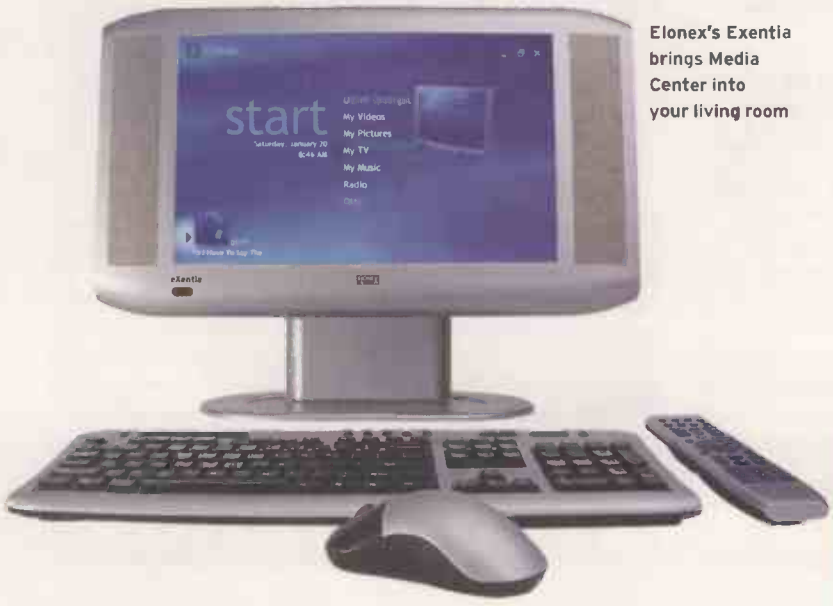
Music

Media Center isn't just about recording TV, though. It's also there for digital music, pictures and videos. Taking music first, the interface is just as easy to use as the other parts of the software.

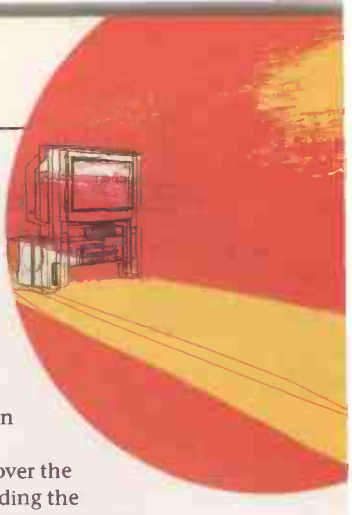
Music can be browsed by artist, genre, album or track. The interface downloads album art automatically, which makes it visually easy to locate the music you want. It's also very easy to copy a CD using a simple menu option, although it uses wma not mp3.



The menu system is easy to use for any user



Elonex's Exentia brings Media Center into your living room



Getting your own mp3s on to the PC is a little harder. There's no option to copy files from memory stick or CD and I had to return to Windows and use the Media Library in Windows Media Player.

While I could copy files over the network, there was no avoiding the Windows interface, as the Library has to be populated from that PC. Playlists also have to be created through Media Player. The Remote Desktop can be used, but this feels like a step too far.

Pictures and video

Unfortunately, the same process applies to video files. It's slightly easier with digital pictures, as directories containing images just need to be copied into the My Pictures folder. Once there, using Media Center's slideshow option is brilliant. The panning and transition effects are really good and make an otherwise dull slideshow a lot more interesting. Naturally, music can be played at the same time.

DVDs can be played as normal, although there are some limitations. First, the Media Center vendor has to bundle the system with DVD Playback software, otherwise there's no codec for playback.

Second, UK PCs will be locked to Region 2 DVDs. Getting a crack for them can be a little trickier than standalone players, as the DVD drive will need a firmware update. You need to make sure you get the exact firmware for the drive to avoid damaging it beyond repair.

The verdict

I got used to having a Media Center in the house – it meant I never had to miss a favourite TV programme, thanks to the easy recording settings. It helps that the electronic programme guide is so easy to use and free. The interface is incredibly simple to use and, whatever you think of Microsoft, credit has to be given. In particular, the picture slideshow option is excellent.

Media Center is not perfect though. First, there should be no need to return to the Windows interface, which is very difficult to read on a TV. While this can be put up with, the price of Media Center systems remains an issue. Essentially, a Media Center is a high-spec PC with a price tag to match. You have to expect to pay around £1,000, which is a lot of money to part with. If it was more like an appliance with only the Windows front end and a price tag in the region of £500, it would be excellent. As it stands, it's a good system, but one for people with cash to burn. As an alternative, come back next month when we'll look at how to build your own media centre.

Elonex contacts

Product: Elonex Exentia
Price: £1,779 (£1,514.04 ex VAT)
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www.elonex.co.uk

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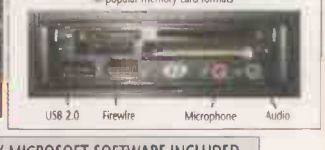

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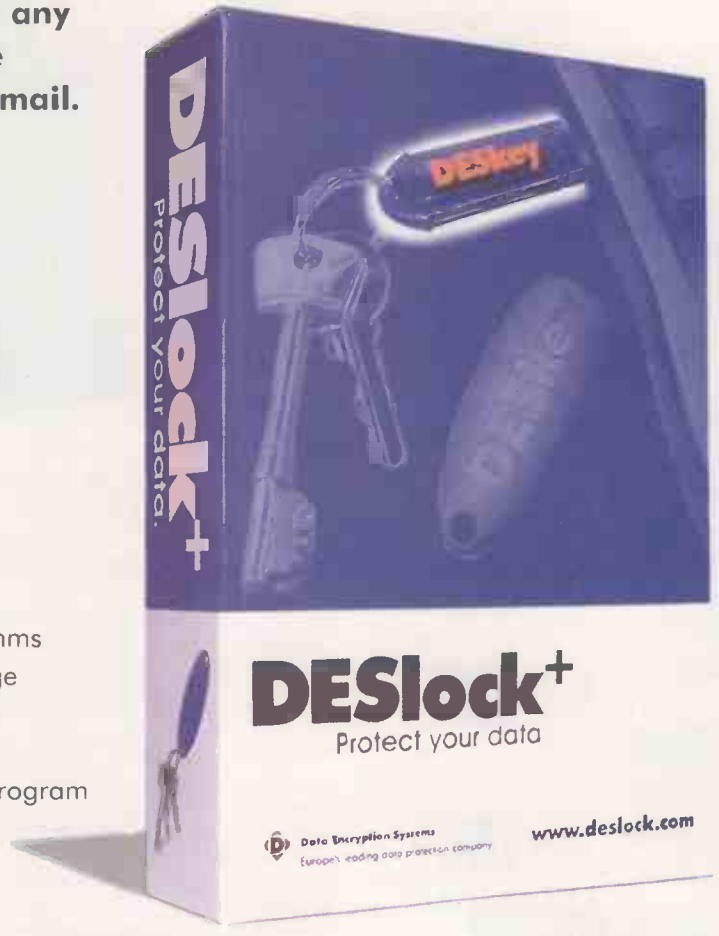

FEATURES

- AES, Triple DES and Blowfish Encryption Algorithms
- RSA Algorithm in DESkey Token for key exchange
- Storage for up to 64 encryption keys per Token
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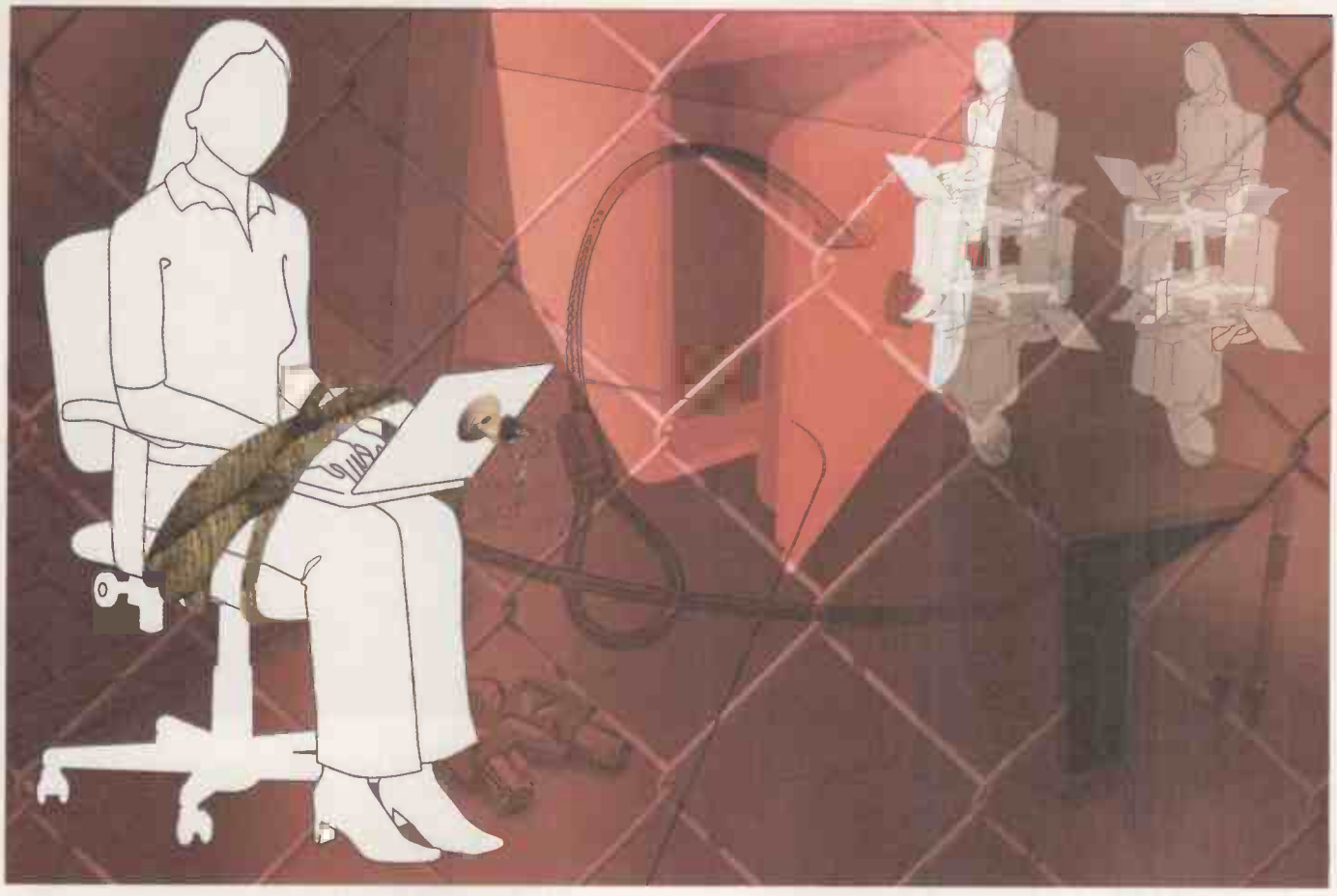

WORDS: KELVYN TAYLOR & RICHARD HUNT

Protect your notebook

Sensitive data on your notebook PC is vulnerable to theft. We investigate some of the security measures you can take to help protect yourself

Notebooks are popular targets for thieves, and if your notebook is stolen then you can usually say goodbye to not only your hardware, but also your important confidential data. Because of this, notebook manufacturers and a range of accessory companies offer various add-on security devices to improve protection (see the table on page 109).

Some of these are meant to stop the notebook being stolen in the first place, whereas others attempt to protect the stored information from prying eyes if the worst comes to the worst and your notebook falls into the wrong hands.

If all you're concerned with is protecting your expensive hardware, then you ought to look carefully at possible preventative measures. Apart from the well-known Kensington Security Locks, there are alarm systems and movement sensors. However, your notebook is only really protected if the data stored on it is secured using encryption software. This means that the best security involves a combination of hardware and software protection. You can't rely on any of the systems described here to ensure complete security on their own. The free built-in mechanisms you'll find on many systems, such as a Bios password or operating system logons, are the least secure options, designed mainly to deter casual prying.

Prevention: make theft impossible

The simplest hardware protection is a lock with which you can secure the notebook to something solid, such as a wall hook or immovable table leg. This will at least reduce the risk of theft while you're in an Internet cafe, an insecure office or on a train. A requirement if you are going to use a lock like this is a reinforced slot (Kensington Lock Slot) on the device's chassis, something which is built-in on most modern notebooks. A Kensington Lock Slot-compatible lock (for examples see **http://uk.kensingtoneurope.com**) can be inserted and secured with an attached steel cable.

Potential thieves will need a bolt cutter to steal the notebook. The disadvantage of this security method is that you need something to fix the cable to, and of course you need to always take the lock with you.

A movement sensor is more flexible. This type of theft prevention device, such as the Targus Defcon 1 (**www.targus.co.uk**, €50 – approx £34) is also secured to the Kensington Lock Slot using a steel cable and you activate it when you're leaving the notebook unattended. If a thief gets near to the machine or tries to cut the cable, the movement sensor sounds a loud alarm. Movement sensors are only useful if you're not far from the machine and can get back quickly, plus you need to be able to shut off the alarm by remote control if it's a false alarm.

More complex notebook alarm systems, such as Caveo's Anti-Theft-System (**www.caveo.com**, €100 – approx £68), work in a similar but more intelligent way. The system has a PC Card with a movement sensor. If the alarm is turned on and a thief moves the notebook further from its position than the radius you've specified, a loud alarm is triggered and the card blocks access to the operating system. You have to enter a security code to regain access to the system.

Encryption standards

- The ancestor of all modern encryption techniques is DES (Data Encryption Standard). DES was developed in 1977 by IBM and was regarded for a long time as secure. The algorithm uses one 56bit key for each 64bits of data to be encrypted. In 1997, however, a DES-encrypted message was cracked, albeit with great effort. As a result of this, since 2001 the US Government has used its successor, AES (see below). More secure than normal DES is triple DES, which encrypts the data three times, using a different key each time.

- The Blowfish coding algorithm is also widely used. This works with keys between 32 and 448bits. Blowfish was developed as a replacement for DES and optimised for speed; it is about 20 times faster than DES. Even faster is the same developer's Twofish algorithm which uses 128 and 256bit keys and is at least 10 per cent faster than AES.

- Advanced Encryption Standard (AES, also known as the Rijndael algorithm) is regarded as particularly secure. In 1997 a US Government department called on experts worldwide to make suggestions for a new encoding algorithm with a minimum of 128bit keys. The US experts' choice was the Rijndael algorithm by two Belgian cryptography specialists, and since then this has been used in the AES. AES uses keys of up to 256bit length. Increasing the key length also increases the time taken for encryption: encryption speed using a 256bit key is about 40 per cent slower than a 128bit key.

Basic security for free

The data stored on a notebook can be more valuable than the actual hardware, so that needs to be guarded as well. Depending on your operating system you use, certain minimal levels of built-in protection are available. For example, Windows NT4, 2000 and XP, Linux and Mac OSX have a difficult-to-bypass user password. Without knowing this password, you can't get into the system. Windows 95, 98 and ME don't have this basic level of security. In any case, all a thief has to do is remove the hard disk and install it in another PC as a secondary drive and the drive can then be read without a password. Any unencrypted data is then completely open.

Another basic protection technique is to use a boot password requiring authentication at Bios level. The system will only start after the correct password has been entered. This function is usually activated in the notebook's Bios by an option called something like Set Power-On Password (the exact name varies according to the Bios version). Many Bioses also allow you to add an extra password to prevent access to the Bios setup menu. This free feature, however, only gives a minimal level of protection; for one thing, the password can be read easily by someone with physical access to a logged-on system using fairly simple Windows utilities. More worrying, Bios passwords on some notebooks can be rendered useless by removing the onboard CMOS battery for a short time, thus resetting the Bios to its factory defaults. And it doesn't prevent someone reading the hard disk after installing it in a desktop PC.

Notebook on a wire: you can protect almost any modern notebook from theft using a Kensington Lock

Data encryption

The most system and Bios passwords will do to determined thieves is hold them up for a while. A better idea is to use encryption tools, such as Safeguard from Utimaco (**www.utimaco.com**, £39.97) (see table 1 for more examples). These programs encrypt files, folders or whole partitions and only let you access the data after entering a password. If the drive is removed and mounted in another PC, the thief will only see unusable rubbish. These programs are particularly easy to use if, like Safeguard or Safe 6 from Steganos (**www.steganos.com**), the files are encrypted in real time without user intervention. This means that you won't forget to encrypt your work. In addition, you won't have to wait ages until the data is encoded. However, even using realtime encryption products, the complete first-time encryption of a hard disk can take several hours.

All the commercial encryption programs make use of the encoding processes described below. All these processes, even the somewhat elderly DES, offer sufficient protection against attacks. Theoretically, methods for cracking these encryption processes exist, but in practice they are not really relevant as thousands of PCs would be needed to crack a single key.

TABLE 1 – ENCRYPTION SOFTWARE

MANUFACTURER	ASHAMPOO	CYPROTECT	JETICO	PC DYNAMICS	PGP	SECURSTAR	STEGANOS	UTIMACO
PRODUCT	PRIVACY PROTECTOR PLUS	DISK ENCRYPTION PERSONAL	BESTCRYPT	SAFE HOUSE	PERSONAL DESKTOP	DRIVECRYPT	SAFE 6	SAFEGUARD PRIVATECRYPTO PERSONAL
Guide price	$19.99 (£11.20)	€87 (£58.10)	€85 (£56.75)	$34.99 (£19.60)	£28	$59.95 (£33.50)	£15.99	£39.97
URL	www.ashampoo.com	http://english.cyprotect.com	www.jetico.com	www.pcdynamics.com	www.pgp.com	www.securstar.com	www.steganos.com	www.utimaco.com
Security dongle?	✗	✗	✗	✗	✗	USB	✗	✗

No entry for data spies: hard disk encryption programs protect your valuable data even if the notebook is stolen

USB fingerprint scanners enable notebooks without built-in scanners to use fingerprint authentication

Passwords outdated

The software mentioned above, such as Safeguard, only gives access to the data after entering a password. Some programs use both a password and special USB tokens; one of these is Drivecrypt from Securstar (www.securstar.com). Externally these devices resemble the widely-used USB memory sticks and store your personal software encryption key. The encryption software only releases the data if the correct USB token has been inserted. This means that password cracking becomes impossible. If you remove the stick, the system is locked automatically and the data in encrypted directories becomes unreadable. The main drawback of such authentication methods is that if both notebook and USB stick are stolen, the route to the data is open.

Despite the alternative technologies available, passwords are still very widely used, so here are a few tips on secure passwords. We recommend that passwords have at least eight characters including a symbol such as $, %, ! or ?. You can use a long word or phrase and change some of the characters for symbols, for example Personal Computer World becomes Pe350n/| 9om9ute> =r|c. To further improve security it is a good idea to use different passwords for different logins, such as Windows itself, web mail and so on. Finally, you should change your passwords regularly.

Fingerprint authentication

A fingerprint reader is a sensible alternative to logging on using a relatively insecure password. Some notebook manufacturers, such as Fujitsu Siemens and Samsung incorporate fingerprint scanners in their notebooks, making logging on using a password superfluous. For example, on the Fujitsu Siemens Celsius Mobile H you can protect access to the Bios using a fingerprint. HP and IBM offer fingerprint readers as an optional extra (PC Card or external USB module) for their notebooks. Then there are third-party devices, such as the Sitecom (www.sitecom.com) PC-011 PC Card (€250 – £167). However, these solutions are only available for Windows, and can't be integrated with the Bios.

The drawback of fingerprint readers is that they're easy to trick. Scanner models which only register the pattern of the fingertip loops and not their depth or the finger temperature are particularly easy to fool. A simple copy of the fingerprint will mislead these models. However, if you've got cold fingers or a small cut on the fingertip, the scanner could have difficulty recognising you and lock you – the authorised user – out as well.

Factory fitted: Some notebook manufacturers incorporate a fingerprint scanner as standard

Apart from fingerprint readers and USB dongles, there is a wide range of hardware products which either block or allow access to notebooks. Manufacturers such as Acer and Dell build a smartcard reader into some of their models. If you've inserted the card, you can log in and access your encrypted data. The smartcard's big advantage is that it is credit card-sized and easily transported. PC Cards, such as those offered by Cryptcard from Ce-Infosys (www.ce-infosys.com.sg), can be used as a hardware key. These cards encrypt the hard disk to protect the system at boot-up, only allowing booting if the card is inserted. While you're working, data encryption on the hard disk is carried out in real time.

Top of the class: IBM

IBM Thinkpads deserve a special mention when it comes to notebook security. They can be fitted with encryption chips as part of IBM's Embedded Security Subsystem. The system consists of a chip integrated on the motherboard and a piece of Windows software. The software enables hard disk encryption, a password manager and support for secure 802.1x Wlans. What's special is the close interlocking of the software and the encryption processor. Because the data streams to and from the chip are secure, it's not possible to intercept the passwords stored on the chip. Thinkpads with these features enabled are well protected against data theft straight from the box.

TABLE 2 – SECURITY PRODUCTS

MOTION SENSORS

MANUFACTURER	PRODUCT	PRODUCT INFO	LOCK TYPE	APPROX. PRICE
Kensington	Sonic Lock	http://uk.kensingtoneurope.com	Combination lock	£18 ex VAT
Targus	Defcon 1 ultra	www.targus.co.uk	Combination lock	£34.25 ex VAT

ALARM SYSTEMS

MANUFACTURER	PRODUCT	PRODUCT INFO	APPROX. PRICE	
4-Laptop-Security	IT-Woofa	www.4-laptop-security.com	$99 (£55.50 ex VAT)	
APC	Kryptonite Sensor Alarm Lock	www.apc.com	£35 ex VAT	
Caveo	Anti-Theft-Card	www.caveo.com	$99 (£55.50 ex VAT)	
Trackit	Portable Anti-Theft-System	www.trackitcorp.com	$59.95 (£33.60 ex VAT)	

USB SECURITY DONGLES

MANUFACTURER	PRODUCT	PRODUCT INFO	APPROX. PRICE	
Marx	Crypto Box USB	www.marx.com	€34.98 (£23.40	

FINGERPRINT READERS

MANUFACTURER	PRODUCT	PRODUCT INFO	INTERFACE	APPROX. PRICE
Precise	Biometric 100A	www.scmegastore.com	USB	$139 (£78 ex VAT)
Precise	Biometric 100MC	www.scmegastore.com	USB + Smartcard	$199 (£112.55 ex VAT)
Targus	Defcon PA460E	www.targus.co.uk	USB	£93.75 ex VAT
Siemens	ID Mouse	www.tekdata.co.uk	USB	£36 ex VAT

SMARTCARDS

MANUFACTURER	PRODUCT	PRODUCT INFO	TYPE	APPROX. PRICE
Logico	Logico Secure Smartcard Suite	www.logico.com	Smartcard	POA

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Wireless wonders

WORDS: WILL STAPLEY TESTING: VNU LABS PHOTOS: BRUCE MACKIE

The widespread adoption of Wifi means it's easier than ever to get connected while you're on the move. We look at eight budget wireless notebooks to see what you can get for your money

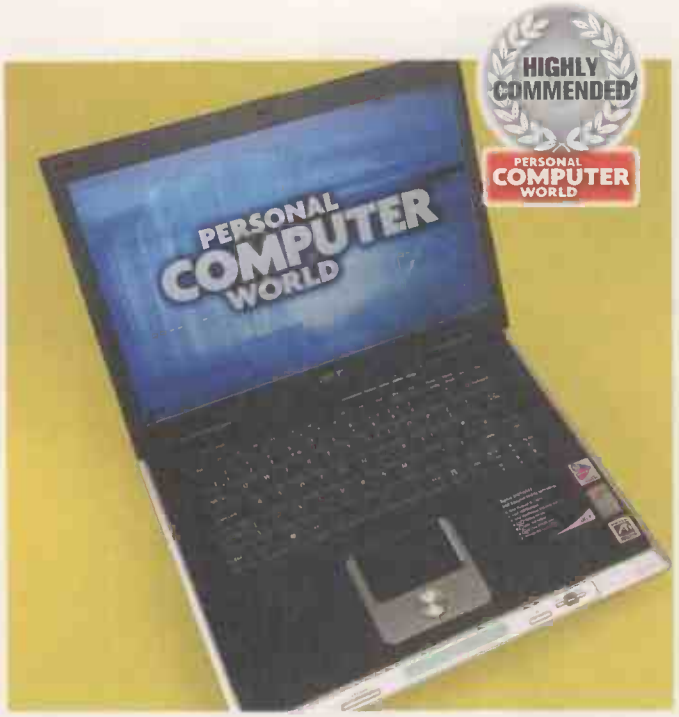
With Wifi hotspots springing up in coffee shops and hotels across the country, so buying a notebook that comes with integrated wireless connectivity is becoming more attractive.

Whereas Centrino notebooks used to be restricted to the slower, but more widely used 11Mbit 802.11b standard, Intel has now updated it so that Centrino models are able to take advantage of the faster 54Mbit 802.11g.

In order to see what's currently available on the market, we asked eight manufacturers to submit a notebook that meets two criteria. First, that it features some form of wireless connectivity and second, that it is priced at no more than £999 including VAT.

Each notebook has been put through our usual rigorous benchmarks, and the battery life has been determined so you'll know for how long you can stray away from the mains. We also asked Apple to submit an Ibook, although we obviously couldn't run it through the same benchmarks as the PCs.

Once you've selected and bought the right notebook, it's also worth considering whether you want peripherals and what type you will need. Throughout this group test you'll find a selection that will help you get the most out of your new notebook.



Acer Aspire 2001

Acer's Aspire 2001 really stands out from the crowd, thanks to its neat silver and black finish

One push of the special Arcade button launches the Aspire 2001 into a Media Center-style application that allows you to watch videos and listen to music without having to boot Windows first.

An Intel Pentium M processor clocked at 1.4GHz sits at the heart of this Centrino notebook, which is backed up with a single 512MB module of Ram.

As you'll see from the benchmark graphs, the ATI Mobility Radeon 9200 housed within the Aspire 2001 can't compete with the 9600 Series – it didn't return bad results, but when compared with the 9600 series it looks a little tired. If you're not planning on playing the latest games, this really isn't a problem. Meanwhile, we weren't surprised to see a 40GB hard drive and CD-RW/DVD-Rom drive since they're pretty much standard for this price point.

Along with supporting the 802.11b wireless standard, the Aspire 2001 is one of only two notebooks in this group test to also provide both Bluetooth and infra-red support.

The 15.5in screen performs well and has a native resolution of 1,200 x 800 and, like most of the others, the Aspire 2001 features a built-in card reader, although it does not cater for Compact Flash and XD memory cards.

In terms of battery life, this notebook from Acer was the best in the group at just five minutes short of four hours, making it a good choice for mobile workers.

With average, but by no means stunning, results in our range of benchmarks, the Acer Aspire 2001 probably won't appeal to those who are after performance. However, features such as the impressive Arcade mode will help put this notebook on more than a few shopping lists.

DETAILS

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Acer 0870 900 2237
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CONS Performance is not the best around
VERDICT
If you're after performance look elsewhere, but the Aspire 2001 does have some neat tricks up its sleeve

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

AJP D410U

Housed in a smart silver casing, AJP's D410U features a 2.8GHz Pentium 4 Hyperthreading (HT) instead of Intel's mobile version.

A small switch on the front of the notebook allows you to turn the wireless mode on and off, while three more shortcut buttons are to be found just above the keyboard. In an effort to appeal to owners of just about every digital camera owner, AJP has included a six-in-one card reader. The only major card not supported is the XD picturecard.

Two 256MB PC2700 modules combine to provide the Pentium 4 with 512MB of Ram, while the 40GB hard drive supplies adequate storage space. AJP has used an ATI Mobility Radeon 9600 to take care of the graphics and, as you'll see by the score of just less than 3,000 in the 3Dmark 2003, it managed to beat the rest by some way. This impressive score is mainly thanks to the 128MB of Ram devoted to the graphics card.

The 802.11b standard is the Wifi flavour of choice for the D410U, but Bluetooth fans will be disappointed to hear that built-in support for this short-range wireless standard isn't provided – indeed only two models in this group test provide Bluetooth support.

AJP has included a webcam built into the notebook's casing along with a CD-RW combo drive. The powerful desktop Pentium 4 processor is quite a drain on battery power, and the D410U was only able to last for little more than an hour before shutting itself down.

At 4.45kg, AJP's D410U is at the heavy end of this group and, if you're after true portability you might want to look for a lighter model. However, if ultra-portability and long battery life aren't essential, the D410U offers both great performance and impressive features. When compared against the others in this group test, it comes off very favourably, and would make it a good desktop replacement.

DETAILS

RRP £999 (£850.21 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
AJP 020 8208 9755
www.ajp.co.uk
PROS Good performance and features
CONS Battery life; heavy
VERDICT
Battery life takes quite a beating thanks to the desktop Pentium 4, but you're rewarded with excellent performance

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

Evesham Voyager XT

The Voyager XT is labelled as a Centrino notebook and supports the new 802.11g wireless standard.

Until recently, all Centrinos were restricted to the slower 802.11b standard. However, Intel has now boosted its Centrino specifications and only Evesham and Rock were able to submit notebooks that took advantage of the faster Wifi standard within a Centrino environment.

Oddly, the Voyager XT doesn't come with any Evesham branding. The design is a bit plain, while shortcut buttons are limited to an email and Internet button.

The driving force behind the Voyager XT is a 1.4GHz Pentium M processor and 256MB of Ram. Video performance is given a boost thanks to the inclusion of a Radeon 9600 Series graphics card, which has 64MB of Ram devoted to it.

A 40GB Toshiba hard disk provides adequate storage space, while CD-RW and DVD-Rom functionality is on offer thanks to the Slimtype combo drive.

Battery life was respectable, but it was the only Centrino to just miss out on reaching the three-hour mark, lasting two hours and 53 minutes in our battery test. In terms of performance, the Voyager XT doesn't disappoint in the graphics benchmarks. The Radeon 9600 Series returned some decent scores in the 3Dmark 2001 and 2003 benchmarks. The other results were a little less exciting, and in the Sysmark 2004 test the Voyager XT only just managed to avoid getting the worst score.

Evesham has supplied a reasonable notebook in the Voyager XT, and the fact that it's a Centrino and supports the 802.11g standard helps make it a great deal. If the benchmark scores don't bother you too much, then it's certainly a model to keep in mind when it comes to deciding where to spend your cash.

DETAILS

RRP £999 (£850.21 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Evesham 0870 160 9500
www.evesham.com
PROS Good graphics
CONS Overall performance is only average
VERDICT
A solid overall effort, but the varying benchmark scores might concern those who want more performance

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

Wireless choices

As you'll see, all of the entries in this group test have either the 802.11b or 802.11g wireless standard.

Since 802.11g is faster than 802.11b – and backwards compatible with them – it's the obvious choice to go for. However, should a notebook with only the 802.11b wireless standard be considered a bad choice?

The fact is that if you're simply going to be using it to browse the web, the 11Mbits/sec speed of 802.11b will be more than adequate. On the other hand, when it comes to transferring large files you might be glad of the extra speed 802.11g has to offer.

It's also important to realise that although 802.11g boasts 54Mbits/sec, you'll never never get that sort of performance from your wireless network. In reality, you'll probably experience speeds of around 20Mbits/sec or 4.5Mbits/sec if using an 802.11b network. What's more, if you're using an 802.11g device to connect to an 802.11b network, you'll find that it has to obey the speeds of the slower 802.11b standard.

The lesser-used 802.11a wireless standard has a rather limited market, mainly due to the fact that it's not compatible with 802.11b or 802.11g equipment, although some dual-mode devices are compatible with all three standards.

In its favour, the operating frequency of 5GHz is far less congested than the 2.4GHz of the other two frequencies. This means it can co-exist with 802.11b/g networks and also won't be affected by other nearby equipment using the 2.4GHz frequency.

STANDARD	802.11A	802.11B	802.11G
Theoretical maximum speed	54Mbits/sec	11Mbits/sec	54Mbits/sec
Approximate average speed	20Mbits/sec	4.5Mbits/sec	20Mbits/sec
Frequency	5GHz	2.4GHz	2.4GHz
Theoretical range outdoors at top speed	30m	120m	50m
Theoretical range indoors at top speed	12m	60m	20m
Compatibility	802.11a	802.11b	802.11g, 802.11b
Users per access point	64	32	32
Pros	Not affected by 2.4GHz devices, so can sit alongside 802.11b/g networks	Widely used; cheaper than 802.11g; short range, so you can have many access points in a small area	Five times faster than 802.11b; backward compatible with all 802.11b networks
Cons	Not compatible with 802.11b/g unless using a dual-mode device; not widely used in the UK	Much slower than 802.11g – if you're transferring large files you'll notice the difference	More expensive than 802.11b; longer range, so may interfere with other 2.4GHz equipment

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- Built in Video Camera
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- Built in Bluetooth Support & Built in Wireless antenna*1
- 329(W)x275(D)x36mm (H) / Weight: 3.3Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3D Sound & Speakers with 5.1 channel output, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Windows XP Home with CD & Manual, External USB FDD (Optional), Wireless LAN module (Optional)*1, Bluetooth module (Optional)*1, External USB TV Tuner (Optional)

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- 354(W)x250(D)x25-32mm (H) / Weight: 3.0Kg
- Carry Case, 36 months RTB Warranty***

Other Features: 1x PC Card Slot, Smart Li-Ion Battery**, Windows XP Home with CD & Manual, (Optional) External USB FDD

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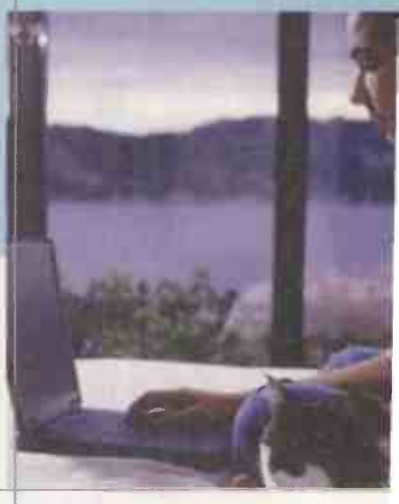

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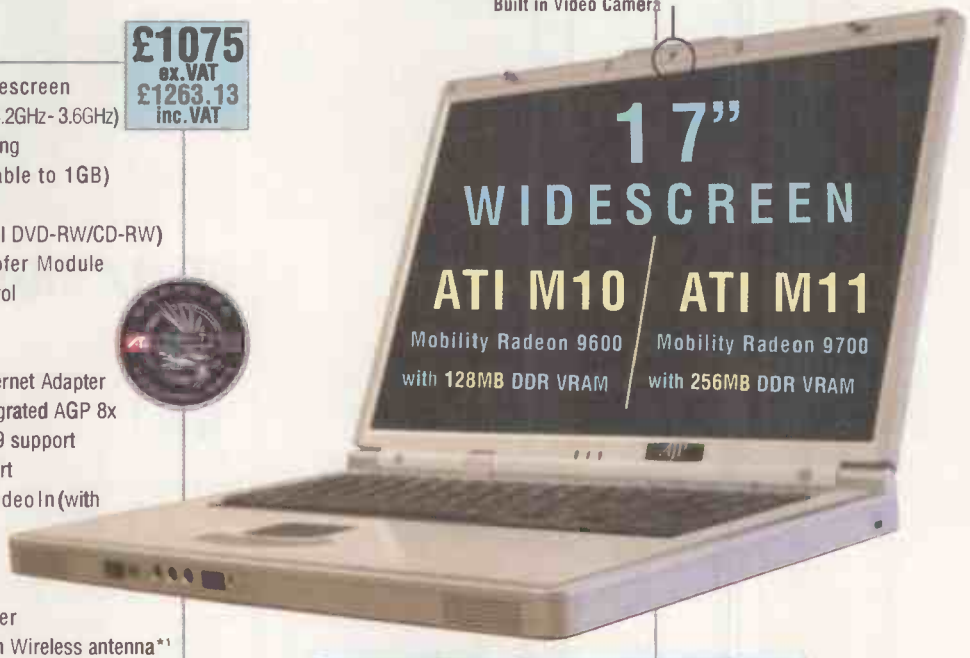
- Built in 10/100/1000-Giga LAN Ethernet Adapter
- ATI Mobility Radeon M10 with Integrated AGP 8x
- 128MB DDR Video RAM & DirectX 9 support
- IEEE 1394 Firewire 400Mbps port
- Ports: 2xUSB 2.0, IrDA, TV-Out, Video In (with TV Tuner only), Parallel, Serial, Monitor, PS/2, S/P DIF output
- Built in Video Camera
- Built in 6-in-1 Smart Card Reader
- Built in Bluetooth Support & Built in Wireless antenna*1
- Full Size Keyboard & Separate Numeric Keypad
- 393(W)x275(D)x37.5mm (H) / Weight: 3.8Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built In 3D Sound with virtual 6 channel output, 1x PC Card Slot, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Windows XP Home with CD & Manual, External USB FDD (Optional), Wireless LAN module (Optional)**, Bluetooth module (Optional)*1

Built in Video Camera



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- 1997 - The Special Achievement Award for Business, PC Direct

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*2 - Buy Now Pay Later typical example based on £1,000 purchase price. 5% deposit required at point of purchase (£50) then pay nothing for 11 months. On the 12th month choose to settle the balance in full of £950 (no interest) or start a 36 month repayment plan (interest calculated from date of ordering) of £56.71, total amount payable £2041.56 29.8% APR. Finance is subject to status. Terms & Conditions apply. Written quotations available on request. Applicants must be over 18, under 75 and in full time employment. Fee may apply.

Hi-Grade C7000

Hi-Grade's two-tone dark grey and silver casing isn't perhaps the most exciting design, but thanks to the CD function keys just above the keyboard, you can use it to play audio CDs without having to first boot up Windows. A collection of five more shortcut keys sit along the left side of the keyboard.

The C7000 is one of four notebooks in this group test to feature an Intel Pentium M processor. However, the difference between Hi-Grade's and the rest is that it's the 1.5GHz model, not the 1.4GHz version. Hi-Grade has also managed to squeeze in a 512MB PC2700 Ram module.

Wireless options consist of the 802.11b standard and an infra-red solution. Unfortunately, owners of Bluetooth devices won't find any built-in support with the C7000.

With a decent amount of memory and a good-quality processor, Hi-Grade has made sure that the C7000's graphics performance isn't left by the wayside. One of three notebooks to include an ATI Radeon Mobility 9600 graphics, it managed to return some commendable scores in our benchmarks.

Hi-Grade shipped the C7000 with a standard combo drive that allows you to write CDs and read DVD-Roms. At 36mm deep, the Hi-Grade is the thinnest notebook in this group test, and at 3.25kg it's also one of the lightest, so is good for those on the move. You also get a memory card reader that will accept four popular formats, along with one Firewire and three USB ports.

The benchmark graphs show exactly how well the C7000 did in terms of performance. It slipped up a little against the power-hungry desktop Pentium processor notebooks, but otherwise the C7000 returned top-end scores. Combine this with a good range of features and the Editor's Choice award simply has to go to the C7000.

DETAILS

RRP £998.75 (£850 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Hi-Grade 020 8532 6115
www.higrade.com
PROS Excellent components; great performance
CONS Can't match the desktop processor models in this test
VERDICT
Quality components and good benchmark scores, make the C7000 a worthy winner

FEATURES	★★★★★
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

HP NX 9105

With a particularly robust design and a widescreen display, the NX 9105 looks like it could withstand a few knocks. Its bulky design places it as the largest notebook in this group test and might therefore be of some concern to those interested in ultra-portability.

To HP's credit, ports are clearly labelled on the top as well as the side of the casing, which makes hooking up peripherals easy. Featuring a scroll section, the stylish touchpad also comes with a button allowing you to disable the entire pad, which helps avoid activating the touchpad while typing.

HP has used AMD's Athlon XP-M 3000+ processor with the NX N105, which has an actual clock speed of 1.6GHz. Combined with 512MB of Ram, this processor helped the NX 9105 notch up some decent scores in our benchmarks. It achieved second place for Sysmark 2004, although PCmark 2004 proved to be a slightly tougher test, as it finished middle of the road.

Our graphic-intensive tests weren't quite as kind to the NX 9105, and the Nvidia Geforce4 420 graphics weren't helped by only being given 32MB of Ram to play with. The Athlon processor is also quite a drain on power and the NX 9105 was only able to last for one hour, 48 minutes, so you would really want to use it as a desktop replacement.

HP has done well in the storage department by including a 60GB hard disk. The NX 9105 also sports an LG DVD+RW optical drive, which will come in handy if you need to archive large amounts of data. The NX 9105 comes with the faster 802.11g wireless standard, as well as Bluetooth and infra-red connectivity.

With a good range of features, 512MB of Ram and a speedy processor, this HP has a lot going for it. However, the graphics performance lets it down a little.

DETAILS

RRP £915.32 (£779 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
HP 0845 270 4222
www.hp.co.uk
PROS Good range of features
CONS Poor graphics performance
VERDICT
With a solid design, the robust NX 9105 comes with a DVD writer and fast Athlon processor, but it's let down by its graphics performance

FEATURES	★★★★★
PERFORMANCE	★★★½☆
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

Apple Ibook

Apple prides itself on the design of its products and you simply can't deny that the Ibook is a stylish notebook and would sit very well next to the likes of the Ipod.

Powered by a 933MHz G4 processor alongside 256MB of Ram, you wouldn't immediately think that the Ibook is as powerful as Apple would have you believe. However, you can't compare this to a similar speed of PC processor since the architecture and Mac OSX operating system are so different.

The 14in screen has a fairly low native resolution of 1,024 x 768, and ATI's Mobility Radeon 9200 with 32MB of memory handles the graphics. We tried playing Tony Hawk's Pro Skater 4 and it just about managed to run when using the lowest resolution and detail settings. When the resolution was turned up a notch, the Ibook started to struggle.

Unlike all the PC notebooks in this group test, the Ibook doesn't come with wireless networking as standard. If you want to add wireless connectivity to your Ibook you'll have to purchase an Airport Extreme card for £79, which supports the faster 802.11g standard.

Apple supplies the 14in Ibook with a 40GB hard drive as standard, which is similar to most of the PC notebooks at this price point. You'll also find a CD-RW combo drive that happily reads DVD-Roms as well as reading and writing CDs. Like the popular Imacs, the drive itself doesn't feature a tray so you simply push the CD into the drive manually.

A range of ports and sockets are found on the left side of the Ibook, including two USB and one Firewire socket, along with a modem and network port.

If you've been using PCs for a long time, it might take a little time adjust to the Ibook's way of doing things. In reality it's just a matter of what you're used too and Mac users similarly struggle when it comes to PCs. If you fancy a stylish notebook then the Ibook is a good choice, but be aware that you won't have the same choice of hardware or software as on a PC.

RRP £999 (£850.21 ex VAT)
BEST PRICE www.pcw.co.uk/bestprices
PRODUCT INFORMATION Apple 0800 039 1010 www.apple.com/uk
PROS Ultra-stylish; alternative to PC
CONS No Wifi connectivity as standard; small screen
VERDICT
It's hard to compare an Ibook to a collection of PC notebooks, but if you've got an eye for style and don't mind the OSX operating system, it's certainly worth a test drive

Medion MD41567

After featuring in a standalone review in the June *PCW*, and achieving a decent overall score, we felt it only fair to allow the Medion MD41567 to try its luck against the other models in this group test.

The rather chunky appearance and plastic feel might be of concern to those who have an eye for style.

Like AJP's submission, the MD41567 sports an Intel Pentium 4 Hyperthreading (HT) desktop processor, but it's a slightly faster model being rated at 3GHz. Despite this, it still managed to last for almost two hours on a single battery.

The 512MB of Ram provides ample support for the processor, while the Medion is one of only two notebooks that include a 60GB hard disk.

The Nvidia Geforce FX Go5350 graphics card returned some acceptable scores in our benchmarks, although it never managed to challenge for the top spot, where the ATI Radeon 9600 Series models achieved better scores by some way. In our PCmark 2004 benchmark it was a different story – just as with the AJP notebook, the Pentium 4-powered Medion returned a score that was above the other mobile processors.

The screen is nothing special and features a relatively low native resolution of 1,024 x 768. It looks a little dated when placed next to one of the higher resolution widescreen versions. However, the Medion has a neat little trick up its sleeve in that it features a built-in TV tuner module.

Wireless options include both the 802.11g standard and infra-red, although Bluetooth is left out of the picture. Like HP, the Medion also includes the impressive LG DVD+RW optical drive with the MD41567.

With a fast processor, large hard drive, versatile optical drive and a host of other features, the Medion fares very well against the other entries.

DETAILS

RRP £999 (£850.21 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Medion
www.staples.co.uk
PROS Range of features; fast processor
CONS Graphics performance
VERDICT
A good range of features and the Athlon processor performed well, but it takes a big bite out of battery life

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

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- ☑ S-Video TV-out connections for full screen presentations or DVD playback
- ☑ 56K Modem including telephone cable for standard Internet and Fax.
- ☑ 12 Cell Li-ion long life (normally 2.5 hrs) battery and AC adaptor/charger
- ☑ Ergonomic keyboard, Glide pad and 4 direction scroll.
- ☑ Dimension 332x285x37mm; 3.6Kg

PLUS MICROSOFT® SOFTWARE

- ☑ Microsoft Office 2003 60 day trial. Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Microsoft Outlook*
- ☑ Microsoft Works 7 – Six integrated applications for wordprocessing, spreadsheet, graphics, filing, address book, calendar etc.
- ☑ Microsoft Windows XP Home Edition
- ☑ Cyberlink Power DVD software suite for DVD playback
- ☑ Pinnacle DVD copying suite for easy DVD creation

▷ TOP QUALITY SOFTWARE INCLUDED

(Model N2912)

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Starts	Web	Ends
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†Standard factory direct delivery of £39.99 for all orders. Typical finance example: Cash price £1000 inc VAT and delivery. Pay nil deposit and nothing for 6 months. Then pay just the CASH PRICE (£1000) only if loan fully repaid within 6 months. Finance also available over longer period of 4 years at APR 29.8%. No deposit and no payments for 6 months and then 42 monthly payments of £40.92. Total price £1718.64. Finance is subject to status, Written details on request. Finance only via telephone orders. The 60 day trial version – option to purchase extended version for special price – ask staff for details. 2002 Advanced Micro Devices, Inc. All rights reserved. AMD, AMD Arrow logo, AMD Athlon, AMD PowerNow!, AMD Athlon 64 and relative combination, are trademarks of Advanced Micro Devices, Inc. Prices checked daily. Prices, specifications and offers subject to change, availability and our conditions of sale – copies of which are available from Tiny.com, DCS Ltd, Granville House, Burnley, BB12 7TG. Fax: 01282 77 07 01. Component brands may vary. Licensed credit brokers. E&OE.

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Notebook For £999†

inc VAT

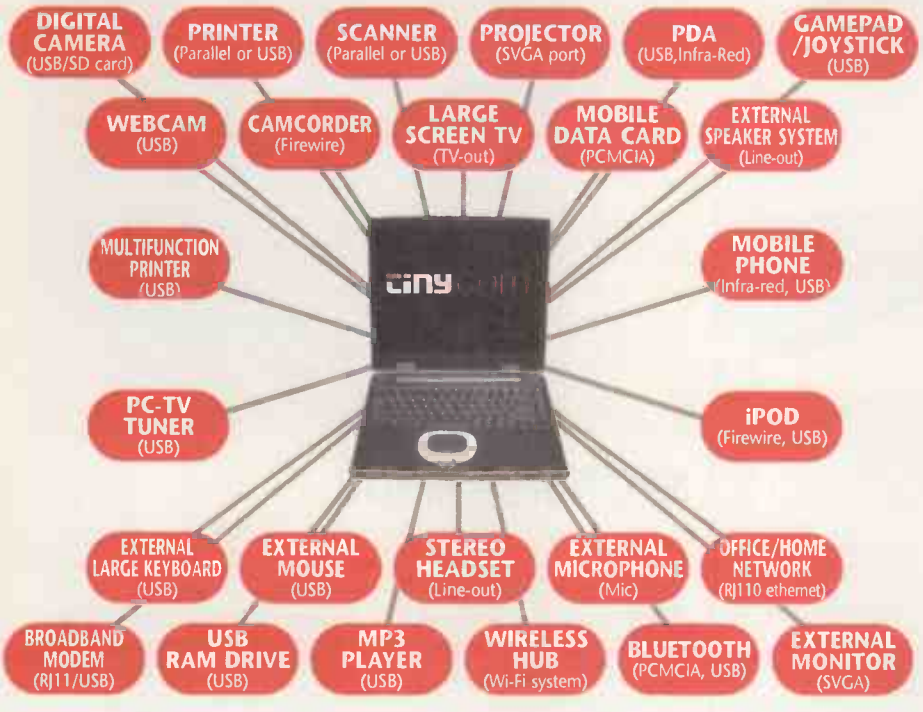
AMD 64 Mobile Athlon

SPECIALS | HOME PCs | POWER PCs | HOME LAPTOPS | BUSINESS PCs | BUSINESS LAPTOPS

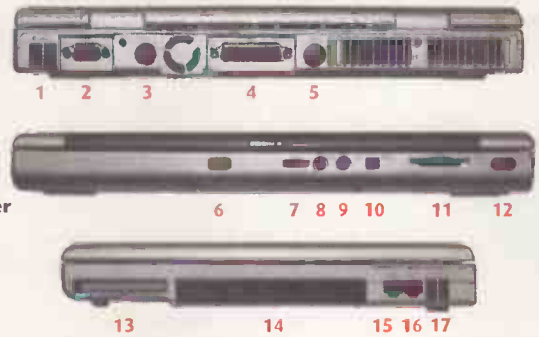
▷ TINY MEDIABOOK SPECIAL

Ultimate Connectivity

This notebook allows you to connect to all these devices (and much more) with ease.



1 USB ports x2
2 VGA output
3 S-Video connector
4 Printer
5 Power supply in
6 Wireless indicator
7 Volume control
8 Line-out
9 Microphone
10 Firewire
11 Multi-format card reader
12 Infrared
13 PCMCIA type II
14 DVD/CD Writer
15 Network/ Broadband
16 Modem
17 USB x2

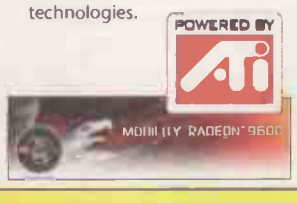


WHY IS THIS THE FASTEST NOTEBOOK WE HAVE SEEN?

The amazing power of this notebook comes from three key factors:

1 True 64-Bit Processor
The AMD Athlon 64 3200+ notebook processor provides more power with 64-bit processing and 1600MHz system bus with HyperTransport technology. Not only does it provide more power now, it is also future-proof – ready for Microsoft's next (64-bit) operating system.

2 Superb ATI Radeon 9600 128MB 8xAGP Graphics
Your games and presentations will leap off the screen thanks to this high performance graphics engine with 128MB dedicated DDR GRAM and full support for DirectX 9.0. Incorporates ATI Smartshader, Smoothvision and Overdrive technologies.



3 Massive 1024MB DDR RAM
Massive amount of high speed memory (2x 512MB SODIMM modules) provide further boost to performance and allows multitasking.

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10 Reasons why this is The Best Notebook Deal in the UK

1. Double Processing Power
AMD Athlon 64 processor is true 64-bit, providing double the bandwidth of 32-bit processors. Future-proof and ready for Microsoft's next (64-bit) operating system. This notebook comes with an Athlon 64 3200+.

2. Double RAM Memory
Twice as much memory (1024MB) as other power notebooks that only offer 512MB.

3. Double Hard Disk Space
Massive 80GB Hard disk provides twice as much storage as other notebooks that normally use 40GB – future proof!

4. Double Graphics Power
128MB dedicated memory and 8x AGP ATI 9600 Radeon Graphics compared with 64MB shared memory graphics in other notebook systems.

5. Ultra Fast DVD-Burner Speed
High speed and multiformat, Panasonic DVD-Burner allows DVD or CD creation/copying with ease and speed.

6. Superb Hi-Res Screen
Ultra Hi Resolution SXGA+ screen with 1400x1050 = 1.47 million pixels. Most other notebooks are just XGA with 1024x768 = 0.79 million pixels. Over 86% higher resolution than other screens!

7. Ultimate Connectivity
As well as multi-format card reader, the system has built-in connectivity for virtually everything – see opposite.

8. Wi-Fi Wireless Built-in
On most other notebooks this is an optional extra. On this model the wireless module and antenna are built-in. The moment you switch on the notebook, it automatically connects to the internet if you are in a Hotspot or near a wireless signal – simply great.

9. Microsoft Office XP 2003
Top quality software including Microsoft Office 2003 60 day trial, Works 7.

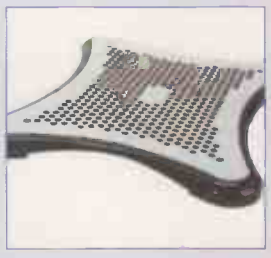
10. Pay Nothing For 6 Months – No Interest
Buy this notebook with a Package or Power package and pay nothing for 6 months. Then pay just the CASH price with no interest charges if fully paid in 6 months!

Accessories

Belkin USB Numeric keypad

Belkin 0080 0223 55460
www.belkin.co.uk
£24.99 (£21.27 ex VAT)
If you're used to using the numeric keypad on your desktop PC's keyboard, this device from Belkin lets you quickly add a numeric keypad to any notebook via a spare USB port.

Antec Notebook Cooler



Special Tech
www.specialtech.co.uk
£29.59 (£25.18 ex VAT)
This cooling device sits underneath your notebook and attaches via a USB cable. Two small fans then divert heat away from the case, reducing the chance of a heat-related crash. Read a full review at www.pcw.co.uk/products/1153737.

Trust USB2 External Hard Disk Case

Trust 0845 609 0036
www.trust.com
£24.99 (£21.27 ex VAT)
Traditionally notebooks come with relatively small hard disks, and installing a new drive can be tricky. This case from Trust lets you attach a 2.5in hard disk via a fast USB2 link direct to your notebook.

Gigabyte Bluetooth dongle

Ebuyer 0870 467 0753
www.ebuyer.com
£20.46 (£17.41 ex VAT)
Not all notebooks come with Bluetooth connectivity, but with a suitable dongle, such as this from Gigabyte, you can add Bluetooth to your notebook without spending a fortune.

Creative Webcam Notebook

Creative uk.europe.creative.com
£39.90 (£33.96 ex VAT)
You can add any webcam to your notebook just as you would your PC, but this version from Creative will attach to the top of your notebook's screen thanks to the spring clip.

Creative Soundblaster Audigy 2 NX

Creative uk.europe.creative.com
£85.02 (£99.90 ex VAT)
For just less than £100 you can add 24bit audio to your notebook via a spare USB port. It supports 2.1 and 5.1 DVD audio and 7.1 Dolby Digital, along with a range of inputs and outputs.

NEC Versa M500

NEC has done a good job designing the Versa M500, and the black and silver finish certainly catches the eye.

Open the notebook and you'll find that shortcut buttons have been omitted – the only button to been seen is the power switch. Four USB2 ports sit on the side of the unit along with a single Firewire socket and a four-in-one memory card reader.

This Centrino model features a 1.4GHz Pentium processor and 256MB of Ram. While we have no major qualms with the processor and memory, the graphics is more of a concern.

NEC has gone with Intel's integrated Extreme Graphics Solution that shares 64MB of system memory, rather than having its own devoted memory, which is no surprise at this price point. While this helps save money, a look at our benchmark results shows that it's not the best choice for anyone who wants to play games.

The 40GB hard drive installed in the Versa M500 is a little faster than the others in this group test. Whereas all the other hard disks spin at 4,200rpm, this Seagate model runs at 5,400rpm, although it's not a huge performance difference.

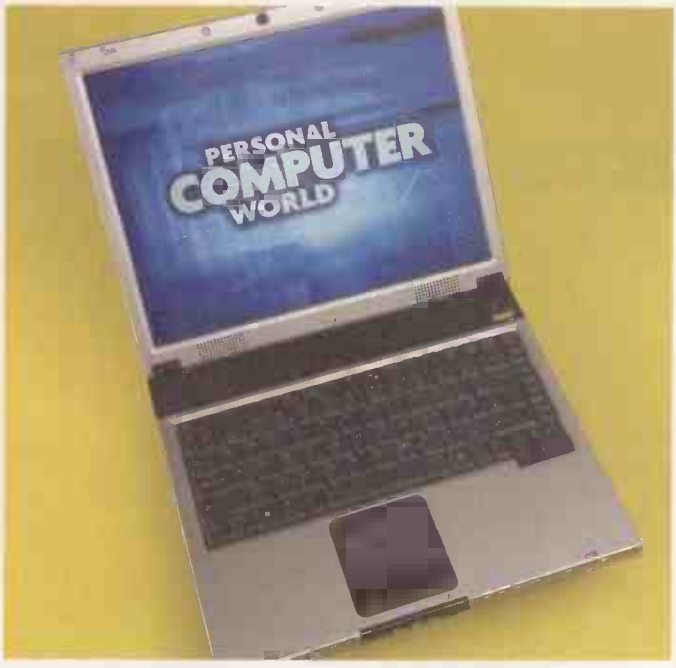
NEC has shipped the Versa M500 with Wifi in the form of the 802.11b standard, but neither Bluetooth nor infra-red is offered as an alternative – only the Rock notebook manages to repeat this feat.

While our performance tests show that the NEC struggled somewhat, there's one final important difference between the Versa M500 and the other notebooks In this group test – and that's the price. At £200 cheaper than most of the others, you can't deny that this is a great budget buy for someone who wants a wireless portable computer. If the performance issues don't bother you, it's well worth a look.

DETAILS

RRP £799 (£680 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
NEC 0870 010 6329
www.nec.co.uk
PROS Cheaper than the rest
CONS Poor performance; integrated graphics
VERDICT
The integrated graphics returned some poor benchmark scores, but at £799 it's a great bargain buy

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



Rock Pegasus CTS

If you want a small notebook, the Rock Pegasus CTS beats all the others in this group test in terms of height and width, while it's also among the thinnest.

It's the lightest model in the tests weighing 3kg – we've reviewed lighter, but it beats the others tested here. The diminutive size will attract those wanting to carry their notebook around with them, but it has a negative effect on the screen. Rock could only fit a 14in TFT with a native resolution of 1,024 x 768 and it's the smallest of the eight models tested here. Unlike all except the Evesham notebook, you won't find a card reader of any sort on the Pegasus CTS.

This Centrino offering features the Intel Pentium M 1.4GHz processor, and has a total of 256MB of Ram to back it up. Unfortunately, Rock has only been able to find room for a 30GB hard disk. Like the NEC Versa M500, Rock has not gone for an expensive ATI or Nvidia graphics card, but instead uses the onboard Intel Extreme Graphics Solution with 64MB of shared system memory. As a direct result of this, the scores returned in 3Dmark 2001 and 2003 and the Unreal Tournament benchmark were disappointing.

Although our review model came with the 802.11b Wifi standard, Rock has told us that it will now be shipped with the faster 802.11g version. Rock, like AJP, has also included a webcam into the case of the Pegasus CTS.

Overall, it's hard to find many plus points other than its size and built-in webcam. It struggled in just about every test in our benchmarks, and other factors, such as only 256MB of Ram and a slightly smaller hard disk than the rest, go against it. If it were priced less than the others then fair enough, but as it stands there are definitely better deals to be had elsewhere.

DETAILS

RRP £962.33 (£819 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Rock 0870 990 9090
www.rockdirect.com
PROS Relatively small and light
CONS Poor performance
VERDICT
Certainly the smallest notebook this month, but when compared against the other offerings, this entry from Rock just seems too expensive for what you get

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

Accessories

Creative Mouse Notebook
Creative uk.europe.creative.com
£16.94 (£19.90 ex VAT)
Trackpads are great for occasional use, but you may eventually start missing your mouse. This specially designed small notebook mouse from Creative even allows you to choose the length of the cable.

Belkin 300w AC Anywhere
Belkin 0080 0223 55460
www.belkin.co.uk
£60 (£51.06 ex VAT)
AC Anywhere will turn any 12v DC car cigarette lighter into a standard 230v current. This allows you to charge and run your notebook, as well as powering other AC equipment such as TVs and video cameras.

Trust 5-in-1 Card Reader
Trust 0845 609 0036
www.trust.com
£19.99 (£17.01 ex VAT)
Although most of the notebooks in this group test come with built-in card readers, there are many that don't. This PC Card from Trust supports SD, MMC, Smart Media and both the Sony Memory Stick and Memory Stick Pro.

Belkin Travelite Retractable USB Lamp
Belkin 0080 0223 55460
www.belkin.co.uk
£14.99 (£12.76 ex VAT)
This small LED lamp provides just enough light for you to use your notebook in dimly lit conditions. Powered through a USB port, it clips to the side of your notebook and features a retractable cable.

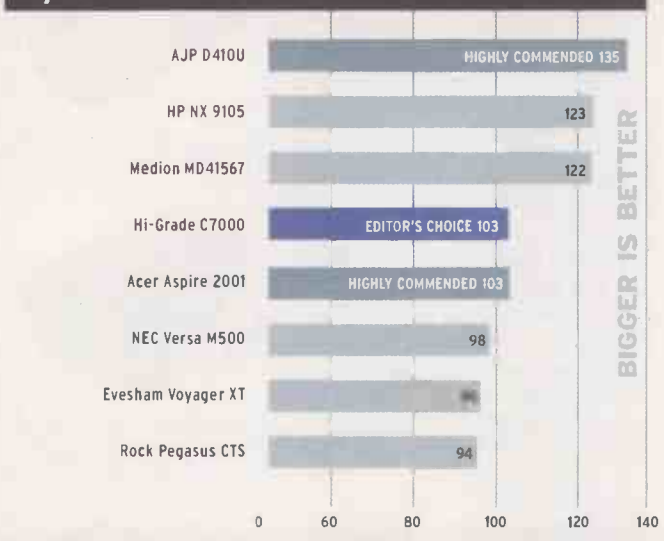
Trust 520DS USB2 Mini Docking Station
Trust 0845 609 0036
www.trust.com
£21.99 (£18.71 ex VAT)
This small mini docking station provides your notebook with three USB2 ports and PS/2 ports for an external mouse and keyboard, and hooks up to your notebook via a spare USB port.

Trust USB 2 Cardbus
Trust 0845 609 0036
www.trust.com
£29.99 (£25.52 ex VAT)
If you own an older notebook that only has USB1.1, or perhaps no USB ports whatsoever, you can add three fast USB2 ports to your notebook by simply inserting this device in to a spare PC Card slot.

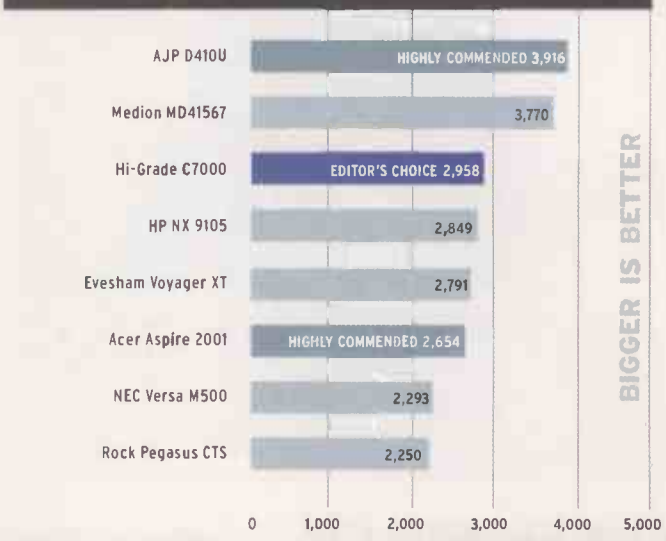
Lab results

vnu labs

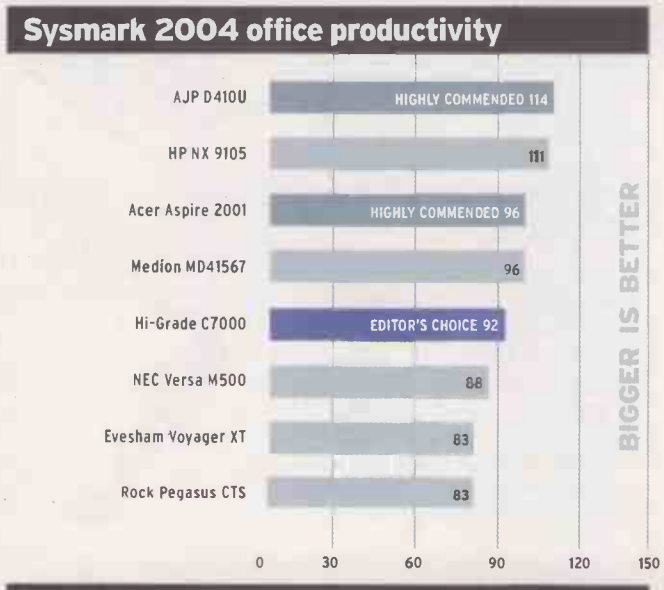
Sysmark 2004



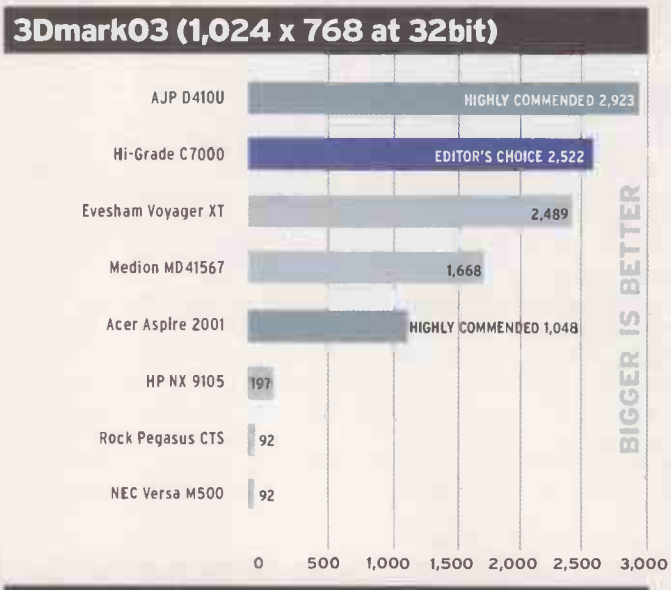
PCmark 2004



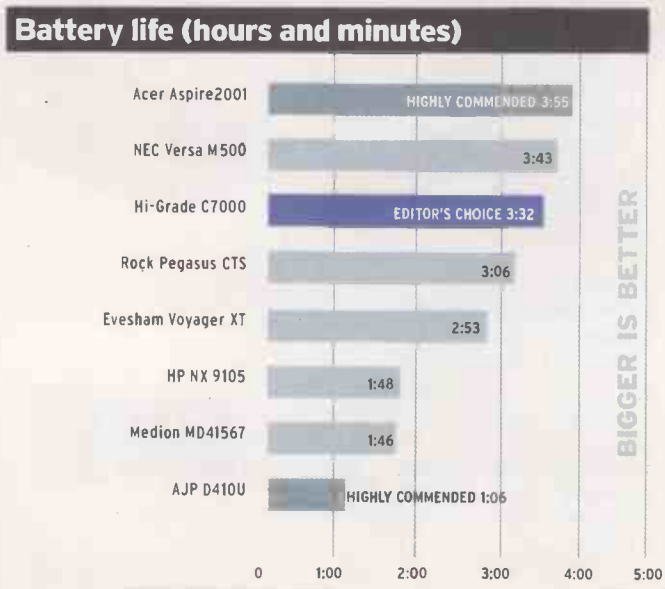
Sysmark 2004 office productivity



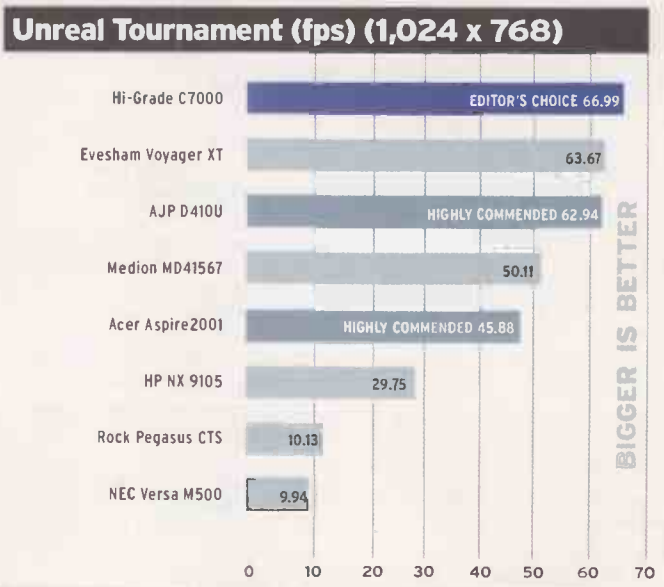
3Dmark03 (1,024 x 768 at 32bit)



Battery life (hours and minutes)



Unreal Tournament (fps) (1,024 x 768)



Please see page 12 for an explanation of how we tested the notebooks

LaCie

Leader in FireWire / USB2.0 External Hard Drives, CD-RW & DVD+/-RW

LaCie External Hard Drives

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Firewire 800, 400
& USB2.0

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250GB srp £122 (£143.35 inc VAT), **320GB** srp £184 (£216.20 inc VAT),
400GB srp £249 (£292.58 inc VAT), **500GB** srp £339 (£398.33 inc VAT)

LaCie MobileDrives

MOBILEDRIVE

- Ultra portable (can fit into a pocket) and bus-powered via FireWire or USB
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- Compatible with Windows Backup Utility

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40GB MobileDrive srp £85 (£99.88 inc VAT)
60GB MobileDrive srp £106 (£124.55 inc VAT)
80GB MobileDrive srp £151 (£177.43 inc VAT)

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MOBILE SLIM
DVD+/-RW
& CD-RW

- Sleek, robust cose, portable ond stackable
- CD-RW super fast write ond rewrite speeds
- Dual format DVD+/- RW high 4.7GB copacity
- Bundle includes DVD authoring software
- Firewire or USB2 versions (cables included)

Available from:
CD-RW 52x32x52x srp £44 (£51.70 inc VAT)
DVD+/-RW 8x4x12x+CDRW multidrive srp £89 (£104.58 inc VAT)
Mobile 24x24x24x CD-RW/DVD Combo srp £73 (£85.78 inc VAT)
Mobile 4x DVD+/-RW+CDRW multidrive srp £119 (£139.83 inc VAT)

LaCie Ethernet Disk (Network NAS Storage)

- Share data among as many as 25 users
- Backup function with integrated scheduling feature
- Easily administered via any web browser and accessible through any computer on the network or remotely via http/ftp
- Increase the capacity through the USB & FireWire interfoces
- Quick and simple installation - up and running in 10 minutes
- Features o Microsoft Windows XP® embedded operating system

Available from:
80GB srp £269 (£316.08 inc VAT), **160GB** srp £379 (£445.33 inc VAT)
250GB srp £449 (£527.58 inc VAT), **500GB** srp £649 (£762.58 inc VAT)

LaCie Professional TFT & CRT Monitors

PHOTON 20.1" TFT/LCD

- VGA & DVI connectors on TFT/LCD
- TFT/LCD includes Tilt & Swivel function
- 3-year advanced replacement warranty

- Optional BlueEye provides hardwore calibration of E19 & E22
- BlueScon 48 comes with SilverFost softwore ond offers true 48-bit sconning for multiple A4 formats including transporancies

19" Photon Vision TFT/LCD srp £395 (£464.13 inc VAT)
20.1" Photon Vision TFT/LCD srp £575 (£675.63 inc VAT)
19" Electron19 Blue CRT srp £229 (£269.08 inc VAT)
22" Electron22 Blue CRT srp £449 (£527.58 inc VAT)
48-bit BlueScan48 Flatbed Scanner srp £559 (£656.83 inc VAT)

NEW!

LaCie DataWatch

- USB 2.0 Flash Memory storage device
- 3 yeor bottery life with Japan Movement
- Ships with USB extension cable
- Water resistant, shockproof and onti-static

- Transport you files between home and work, while never losing another USB key. The LaCie DataWatch is simple to use ond allows you to easily transfer your audio files, presentotions, spreodsheets or documents. Wherever you go, you'll be oble to easily share files between Macs/PCs

LaCie DataWatch 256MB USB2 srp £69 (£81.08 inc VAT)
LaCie DataWatch 128MB USB2 srp £36 (£42.30 inc VAT)
8in1 Memory Card Reader/Writer USB2.0 srp £15 (£17.63 inc VAT)
Data Bank USB2.0 20GB srp £109 (£128.08 inc VAT)
Data Bank USB2.0 40GB srp £139 (£163.33 inc VAT)

E&OE May 2004

LaCie products are available from leading resellers - visit **www.lacie.com/uk/wheretobuy**

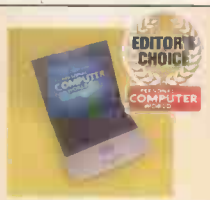
LaCie UK Ltd, 46 Gillingham Street, London, SW1V 1HU - Email: info.uk@lacie.com www.lacie.com/uk

Table of features

MANUFACTURER	**ACER**	**AJP**	**EVESHAM**
MODEL NAME	**ASPIRE 2001**	**D410U**	**VOYAGER XT**
Price inc VAT (ex VAT)	£949 (£807.66)	£999 (£850.21)	£999 (£850.21)
Telephone	0870 900 2237	020 8208 9755	0870 160 9500
URL	www.acer.co.uk	www.ajp.co.uk	www.evesham.com
HARDWARE SPECS			
Processor	Intel Pentium M, 1.4GHz	Intel Pentium 4 HT, 2.8GHz	Intel Pentium M, 1.4GHz
Chipset	Intel Odem i855PM-333	Sis 648FX	Intel Odem i855PM-333
Memory quantity and type	512MB PC2700 DDR SD-Ram	512MB PC2700 DDR SD-Ram	256MB DDR SD-Ram
Occupied/spare Ram slots	1/0	2/0	1/0
Hard disk size	40GB	40GB	40GB
Hard disk manufacturer, model and spin speed	Hitachi IC25N040ATMR04-0 4,200rpm, Ultra-ATA/100	Hitachi IC25N040ATMR04-0 4,200rpm, Ultra-ATA/100	Toshiba MK4025GAS, 4,200rpm, Ultra-ATA/100
No of PC Card slots	1	1	1
Memory card support	SD/MMC/SM/MS	CF/Microdrive/SD/MMC/SM/MS	N/A
No of USB ports	3	2	2
No of Firewire/serial/parallel/PS/2 slots	1/0/0/0	1/1/1/1	1/0/1/0
MULTIMEDIA			
Optical drive/Floppy drive	Matshita CD-RW CW-8123	SONY CD-RW CRX830E	Slimtype Combo LSC-24081
Primary optical drive speed	DVD: 8x, CD: 24x 24x 24x DVD-Rom/CD-RW	DVD: 8x, CD: 24x 24x 24x DVD-Rom/CD-RW	DVD: 8x, CD: 24x 12x 24x DVD-Rom/CD-RW
Graphics card manufacturer and model	ATI Mobility Radeon 9200	ATI Mobility Radeon 9600 Series	ATI Mobility Radeon 9600 Series
Memory	64MB	128MB	64MB
Screen size/max resolution	15.5in/1,200 x 800	15in/1,400 x 1,050	15in/1,400 x 1,050
OTHER INFORMATION			
Wireless standards supported	802.11b	802.11b	802.11g
Bluetooth/IR support	✓/✓	x/✓	x/✓
Misc hardware/modem	Agere Systems AC97 Modem	56K MDC modem, built-in webcam	Smart Link 56K modem
Weight in kg (inc battery, ex power supply)	3.65	4.45	3.4
Dimensions in mm (w x d x h)	360 x 275 x 38	326 x 280 x 44	327 x 270 x 41
Battery technology	Lithium ion	Lithium ion	Lithium ion
Battery life (minutes:seconds)	3:55	1:06	2:53
OS	Microsoft Windows XP Home Edition	Microsoft Windows XP Home Edition	Microsoft Windows XP Home Edition
Bundled software	Norton Anti-virus, Instant On Arcade, NTI CD & DVD Maker, Cyberlink Power Director Pro	Intervideo WinDVD Creator, Roxio Easy CD & DVD Creator	Pinnacle Studio, Pinnacle Instant CD/DVD
Standard warranty*	1yr C&R	3yrs RTB (labour only for last 2yrs)	1yr on-site, 2yrs RTB
SCORES			
Features	★★★★½	★★★★½	★★★½☆
Performance	★★★★½	★★★★★	★★★★½
Value for money	★★★★½	★★★★★	★★★½☆
Overall score	★★★★½	★★★★★	★★★½☆

* RTB = return to base, C&R = collect and return

For the best notebook prices go to www.pcw.co.uk/bestprices

					
	HI-GRADE	**HP**	**MEDION**	**NEC**	**ROCK**
	C7000	**NX 9105**	**MD41567**	**VERSA M500**	**PEGASUS CTS**
	£998.75 (£850)	£915.32 (£779)	£999 (£850.21)	£799 (£680)	£962.33 (£819)
	020 8532 6115	0845 270 4222	N/A	0870 010 6329	0870 990 9090
	www.higrade.com	www.hp.co.uk	www.staples.co.uk	www.nec.co.uk	www.rockdirect.com
	Intel Pentium M, 1.5GHz	Athlon XP-M 3000+, 1.6GHz	Intel Pentium 4 HT, 3GHz	Intel Pentium M, 1.4GHz	Intel Pentium M, 1.4GHz
	Intel Odem i855PM-333	Nvidia Nforce3, AMD Hammer	Intel Springdale i865PE	Intel Montara-GM i855GM	Intel Montara-GM i855GM
	512MB PC2700 DDR SD-Ram	512MB PC2700 DDR SD-Ram	512MB PC3200 DDR SD-Ram	256MB PC2100 DDR SD-Ram	256MB PC2100 DDR SD-Ram
	1/1	1/0	2/0	1/1	1/1
	40GB	60GB	60 GB	40GB	30GB
	Hitachi IC25N040ATMR04-0 4,200rpm, Ultra-ATA/100	Hitachi IC25N060ATMR04-0 4,200rpm, Ultra-ATA/100	Hitachi IC25N060ATMR04-0 4,200rpm, Ultra-ATA/100	Seagate ST94011A 5,400rpm, Ultra-ATA/100	Fujitsu MHT2030AT 4,200rpm, Ultra-ATA/100
	1	1	1	1	1
	MS/SD/MMC	SD/MMC/SM/Ms/Pro	SD/MMC/MS/MSPro/CF/Microdrive	SD/MMC/SM/MS	N/A
	3	3	3	4	2
	1/0/1/0	1/0/1/0	1/1/0/1	1/0/0/0	1/0/0/0
	QSI SBW242u	HL-DT-ST DVD+RW GCA-4040N	HL-DT-ST DVD-RW GWA-4040N	QSI CDRW/DVD SBW-242	Sony CD-RW CRX830E
	DVD: 8x, CD: 24x 24x 24x DVD-Rom/CD-RW	DVD+RW: 2.4x 4x, DVD-Rom: 8x, CD: 16x 10x 24x DVD-Rom/CD-RW	DVD-RW: 2x 1x, DVD+RW: 2.4x 4x, DVD-Rom: 8x, CD: 16x 10x 24x DVD-Rom/CD-RW	DVD: 8x, CD: 24x 10x 24x DVD-Rom/CD-RW	DVD: 8x, CD: 24x 24x 24x DVD-Rom/CD-RW
	ATI Mobility Radeon 9600 Series	Nvidia Geforce4 420 Go	Nvidia Geforce FX Go5350	Intel 82852/82855 GM/GME	Intel 82852/82855 GM/GME
	64MB	32MB	64MB	64MB shared memory	64MB shared memory
	15in/1,400 x 1,050	15.5in/1,280 x 800	15in/1,024 x 768	15in/1,024 x 768	14in, 1,024 x 768
	802.11b	802.11g	802.11g	802.11b	802.11b/g
	x/✓	✓/✓	x/✓	x/x	x/x
	Agere Systems AC97 modem	Agere Systems AC97 modem	Intel 537EA modem/TV Tuner module	Smart Link 56K modem	Smart Link 56K modem, built-in webcam
	3.25	4.65	4.4	3.35	3
	330 x 273 x 36	360 x 283 x 50	335 x 295 x 50	325 x 276 x 38	312 x 260 x 39
	Lithium ion	Lithium ion	Lithium ion	Lithium ion	Lithium ion
	3:32	1:48	1:46	3:48	3:06
	Microsoft Windows XP Home Edition	Microsoft Windows XP Professional	Microsoft Windows XP Home Edition	Microsoft Windows XP Professional	Microsoft Windows XP Home Edition
	Panda Anti-virus, Power DVD, Ability Office	Intervideo WinDVD Creator, Norton Anti-virus	MS Works Suite 2004, Medion Home Cinema Suite, Nero Burning Rom 6, Pinnacle Instant Copy 8 SE, Etrust Anti-virus (90-day trial) DivX software	MS Works 7, Norton Anti-virus 2003, Recordnow DX	Intervideo WinDVD, Roxio Easy CD & DVD Creator, Ability Office, Panda Titanium Anti-virus
	2yrs C&R	1yr C&R	1yr C&R	1yr C&R	3yrs C&R
	★★★★★	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆
	★★★★☆	★★★☆☆	★★★☆☆	★★☆☆☆	★★☆☆☆
	★★★★★	★★★★☆	★★★★★	★★★★★	★★☆☆☆
	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★☆☆

Vendors of group test products are only obliged to sell them at the prices quoted here (which include delivery and credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances.

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Editor's Choice

As always, we had a wide range of notebooks submitted for this month's group test. While some concentrated more on raw power than portability, others carried their Centrino flag and preferred battery life over top-end performance. There wasn't a huge difference in the price tags though. In fact, the NEC Versa M500 is the only notebook to come in a lot cheaper than the £999 upper price limit.

When deciding on which model to buy, you must determine whether power is more important to you than battery life. A speedy processor won't run at full pelt unless it can get its teeth into the battery and, similarly, a powerful ATI Mobility Radeon 9600 Series graphics card will need its fair share of power.

This isn't really a huge problem if you're not planning to use your notebook on the go too much. On the other hand, if you want to make full use of the Wifi capabilities, you might not be too happy if your notebook starts complaining that the battery is low within two hours of use. If you want true portability, you'll have to sacrifice some speed and go for one of the Centrino models.

The winners

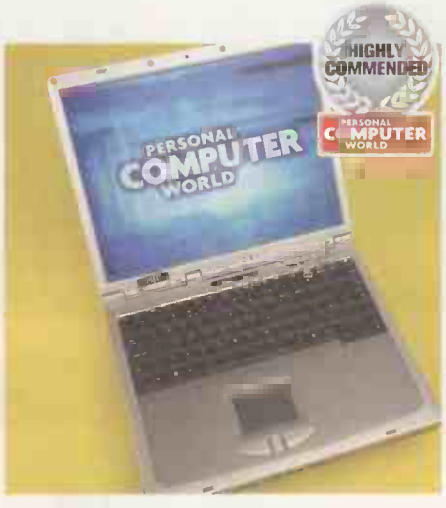
There were a few notebooks that stood out as being possible winners of this group test, but the one that scoops the **Editor's Choice** is **Hi-Grade's C7000**. Modelled around the Intel Centrino standard, the

'A notebook of this calibre for less than £1,000 is great value for money'

C7000 housed a decent Intel Pentium M processor clocked at 1.5GHz, along with a hefty 512MB of Ram.

The quality components didn't stop there though and, thanks to the ATI Mobility Radeon 9600 Series graphics card, the C7000 was able to return decent scores in all of our benchmarks. Although the faster 802.11g wireless standard isn't available on this notebook, the 802.11b version is ready and waiting to be used. Combine this with a built-in memory card reader and a CD-RW combo drive and you've got an impressive portable notebook.

Hi-Grade C7000



AJP D410U

Acer Aspire 2001

A Centrino notebook of this calibre for less than £1,000 really does represent great value for money.

Deciding on the other awards wasn't quite as easy since there were some impressive notebooks that had different strengths and weaknesses. In the end, we felt that the **AJP D410U** deserved the first **Highly Commended** award, thanks mainly to its raw power.

If you want a notebook that will serve you well on the move, then the D410U isn't necessarily the best choice, since it only lasts slightly longer than an hour away from the mains. What's more, at 4.45kg, it's quite heavy. However, as a desktop replacement system it's a real beast.

Take a look at the performance graphs and you'll see that the Pentium 4 Hyperthreading processor clocked at 2.8GHz and 512MB of Ram combine to create a truly powerful notebook. Graphics performance was equally solid thanks to the Mobility Radeon 9600 graphics card.

The MD41567 from Medion was another excellent desktop replacement system that's well worth taking a close look at and it even includes a DVD writer. However, the AJP D410U managed to beat it in terms of overall performance.

The final **Highly Commended** award goes to **Acer's Aspire 2001**, which just shaded it against the Evesham.

While Evesham's effort housed an impressive ATI Mobility Radeon 9600 graphics, the Acer only had the 9200 version, but kept running almost twice as long on a single battery charge and included a total of 512MB of Ram as opposed to the Evesham's 256MB.

If you're looking for a wireless notebook for business use and require both good performance and long battery life, the Aspire 2001 from Acer won't disappoint. It also features the Arcade mode, which means it can play videos and music without having to boot up Windows first.

A final notebook that is worthy of consideration is the NEC Versa M500. Although it has some scaled-down components, such as the Intel integrated graphics – which struggled in our benchmarks – and 256MB of Ram, it makes up for it with its price.

At £799 including VAT it undercut most of the competition by a whopping £200. If you're on a tight budget and want a Centrino notebook, you could do a lot worse than the Versa M500 from NEC.

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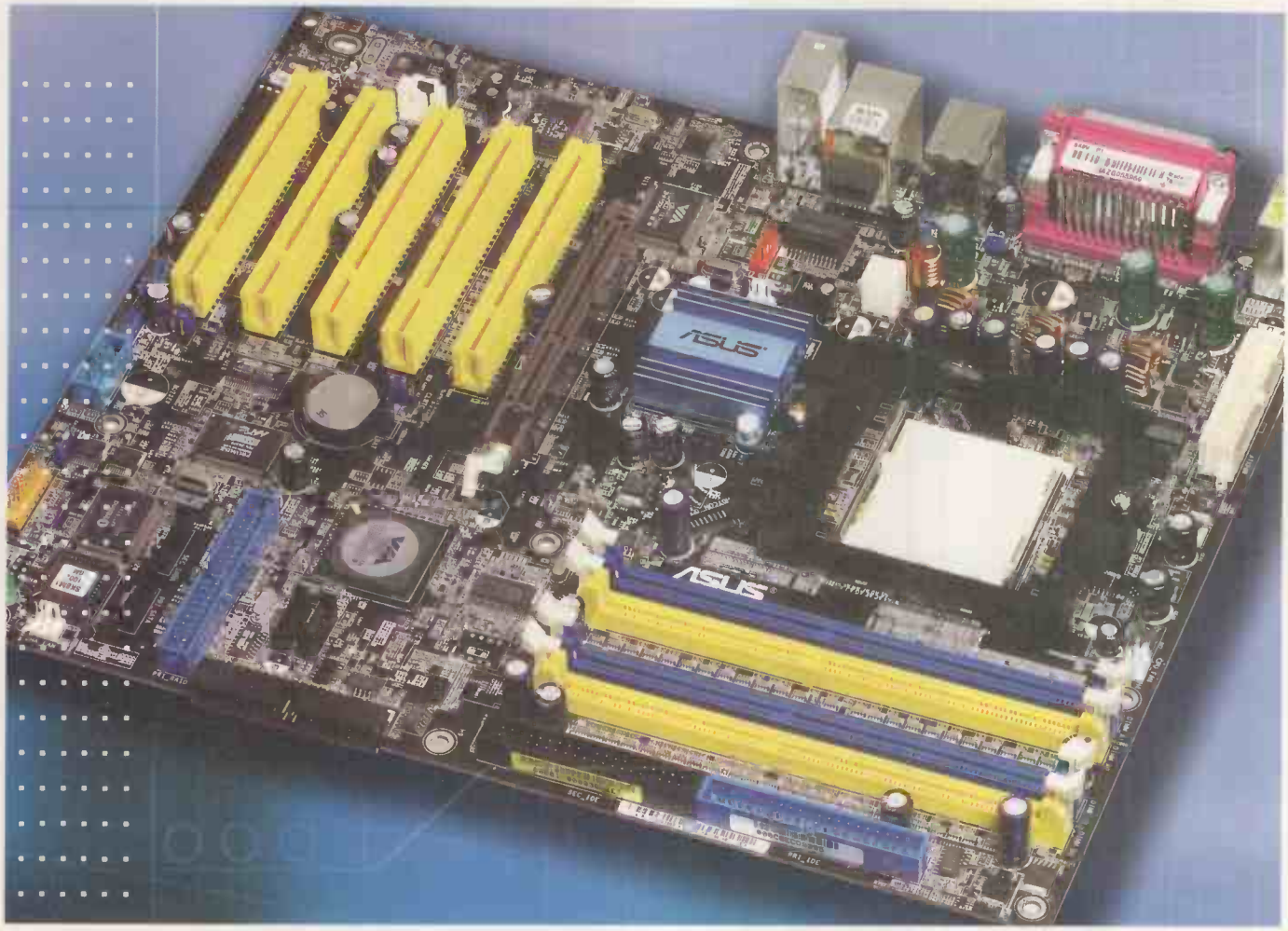

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Motherboard matters

Choosing the right motherboard could be the make or break decision for building your ideal PC. This month we test nine 64bit AMD devices to help you make the right choice

WORDS: RORY REID TESTING: VNU LABS PHOTOS: BRUCE MACKIE

In last month's *PCW*, we looked at Intel motherboards that support the new 90nanometer Prescott Pentium 4 CPU. This month, you can compare their performance with that of the nearest equivalent from rival manufacturer AMD.

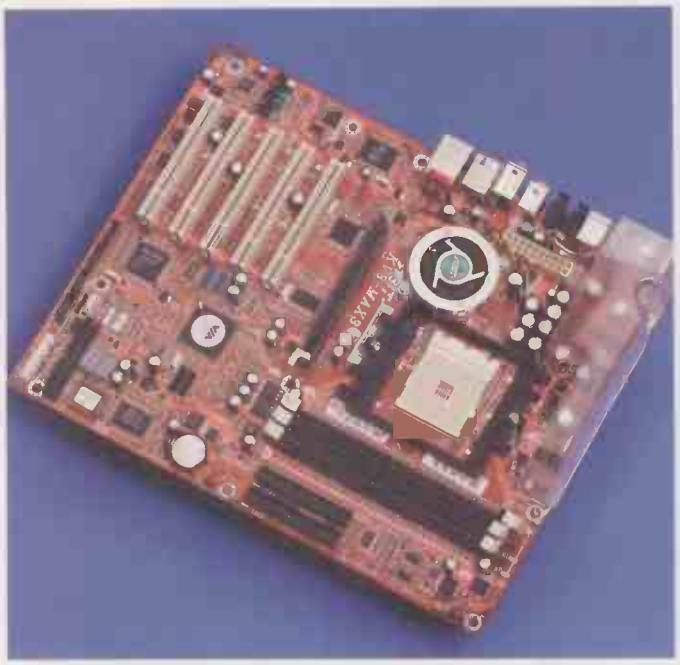
This test investigates nine socket 754 motherboards that support the Athlon 64 processor. If you're upgrading or building a new PC, you'll probably start by choosing a motherboard. As we discovered last month, there are a great number of factors to consider in making the right decision.

If your aim is to maximise performance, then fast components will not be your only concern. Motherboards and their chipsets can often be significant bottlenecks, and their associated features can mean the difference between a relatively future-proof machine and one destined for the scrapheap.

We tested each submission with 1GB of PC3200 Ram, a 256MB Radeon 9800 XT graphics card and an Athlon 64 3400+ processor, courtesy of Evesham. To determine our overall winners, we looked at factors such as connectivity (USB, Firewire, wireless and so on), value for money and overall performance.

To see how well the AMD motherboards performed compared to their Intel rivals, take a look at www.pcw.co.uk/Products/1154444 for the full results.

Finally, for advice on the key considerations when buying a motherboard, plus a full listing of models on the market, read our Buyer's guide ebook on the cover disc.



Abit KV8-Max3

Our first entry takes a departure from the norm thanks to its rather unusual rear panel. Abit has equipped the KV8-Max3 with the usual PS/2 ports, but there is a distinct lack of any serial or parallel connectivity. Instead, there's a range of more modern connectors and an assortment of audio ports relating to KV8-Max3's integrated 5.1-channel sound.

The most unusual addition to the rear panel is the translucent plastic housing that forms the basis of Abit's Outside Thermal Exhaust System (Otes). This acts as a vacuum, expelling the heat produced by the transistors and capacitors through an exit port pointing outside your PC.

The KV8-Max3 caters for a maximum of six USB2 devices. Four slots are built onto the back panel along with a Firewire port, while an additional two can be attached via an expansion header. Unlike some of the budget submissions reviewed later, this expansion header is included as a part of the package.

The KV8-Max3 has a logical and user-friendly layout and 5.1-channel audio, but it is not without its faults. Its three Dimm slots fall foul of a common motherboard idiosyncrasy in that they have been placed rather too close to the AGP slot. This is not a major problem, but if you want to remove or upgrade your memory modules, you may first have to remove your graphics card.

Performance offered by the Max3 was not as impressive as we had hoped. The PCmark 2004 total of 4,499 was enough to place it second overall among its Athlon 64 peers, but this sum was significantly lower than the Pentium 4 motherboard results we recorded last month.

The Max3 is one of the most expensive motherboards of the group but if you like overclocking, its cooling system and commendable blend of features make it one of the better considerations.

DETAILS

RRP £117 (£99.58 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Abit
01438 228 888 www.abit.com.tw
PROS Five-channel ATA Raid; Secure IDE
CONS Price; noisy cooling
VERDICT
It is expensive, but the unusual cooling system and good performance make it worth a look

FEATURES	★★★★½
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★½☆
OVERALL	★★★½☆

AOpen AK89 Max

The AOpen AK89 Max is one of two motherboards in this test that feature the Nvidia Nforce 150 chipset. The majority are based on a standard two-chip architecture, but Nvidia has managed to cram functions supported by both the northbridge and southbridge onto a single piece of silicon.

This is an admirable feat of engineering that, among other things, allows for a clean and spacious layout. AOpen has made good use of this space to add a few extra touches to provide a high degree of usability. The AK89 Max has colour-coded slots and connectors and a well-illustrated poster to help get you started, although the main instruction manual is rather badly translated in places.

The AK89's memory slots are located at the far side of the motherboard, just behind the processor slot. This gives large AGP graphics cards plenty of room, and reduces the chances of memory modules being obscured by IDE cables. Also, the 3GB memory ceiling is among the highest of the group – a fact worth considering if you intend to run demanding applications.

Disk support in the AK89 is commendable. Its two IDE channels aren't redundant array of independent disks (Raid) compatible, but it has four Serial ATA (Sata) channels that can be configured in a variety of Raid arrangements to improve speed, or protect against data loss.

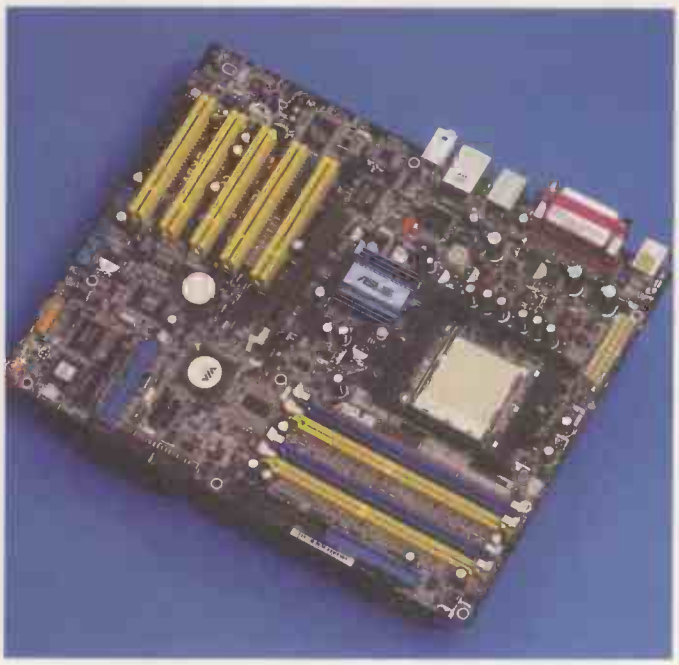
As is normally the case with its motherboards, AOpen has supplied a number of useful software extras. These include the Ezclock overclocking utility, which allows you to change performance settings through a graphical user interface, and Ezrestore, which lets you roll back to previous configurations after a disk error.

At £100, the AK89 Max is not the cheapest motherboard, but it is well designed, offers solid performance and a number of useful hardware and software extras that help to make it worthwhile.

DETAILS

RRP £100 (£85.11 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION AOpen
+31 73 645 9516 www.aopen.nl
PROS Good layout; gigabit Lan
CONS Manual; price
VERDICT
The AK89 Max has adequate performance and a good range of features, but it's not the cheapest entry

FEATURES	★★★½☆
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★½☆
OVERALL	★★★½☆



Asus SK8V-P1

If you've noticed the large difference in price between the Athlon 64 and the Athlon 64 FX CPU, you've probably also wondered whether there was any significant difference in performance between the two. Thanks to its socket 940 CPU slot, the Asus SK8V-P1 is the only motherboard in this group that supports the Athlon FX and Opteron processors.

Bar the slightly different processor pin arrangement, the SK8V-P1 looks much the same as any other Athlon motherboard. It manages to differentiate itself slightly though, thanks to the inclusion of four memory slots and an 8GB memory ceiling – more than double the amount supported by the majority of the group.

Barring the Gigabyte KV8T800 Pro, it is the only motherboard here to support IDE Raid configurations. There are also four Sata ports. Two of these support Raid 0, 1 and 0+1 disk arrangements, while the remainder support 0 and 1 configurations, which either increase disk performance or provide data redundancy.

The SK8V-P1's layout is commendable. The AGP and memory slots are given ample breathing space and many of its connectors are colour-coded to make installation more straightforward. The rear-panel is also logically arranged. There are Gigabit Lan, Firewire and USB2 slots and one of the serial ports has been removed in favour of a coaxial S/PDIF port.

Performance was something of a mixed bag. It outperformed the rest of the group, but we expected a far better overall score. Unfortunately, Asus shipped the SK8V-P1 with a beta edition of its Bios, which we believe contributed to its PCmark score of 4,597.

This score should improve significantly when later versions of the firmware are released, but it is currently difficult to recommend the SK8V-P1 based on its performance here.

DETAILS

RRP £157 (£134 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Asus 01908 518 000 uk.asus.com
PROS Speed; Sata support
CONS Very expensive
VERDICT
Those hoping to see value for money in performance terms may find this incarnation of the SK8V-P1 something of a disappointment

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

Biostar K8VHA-Pro

The Biostar K8VHA-Pro is one of just two motherboards with a communications and network riser (CNR) slot. This is unusual, since the modems and audio devices it was designed to accommodate are now more commonly integrated into the chipset or on separate devices.

Other additions to the K8VHA include its onboard Firewire port. It is capable of supporting a further seven ports, but Biostar has supplied only one extra connector on an expansion header. Amends are made to some degree thanks to its six USB2 slots, but we would prefer to have seen a more even spread of USB2 and Firewire support.

Although it is a full-sized ATX motherboard, the K8VHA has just two memory slots. If you've got more than two memory modules for use in your new system, you may find yourself having to buy new memory, or having to put up with left-over Dimms.

Difficulties may also arise if you've got more than two IDE devices, as Biostar has only included a single data cable. Fortunately, there are two Raid-compatible Sata channels, each accompanied by the necessary cables and power adapters.

The K8VHA has a basic layout and colour-coded ports to ease installation. It has a rather simplistic user manual, but this is generally well written.

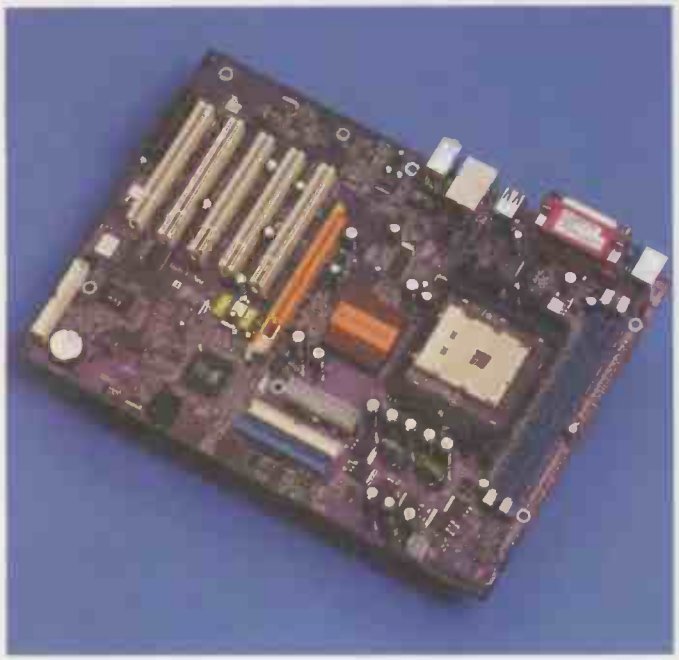
Performance was surprising for a motherboard costing just £61.49. Hot on the heels of the Asus, the K8VHA-Pro beat the rest of the group, thanks to its PCmark score of 4,507. Its hard disk performance score was less impressive than we'd hoped, but it achieved strong results in all other areas.

We've given the Biostar our Editor's Choice award as it stands up well against the competition in several areas. It offers value for money, good performance and a number of useful extras for overclocking and system monitoring.

DETAILS

RRP £61.49 (£52.34 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Biostar 01952 461 141 www.biostar.com.tw
PROS Price; 5.1-channel sound
CONS Two Dimm slots
VERDICT
The K8VHA-Pro is a good foundation for a budget Athlon 64 PC, but it lacks some of the bells and whistles of more expensive motherboards

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



ECS 755-A Pro

The ECS 755-A Pro represents the budget end of our group test.

We expected ECS to equip the 755-A Pro with a good list of features. It is not nearly as well specified as its rivals, but we were pleased to see onboard 5.1-channel audio and two Sata ports. It also sports the same copper northbridge heatsink as last month's ASRock submission.

Unlike the rest of the group, the 755-A Pro does not feature any additional expansion headers to increase the number of ports. There are four USB2 connectors on the rear panel, but if you're looking for Firewire connectivity or Gigabit Lan, you'll have to look elsewhere, as these features are also not included.

The lack of accessories is something of a recurring trend throughout the rest of the 755-A Pro's specification. Only a single Sata data cable is provided and the necessary Molex-to-Sata power adapters are not included in the package.

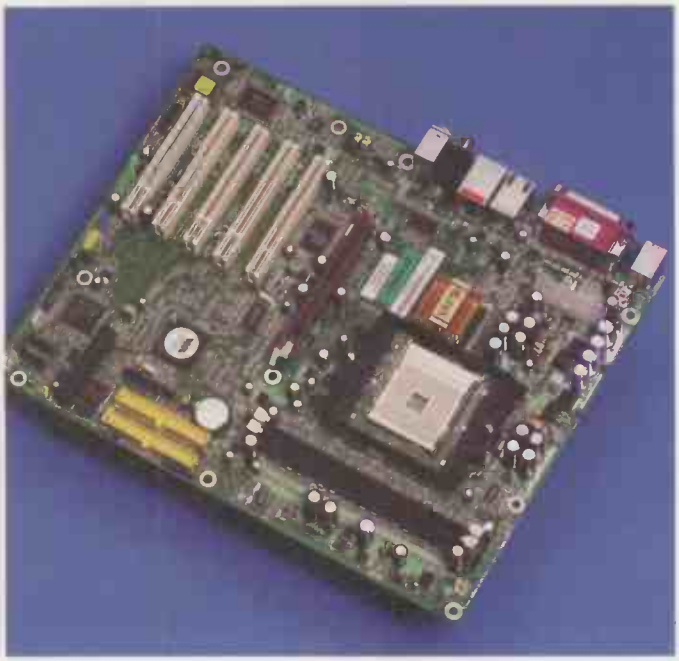
What ECS has opted to include is a CNR slot, an addition that is of little value in modern computing, as the functions it serves – audio and communications support – are either handled by the chipset or dedicated modem. Whereas most of our submissions chose to use the Via or Nvidia chipsets, the 755-A Pro uses the Sis 755/964 combination. It recorded a particularly low hard disk performance score but, in fairness, managed to keep up with the pack in most areas despite being at the bottom of our graphs.

The 755-A Pro is among the cheapest motherboards of the group, but its lack of extras means it doesn't provide the best value for money. ECS said it plans to sell the superior 755-A2 motherboard – with faster memory support – for the same price, but if speed is not your priority, and you already have the connectors you need, then this could be a cost-effective board.

DETAILS

RRP £70.50 (£60 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION ECS 0870 120 5370 **www.ecs.uk.com**
PROS Price; Sata-compatible
CONS Lack of extras; performance
VERDICT
If you want a cheap foundation to an Athlon 64 system, the 755-A Pro is worth considering, but only if you don't mind the lack of features

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



Epox 8HDA3+

The 8HDA3+ looks like a no-nonsense motherboard thanks to its traditional-looking green printed cicuit board (PCB) and plain beige PCI slots.

It is not as basic as it appears though, as it is the only motherboard in this group test with two Lan ports, one of which is of the Gigabit Lan variety. The other is a standard 10/100 port, but this combination allows you to connect two PCs directly without using a network switch.

Epox has placed the Via K8T800 northbridge very near to the processor. This may help to reduce the signal delay between the two chips, but, elsewhere on the 8HDA3+, this approach of squeezing components closely together is a rather unwelcome trend.

The Cmos reset jumper is located between the Cmos battery and secondary Sata slot. Overclockers may need to make regular use of this jumper – the more large-fingered of whom may find it difficult to grasp. The AGP slot is also positioned fairly closely to 8HDA3+'s two Dimm sockets, so elongated graphics cards are likely to obscure its memory modules.

On the upside, there are six Sata slots, four of which are dedicated to offering Raid configurations. Epox has also included an external Sata slot. External Sata devices aren't common, but this is an unusual and welcome addition.

If your normal routine of upgrading or building PCs involves hours of error tracking, you'll be pleased with the inclusion of a debug port that displays hexadecimal error codes that are clearly referenced in the well-written and comprehensive user manual.

At £97, the 8HDA3+ is fairly expensive and some may take issue with the fact that it only supports a maximum 2GB of memory. To its credit though, it offers onboard 5.1-channel sound, anti-virus software and a copy of the useful Norton Ghost disk cloning utility.

DETAILS

RRP £96.82 (£84.71 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Epox 01908 561 888 **www.epox.com**
PROS Dual Lan; external Sata
CONS Cramped layout
VERDICT
If you're on a budget, the 8HDA3+ may not be the ideal board, but it stands out from the crowd thanks to a few small, yet thoughtful additions

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

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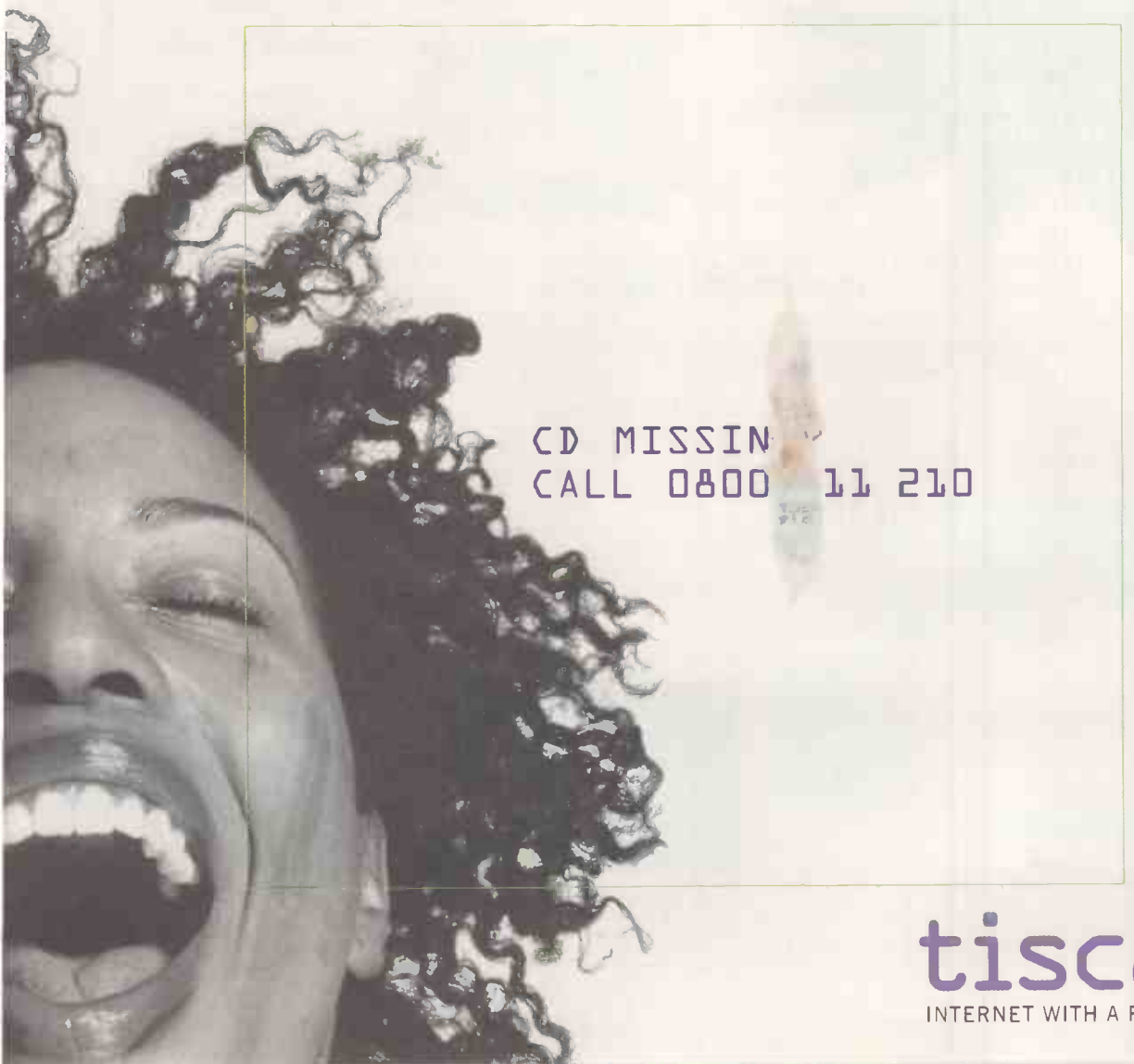

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Gigabyte K8VT800 Pro

Thanks to its garish assortment of colours, the K8VT800 Pro is not the most attractive motherboard in the group. Its appearance isn't helped by its northbridge cooler; an actively-cooled, gold-plated heatsink.

It might not be the best choice if you're considering showing off the innards of your PC, but the K8VT800 Pro is strongly equipped. Gigabyte's dual Bios feature is a standard inclusion here, and provides peace of mind should the primary Bios chip be damaged.

Raid functionality is provided via an onboard controller supporting 0, 1 and 0+1 configurations, although there are only two Sata channels in comparison to the six seen on the Epox 8HDA3+. The inclusion of three IDE channels, one of which is Raid compatible, is some consolation, but enthusiasts may prefer the extra performance offered by a serial interface.

On the rear panel, there's the usual assortment of connectors. Integrated six-channel audio is offered by routing output through the mic and line-in sockets, but there is additional S/PDIF output provided by a coaxial interface. Six USB2 slots round things off.

The easy-to-understand manual and installation poster, along with the colour-coded motherboard connectors, are evidence of the importance Gigabyte places on usability. For those who aren't well versed in Raid configurations, there is a separate instruction booklet that explains the requirements and steps you need to get started.

Performance was generally very good all round, although the overall PCmark 2004 score of 4,417 placed it at the bottom end of the group. Despite this, the K8VT800 proves excellent value for money, has a commendable number of features and would therefore make a good foundation to an Athlon 64-based system. As a result, we have given it our Highly Commended award.

DETAILS

RRP £80 (£68.09 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Gigabyte 01908 362 700 uk.giga-byte.com
PROS Dual Bios; 3yr warranty
CONS Performance could have been better
VERDICT
The Gigabyte K8VT800 Pro is a cost-effective Athlon 64 motherboard with a number of useful features

FEATURES	★★★★½
PERFORMANCE	★★★½☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★½

MSI K8T Neo FIS2R

This MSI Neo was one of the first Athlon 64 motherboards on the market. Despite its age, it is well equipped, as indicated by its FIS2R suffix. The F stands for Fast Ethernet (Gigabit Lan); the I stands for IEEE1394 Firewire; and S2R represents its dual-Sata Raid capability.

The layout is generally very good. It has colour-coded slots and is one of few motherboards with passive cooling for its transistors and capacitors. This is not as effective a solution as that of the Abit KV8-Max3, but the lack of fan means it's quieter.

MSI has paid attention to the F1S2's audio support. Instead of routing the rear and centre channels through the mic and line inputs, individual output ports have been provided for each of its sound channels.

On the rear panel, there is the standard quota of PS/2 and parallel ports, but only one serial port. Instead, two Firewire connectors (one standard and one mini) are included – the highest number of integrated IEEE1394 ports in this group.

Inside the box, you'll find a good selection of extras including the useful MSI D-Bracket. This provides Bluetooth wireless support, which allows you to easily transfer files to and from compatible devices such as a mobile phone or a PDA. The D-Bracket also adds two USB2 ports and has four diagnostic LEDs that flash in different patterns to indicate system errors. This is a good idea in theory, but getting visual access to the lights is not always easy, since the bracket is designed to be mounted at the rear of your PC.

Compared to the Biostar, £100 seemed a bit pricey considering it didn't offer any significant performance gains, but its extra connectivity and features make it a good choice, and a deserving recipient of our second Highly Commended award.

DETAILS

RRP £101 (£83.25 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION MSI 020 8813 6688 www.msi.com.tw
PROS Wireless support; twin Firewire ports
CONS Only two Sata slots
VERDICT
Good performance and some thoughtful inclusions, such as wireless support, make it a good value Athlon 64 motherboard

FEATURES	★★★★½
PERFORMANCE	★★★★½
VALUE FOR MONEY	★★★½☆
OVERALL	★★★★½

Soyo CK8 Dragon Plus

The CK8 Dragon Plus has a striking design, thanks mostly to its black PCB. It has a spacious and user-friendly layout, attributable to the board's avoidance of using separate northbridge and southbridge controllers.

Instead, it uses the single-chip Nforce-3 150 solution, located to the right of the AGP slot. Compared to the rather large heatsinks present on the MSI and Gigabyte motherboards, this passively cooled unit looks rather small, although there's plenty of space to install a larger cooler if you want to overclock.

Usability is aided by the ATX power connector being located near the edge of the motherboard. Also, while it has a mostly jumperless design, experienced system builders will appreciate the CK8 Dragon Plus' extra-long, easy access jumper located on the Cmos reset switch.

Connectivity is something of a mixed bag. It is compatible with Sata devices, has a Gigabit Ethernet port, plus the usual assortment of USB2 slots, but the board does not support Firewire. It has the largest number of PCI slots in the group, but this provides little compensation, as the popularity of PCI components is on a general decline. Performance was also rather disappointing. The CK8 racked up an overall PCmark 2004 score of just 4,125, and consistently registered results in the lower half of our performance graphs. One saving grace was the motherboard's excellent returns in our hard drive tests. It topped the group by some margin, indicating that users with requirements for fast data transfer may find the CK8 a good option.

Soyo has included one Sata data cable, without the requisite Molext-to-Sata power adapter. Considering the CK8 Dragon Plus costs £100, this is a fairly significant oversight that the rest of the board's specification fails to make up for.

DETAILS

RRP £100.38 (£85.43 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Soyo
+49 44 829 7400 www.soyo.com.tw
PROS Dual Lan
CONS Price; no Firewire
VERDICT
The CK8 is attractive to look at, but it lacks the performance we expected and does not provide as many features as its rivals

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

AMD or Intel?

Once again, the long-standing question of whether to base your PC on AMD or Intel components has reared its head. Whereas Intel has long held the advantage over AMD in terms of clock speeds and volume of sales, the latest Athlon 64 CPUs look set to attract a large following thanks to a variety of advanced features.

One major benefit of this processor is its ability to address one terabyte of Ram (1,000GB). Home users are hardly likely to make use of this much memory, but for high-end servers it could prove to be significant. The mainstream audience will find more relevance in the Athlon 64's ability to handle difficult calculations with relative ease. Hugely demanding games, such as Ubi Soft's Far Cry, require a lot of processing power and are designed to run more efficiently on a 64bit platform.

This new generation of processors also brings a unique approach to data transfer. Whereas Pentium 4s rely on the motherboard chipset to shuttle data between the processor and memory, Athlon 64s have avoided this bottleneck by integrating the memory controller onto the CPU die. This technique does away with the traditional front-side bus design favoured by Intel, and allows the processor to communicate directly with the physical memory through a two-way Hyper Transport link.

If you've taken a glance at the results page, you may have noticed that last month's Intel systems outperformed this batch of AMD submissions in all but our gaming tests. It is worth remembering, however, that the full benefits of a 64bit system cannot be realised until 64bit operating systems become more common. Current options include beta versions of Windows XP 64bit Edition, or Suse Linux, but even these won't realise the Athlon 64's full potential until new software and up-to-date device drivers become available.

In choosing the right processor, you'll also have to consider the all-important issue of price. The retail boxed version of the Athlon 64 3400+ CPU currently costs around £310. For that price, you could buy a 3.2GHz Intel Pentium 4 plus a decent motherboard, and still (depending on which benchmarks you use) see better performance on current 32bit software.

The Athlon 64 FX is an excellent processor in its own right, but is hampered by a high price. You can currently expect to pay up to £550, so you'll have to decide whether it is worth paying almost twice the price of a standard Athlon 64, especially considering the relatively small performance increase it offers. To be fair, it is aimed squarely at enthusiasts – an audience that will probably appreciate its superior memory handling and graphics abilities.

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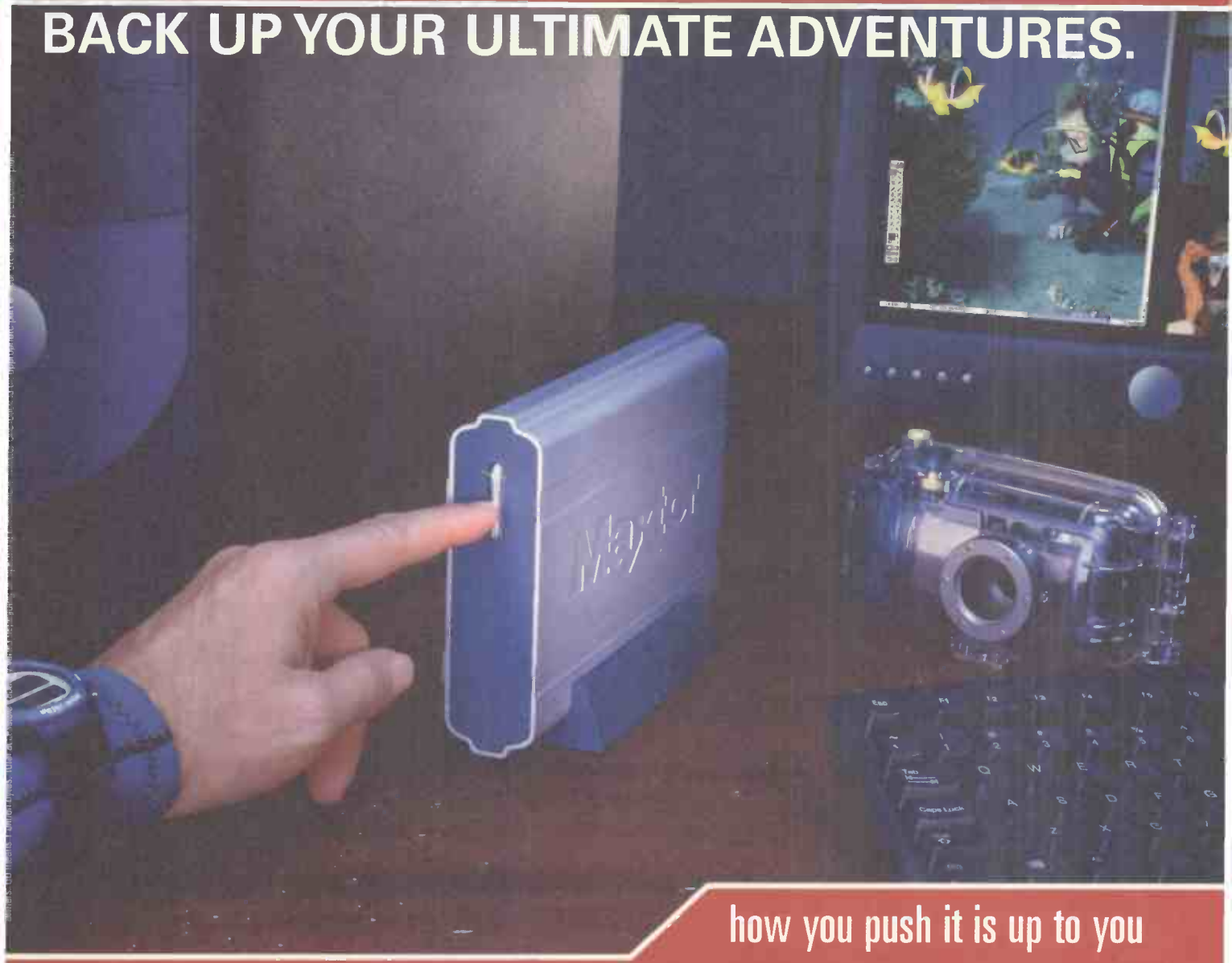

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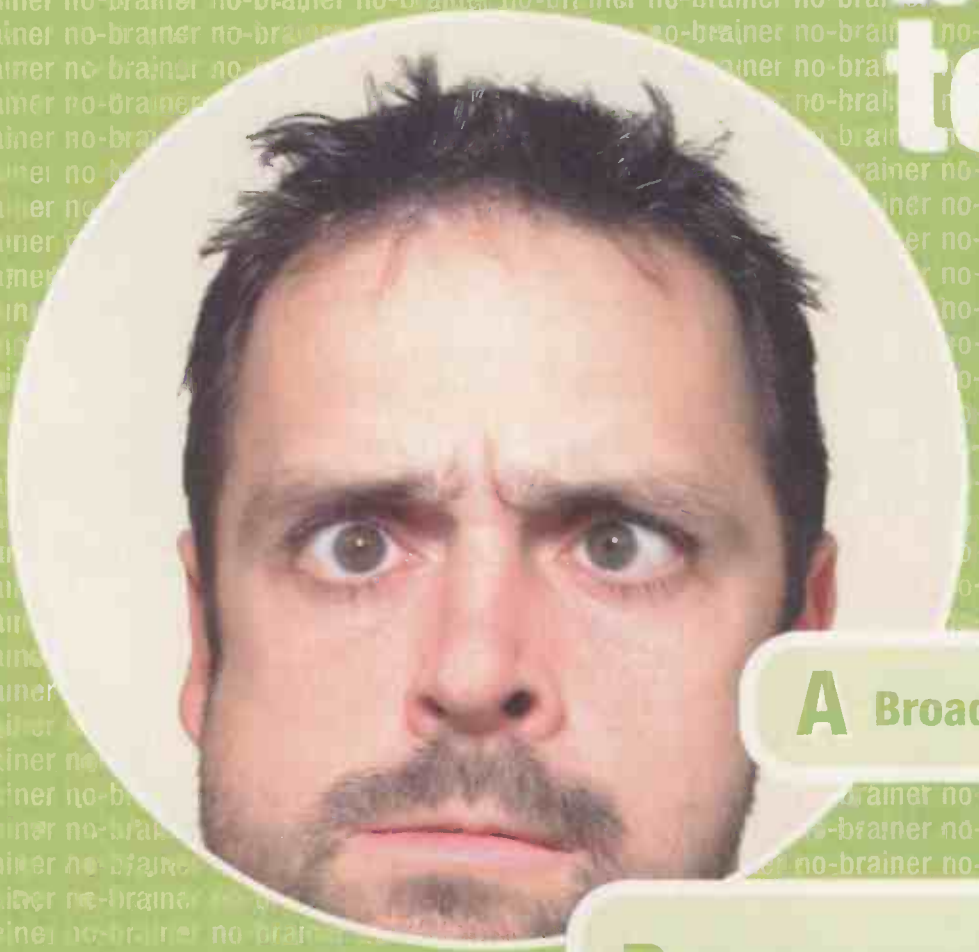

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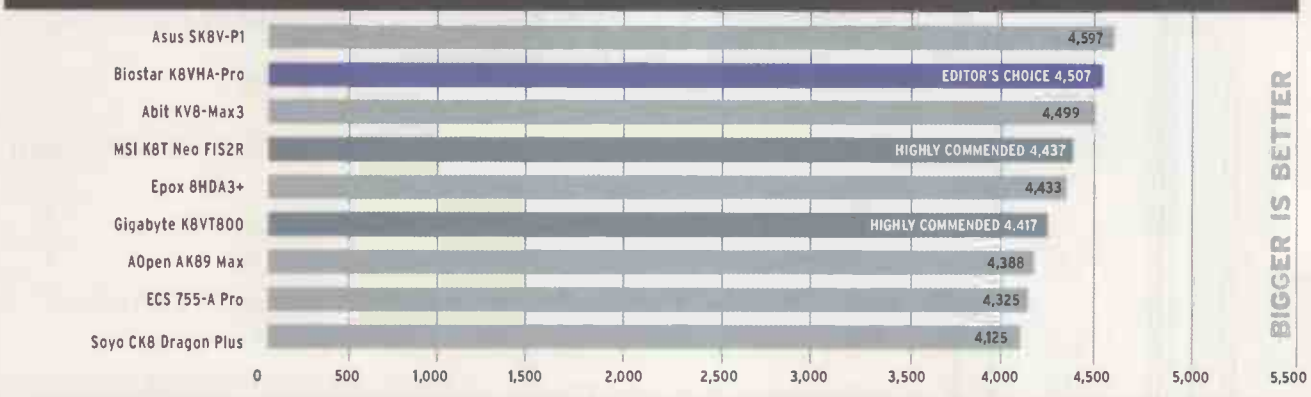
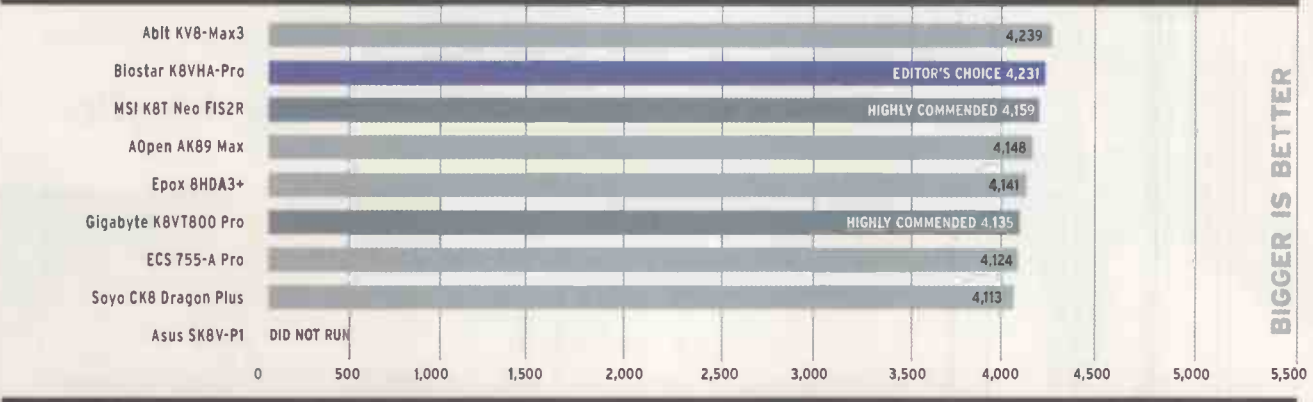
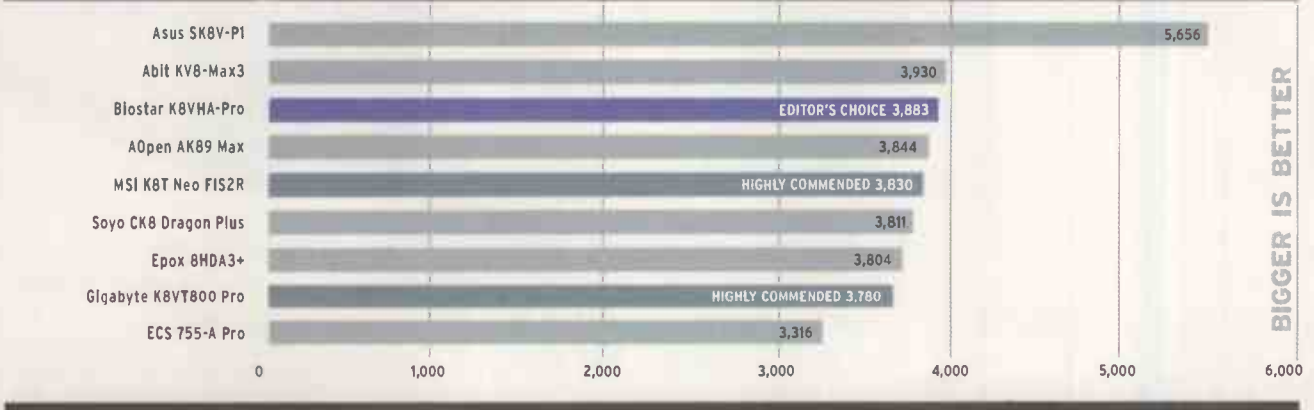


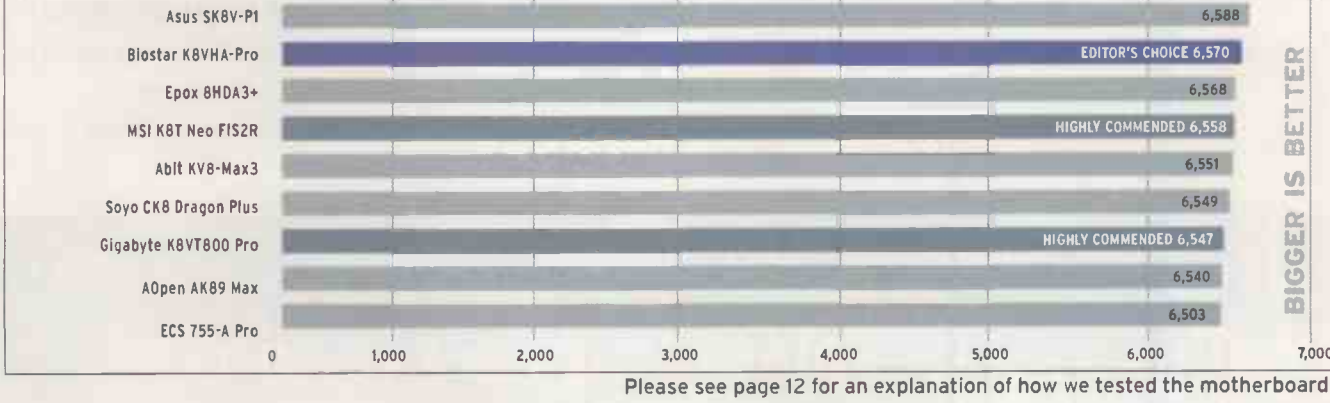
PCmark CPU suite



PCmark memory suite



3DMark03 (1,024 x 768 at 32bit)



Please see page 12 for an explanation of how we tested the motherboards

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URL	www.abit.com.tw	www.aopen.nl	uk.asus.com	www.biostar.com.tw
HARDWARE SPECS				
CPU type	AMD Socket 754 Athlon 64	AMD Socket 754 Athlon 64	AMD Socket 940 FX-51/Opteron	AMD Socket 754 Athlon 64
Chipset	Via K8T800	Nvidia Nforce 3 150	Via K8T800/VIA VT8237	Via K8T800
Memory type	Dual-channel DDR 400/333	Dual-channel DDR 400/333	Dual-channel DDR 400/333/266	Dual-channel DDR 400/333
Memory slots/Max Ram	3/2GB	3/3GB	4/8GB	2/2GB
Official front-side bus speeds	800MHz	800MHz	800MHz	800MHz
AGP 8x	✔	✔	✔	✔
No of PCI/CNR ports	5/0/0	5/0/0	5/0/0	5/1/0
No of PS/2/serial/parallel/game ports	2/0/0/0	2/2/1/1	2/1/1/1	2/2/1/1
No of onboard USB/USB by cable ports	4/2	4/2	4/8	4/4
USB by cable supplied	2	2	4	2
Onboard sound chip	RealtekAC97	Realtek AC97	ADI AD1985	Cemedia AC97
Sound channels	5.1	5.1	5.1	5.1
S/PDIF	In/out	In/out	RCA out	Out
Onboard VGA	N/A	N/A	N/A	N/A
IDE channels	2	2	3	2
IDE Raid channels	0	0	1	0
Sata	6	4	4	2
Sata Raid Channels	6	0	2	2
No of Lan/6-pin Firewire/4-pin Firewire	1/1/1	1/3/0	1/1/1	1/2/0
Gigabit Lan	✔	✔	✔	✔
Modem	✗	✗	✗	✗
FDD/HDD/Sata cables	1/2/4	1/2/1	0/2/2	1/1/2
OTHER INFORMATION				
Misc hardware	Secure IDE card	N/A	N/A	N/A
Bundled software	Norton Antivirus 2003, Ghost 2003, Personal Firewall 2003	Norton Antivirus 2003	Intervideo WinDVD Suite	Norton Netsecurity 2003, Ghost 2003
Standard warranty *	1yr RTB	1yr RTB	3yrs	1yr RTB
SCORES				
Features	★★★★☆	★★★☆☆	★★★★☆	★★★★☆
Performance	★★★★☆	★★★☆☆	★★★★☆	★★★★☆
Value for money	★★★☆☆	★★★★☆	★★★☆☆	★★★★★
Overall	★★★★☆	★★★★☆	★★★☆☆	★★★★☆

* (RTB = return to base, C&R = collect and return)

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					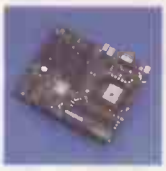
	ECS	**EPOX**	**GIGABYTE**	**MSI**	**SOYO**
	755-A PRO	**8HDA3+**	**K8VT800 PRO**	**K8T NEO FIS2R**	**CK8 DRAGON PLUS**
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	www.ecs.uk.com	www.epox.com	uk.giga-byte.com	www.msi.com.tw	www.soyo.com.tw
	AMD Socket 754 Athlon 64	AMD Socket 754 Athlon 64	AMD Socket 754 Athlon 64	AMD Socket 754 Athlon 64	AMD Socket 754 Athlon 64
	Sis 755 & 964	Via K8T800 + VT8237	Via K8T800	Via K8T800	Nvidia Nforce 3 150
	Dual-channel DDR 333/266	Dual-channel DDR 400/333/266	Dual-channel DDR 400/333/266/200	Dual-channel DDR 400/333/266	DDR 400/333/266
	2/2GB	2/2GB	3/3GB	3/2GB	3/2GB
	800MHz	800MHz	1600MHz	800MHz	800MHz
	✔	✔	✔	✔	✔
	5/0/0	5/0/0	5/0/0	5/0/0	6/0/0
	2/1/1/0	2/2/1/1	2/2/1/1	2/1/1/1	2/2/1/1
	4/4	4/4	4/4	4/4	4/2
	0	0	2	1	0
	Realtek ALC65x	Realtek ALC65x	Realtek ALC658	Realtek ALC65x	CMI 9739A AC97
	5.1	5.1	5.1	5.1	5.1
	N/A	Out	Out/RCA by cable	In/Out (RCA)	N/A
	N/A	N/A	N/A	N/A	N/A
	2	2	4	3	2
	0	0	2	0	N/A
	2	6	2	4	2
	2	4	2	2	2
	1/0/0	2	1/1/1	1/1/1	1/0/0
	✗	✔	✔	✔	N/A
	✗	✗	✗	N/A	N/A
	1/1/1	1/2/4	1/3/2	1/1/2	1/1/1
	N/A	N/A	N/A	Bluetooth adapter	N/A
	PC Cillin 2002	PC Cillin 2002, Norton Ghost 2003	Norton Internet Security 2004, DirectX9	Fuzzy Logic, PC Alert, PC Cillin 2002, Norton Net Security 2003	Norton Personal Firewall, Ghost, Antivirus 2003
	2yrs RTB	1yr RTB	3yrs RTB	1yr RTB	2yrs RTB
	★★☆☆☆	★★★★☆	★★★★☆	★★★★☆	★★☆☆☆
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	★★☆☆☆	★★★☆☆	★★★★☆	★★★★☆	★★★★☆

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- 80GB 7200RPM 2MB Hard Drive
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- Sony Internal Floppy Disk Drive
- 56K Internet Ready Modem
- Luxurious Codegen 400W PSU & Case With Screwless PCI Slots
- Memorex Optical Mouse, Enhanced Keyboard
- Creative SBS-250 Speakers

Editor's Choice

We were eager to see how this month's batch of Athlon 64 motherboards fared in comparison with last month's Intel Pentium 4 submissions. Although the majority of our contributors chose to submit motherboards based on the Via K8T800 chipset, we were pleased to see entries that relied on alternatives from Nvidia and Sis.

As ever, the way each vendor interpreted our brief for this group test proved very interesting. At the lowest end of the spectrum, the ECS 755-A Pro was relatively inexpensive, but its lack of features meant it was firmly targeted at those who already have a drawer full of spare components, or don't mind spending money on extras in order to make the most of its features.

We were also pleased to see the Asus SK8V-P1, a Socket 940 motherboard that supports the Athlon FX-51 and Opteron processors at the top end of the AMD range. Its performance was strong, and if Asus had provided a final version of its Bios, we feel it could have performed far better. Despite its speed, we couldn't help but feel slightly cheated by the SK8V-P1's high price.

Not having to deal with the issue of firmware updates on the majority of our entrants was a pleasant surprise. Experienced readers will know that a motherboard Bios can quite often require an upgrade in order to cope with newer, more advanced processors. This was the bane of several of last month's entries, but was much less of an issue among the Athlon 64 group this month.

'The Athlon 64 consumer is far more interested in performance'

It was interesting to discover that AMD motherboard manufacturers tended to shy away from some of the more extravagant additions found in the Intel entries. Last month we saw all manner of superfluous inclusions, such as multimedia card readers, and infra-red remote controls accompanying many of the submissions. Here, the most unusual inclusion was a Bluetooth adapter, indicating that the Athlon 64 consumer is far more interested in motherboard performance than optional extras.

Biostar K8VHA-Pro

Gigabyte K8VT800 Pro

MSI K8T Neo FIS2R

The winners

As ever, there were a number of motherboards that stood out as worthy award winners. The **Gigabyte K8VT800 Pro** is the recipient of our first **Highly Commended** award thanks to a very good blend of features. It was one of the few motherboards that supported Raid configurations using parallel hard disks, while also offering support for Sata disks.

It provided a comprehensive assortment of audio connectors, including optical and coaxial S/PDIF outputs and scored well in our performance tests. It came second overall among the Athlon 64 motherboards and, despite being beaten by most entries in the memory test, it managed the highest graphics score of the Athlon 64 group. Significantly, it was only beaten on price by two other submissions.

Our second **Highly Commended** award goes to the **MSI K8T Neo FIS2R**. This offered a lower memory ceiling than the Gigabyte K8VT800 Pro, but gave a unique assortment of extras. It had the only rear panel of the group that featured both six and four-pin Firewire ports and had discrete outputs for each of its six audio channels.

We were particularly impressed by the handy MSI D-Bracket. This offered a number of different features – not least Bluetooth wireless support, which should appeal to anyone with wireless devices such as a mobile phone or PDA. This addition also served as a diagnostic tool. It features four LED lights that flashed in a variety of patterns to indicate specific system errors, and offered two extra USB2 ports.

It had a large northbridge heatsink that looked far more substantial than many of the other passively cooled units and it also included most of the features you'd expect from a modern motherboard. It was among the most expensive motherboards, but offered good performance and value for money.

Finally, our **Editor's Choice** award goes to the **Biostar K8VHA-Pro**. This entry surprised us because, although it was the cheapest motherboard in the group, it had a better specification than many of its rivals. For £61.49, you get a high-speed Ethernet port, three Firewire ports – two of which are of the four-pin variety – and two Raid-compatible Sata interfaces.

This may not sound like much on its own, but the budget K8VHA-Pro managed to beat the £100 Soyo CK8 Dragon Plus by a considerable margin, and achieved the closest overall benchmark score to the Asus SK8V-P1 – a socket 940 Opteron/Athlon FX51 board that costs over £90 more.

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Network

WRITTEN BY ALAN STEVENS

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Virtually new

VMware has announced an update to its desktop product, VMware Workstation 4.5. Among the enhancements are support for PXE provisioning, and the ability to run Linux guest operating systems based the on 2.6 kernel. USB devices are available to all virtual machines and users can allocate 3.6GB of memory per VM to support enterprise-class operating systems.

Cheaper clients

Thin-client manufacturer Neoware has added some low-cost models to its Capio and Eon ranges. With prices starting at £129 ex VAT for the Linux-based Capio One, Neoware is hoping to encourage companies to switch to server-based computing. Reduced management overheads and better security are other advantages.

Better ISA

A beta of Microsoft's Internet Security and Acceleration (ISA) Server 2004 has been posted on the company's website. First impressions are of an improved basic firewall and VPN facilities, with the ability to scan for attacks and customise software to handle different network configurations. IPSec VPN links can be policed and the user interface has been reworked in response to complaints from customers left baffled by the old GUI. The final release is expected to ship by the middle of the year.

We put four Dual Xeon servers through their paces, test some network management software and say goodbye to Netware

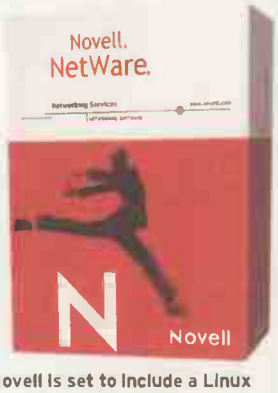
The new face of Netware

The end of Netware as we know it appears imminent following the announcement by Novell of a new Linux-based implementation.

Set to ship some 12 months ahead of schedule, this move shows just how far the company had gone down the open source road before making its plans public with the purchase of Linux developers Ximian and Suse last year.

According to Novell CEO, Jack Messman, the announcement doesn't mean an end to Netware completely. Novell will continue to support and develop its legacy platform, and will offer both Linux and the already announced Netware 7 kernel as part of a new Open Enterprise Server (OES) product. That should appease the substantial Netware customer base while at the same time encourage those looking for better application support to stick with Novell.

Technical details have yet to be finalised, but a lot of Netware services can be hosted on Linux servers already. OES will add core file and print, directory and messaging services to this list, with common management tools across the two platforms.



Novell is set to include a Linux kernel in Netware boxes before the end of the year

The company is also encouraging customers to adopt thin-client technology where applications are hosted on remote servers, and has announced plans to cherry pick the Gnome and KDE interfaces to create a unified Novell Linux desktop.

Licensing could still be an issue, however. The OES announcements, made at Novell's Brainshare conference in March, didn't cover pricing, and open source proponents might be inclined to give it all a miss if faced with the per-user costs of legacy Netware.

More wireless to worry over

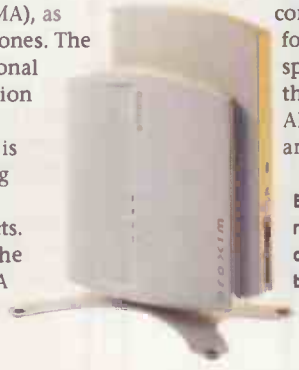
If you thought you knew everything there was to know about wireless networking, think again, as the Ultra Wideband (UWB) technology adds to the confusion.

UWB differs from other wireless technologies in that it isn't fixed to one carrier frequency, transmitting streams of extremely short energy pulses across a broad spectrum. Power levels are very low, the technology is very resistant to interference and data rates are quoted in hundreds of megabits per second, compared to just two for Bluetooth and 54Mbits/sec for the latest Wifi standards.

Intel is championing a new Wireless USB interface based on UWB technology, while others are planning to use it to link anything and everything currently reliant on cables. However one or two hurdles need to be overcome first.

Regulatory approval is one. Another is agreement on signal modulation, with two rival techniques on the table. One proposal is direct sequence code-division multiple access (DS-CDMA), as used on cell phones. The other is orthogonal frequency division modulation (OFDM) which is used on existing 802.11a/g wireless products.

Motorola is the main DS-CDMA protagonist, with Intel, Samsung, Texas Instruments and others pushing for OFDM. Neither has so far garnered enough support to become part of the proposed IEEE 802.15.3a standard for UWB, effectively preventing it being progressed further. Despite that, Motorola is pressing ahead with product development, while the competition have formed their own special interest group, the Multiband-OFDM Alliance (MBOA) and are doing the same.



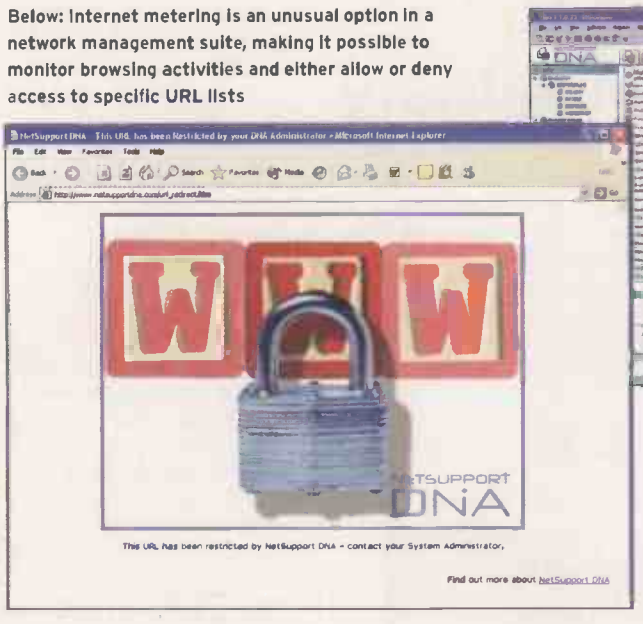
Existing wireless networking products could be eclipsed by new Ultra Wideband solutions

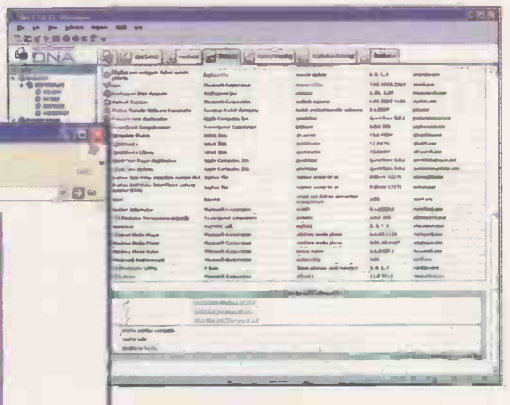
NETWORK MANAGEMENT

Netsupport DNA

A good first management suite from a remote control specialist

Below: Internet metering is an unusual option in a network management suite, making it possible to monitor browsing activities and either allow or deny access to specific URL lists





Above: Although not as comprehensive as some, the inventory tools in Netsupport DNA correctly identified a good range of hardware and software components in our tests

Best known for remote control software, Netsupport recently broadened its product portfolio with the addition of an integrated suite of network management tools called Netsupport DNA (dynamic network administration). Aimed at the small to medium-sized enterprise, this provides hardware and software inventory facilities with local application and Internet access metering. Software distribution is another option, along with remote control and an optional web-based helpdesk.

The Netsupport package is limited to managing Windows PCs and servers on TCP/IP networks, so companies with Linux/Unix systems will need to look elsewhere. A Windows NT/2000/2003 host is also required, as is access to a SQL Server 7 or SQL Server 2000 database. The cut-down MSDE (Microsoft SQL Server Desktop Engine) implementation can be used, but isn't included and must be sourced independently.

Installation is pretty painless, with the option of installing the server software and management console on the same system or independently. Client software needs to be installed on each PC and server to be managed, but that is also simple, with the server able to search for and identify suitable targets using TCP/IP and Windows Netbios scans. Client software can then be pushed out and installed remotely, except on older Windows 95/98 clients which have to be set up from the CD-Rom or via a network share and login script.

The collection of hardware and software inventory information is a core feature, and very well implemented. The data collected isn't as comprehensive as with some systems, but key hardware components such as CPU, memory and disks are correctly identified with Bios details. Software recognition was good, with the ability to identify service pack updates and hot fixes.

On the downside, the console interface takes a little getting used to. However, it doesn't take long to learn how to drill down from summary information to detail, and it's possible to organise systems into groups to manage both collection parameters (chiefly collection frequency) and the way information is displayed. A query tool is included, with the ability to define dynamic groups based on such queries. Using this we were quickly able to identify systems that required hot fixes and memory updates.

Inventory information can be summarised and graphed on screen, with a Crystal Reports engine to generate reports for printing or export in a variety of formats, including pdf. However, it's not possible to customise reports or define new ones (apart from with ad hoc database queries), and a limited number of predefined reports is provided.

Software distribution is also disappointing. All you get is the ability to create packages of files and folders with manually entered setup commands. Of course, you can always add tools to copy an install and automate installation, but other management suites include such utilities as standard.

Elsewhere the application metering works fine, as does the Internet metering tool, which is unusual for a management suite of this kind. Using this we were able to allow or block access to specific URL lists, redirecting browsers to a specific address when blocked and controlling access via a proxy server.

Remote control is an optional extra and comes in two guises: the full Netsupport Manager tool, and a cut-down implementation that offers just core functionality. Neither is integrated into Netsupport DNA – both are called when required, and can be replaced by other third-party applications.

A web-based helpdesk application completes the package. This is optional and not fully integrated, but it can access inventory information stored on the SQL server and has all the basic features expected of such an application.

We encountered few problems when testing Netsupport DNA in the Labs. However, this first release was a little disappointing, with some rough edges, such as the lack of report customisation and tools for software deployment. Still, what it provides worked well, with the basic functionality required to manage a small to medium-sized Windows network.

DETAILS

PRICE £29.61 (£25.20 ex VAT) per user (500-999 users)
CONTACT Netsupport 01778 382 270
www.netsupportsoftware.com
SPECIFICATIONS
Pentium III server, 128MB Ram, 60MB disk space • Windows NT, 2000 or Server 2003 • SQL Server 7/2000 or MSDE • Clients require 80486 processor & 64MB Ram & Windows 95
PROS Remote discovery and configuration; Internet access metering; optional helpdesk
CONS Software distribution; no report customisation; interfaces; tool integration; SQL Server
VERDICT
Covers the basics, but can't yet compete against rivals

FEATURES	★★☆☆☆
ENTERPRISE VALUE	★★★☆☆
EASE OF USE	★★★☆☆
OVERALL	★★★☆☆

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Webuser magazine, United Kingdom.

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Xerox Phaser 7750

Quality A3 colour for professionals and larger enterprise buyers

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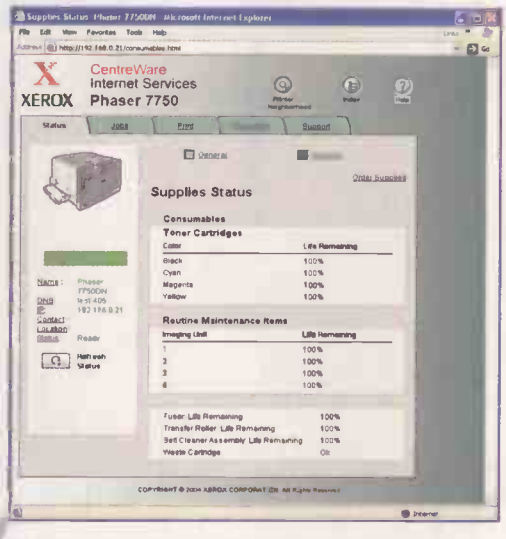


Web-based remote management of the Phaser 7750 is supported by one of the best browser-based printer interfaces we've come across

The Xerox Phaser 7750 is one of the quickest A3 colour lasers available, capable of printing in colour and black and white at up to 35 pages per minute. This it does courtesy of a single-pass laser engine allied to a PowerPC processor, with built-in networking, remote management and optional paper handling facilities.

Speed is clearly a big selling point with the 7750, although the 35ppm claim relates only to A4 documents, with A3 pages being produced at around two-thirds of that rate. That's roughly 21-22ppm, which is a lot slower, but still impressive. The first page appears in around 12 seconds and output quality in our tests was excellent across a range of document types. Maximum resolution is 1,200 x 1,200dpi, with a special photo mode to enhance this further if required. There are lots of colour matching and correcting facilities, including Pantone simulation and support for ICC, ICM and Apple Colorsync systems, enabling the printer to be used in both specialist Microsoft and Apple shops.

Like all A3 printers, the Xerox laser is a hefty device, and benefits from a 150,000 page per month duty cycle. However, it's no harder to maintain and run than a standard mono laser. The consumables are, admittedly, a little unusual, with cylindrical cartridges (one for each component colour) located behind a door at the front. These, though, are easy enough to change and reasonably priced. Black cartridges (good for around 32,000 pages) retail at £91.84 ex VAT while each colour cylinder (rated at 22,000 pages) costs £168.87 ex VAT. Alternatively, running costs, including fuser and imaging unit changes, can be covered by a variety of toner-inclusive price plans with fixed quarterly charges.

On the paper front, a 500-sheet paper drawer comes as standard, along with a 150-sheet multi-purpose tray for labels, envelopes, transparencies and so on. A further feeder containing three more drawers can then be added underneath (£840 ex VAT) or you can opt for a high-capacity feeder (£1,050 ex VAT) to expand the capacity by 2,500 pages. Maximum paper weight is 169gsm (220gsm if manually fed) and all drawers take A3 sheets, with a 1,000-sheet stacker/finisher/stapler (£1,400 ex VAT) another option.

The main processing board features a 715MHz G4 PowerPC chip which can be equipped with up to 1GB of memory using industry-standard Dimms. The base model, the Phaser 7750V/B (£4,899 ex VAT), comes with just 256MB, while our 7750V/DN had 384MB to cope with built-in networking and a duplexer, both absent on the cheaper model. A 20GB internal hard disk is included across the range and, as well as Adobe Postscript 3 and PCL 5c emulations, all 7750 lasers can process Adobe pdf documents directly. Drivers are included for all versions of Windows from 95 up, with Linux, Unix and Novell Netware drivers also available.

Xerox has gone to great lengths to make its latest printers as user-friendly as possible and we certainly had no problems either installing or using the 7750; all the more so because, despite a usable LCD panel at the front of the printer, just about everything you might want to do can be achieved remotely. For example, there's a built-in web server with one of the best interfaces for remote printer setup and management we've seen. The 7750 also ships with Xerox software called Centreware IS, which can be used to remotely manage both Xerox and other manufacturers' printers on the network. Users then get a utility called Printing Scout to tell them when paper or toner needs changing, and there's support in the driver software for N-up and booklet printing, duplexing and a range of other advanced printing options.

Fully configured, the Xerox Phaser 7750 could be viewed as expensive compared to other colour lasers. However, it is an A3 printer and you'd have to pay much the same to match it for speed, output quality and paper handling options, no matter who the vendor is. As such, it represents good value both for pre-press specialists and for companies looking for a general-purpose, A3-capable departmental laser.

DETAILS

PRICE £6,790.33 (£5,779 ex VAT)
CONTACT Xerox 0870 241 3245
www.xerox.com/office
SPECIFICATIONS
Single-pass A3 colour laser • 35ppm (A4) 22ppm (A3) • 715MHz G4 Power PC • 384MB memory • 20GB internal hard disk • 10/100Mbits/sec Ethernet interface • USB2 • 650-sheet • Duplexer • Adobe Postscript 3 • PCL5c emulation • 1,200 x 1,200dpi • 150,000 pages/month
PROS Colour matching/correcting tools; speed; remote management
CONS A3 print speed
VERDICT
Attractive to print professionals and larger enterprise buyers

PERFORMANCE	★★★★★
FEATURES	★★★★½
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★

BROADBAND ROUTER

3Com Officeconnect

Simple to install and feature-packed

The 3Com Officeconnect ADSL Wireless 11g Firewall Router combines everything necessary for Lan and Internet connectivity

A small box with a big name, the 3Com Officeconnect ADSL Wireless 11g Firewall Router does exactly what you might expect. It combines a router, complete with built-in ADSL modem and four-port Ethernet switch, with an 802.11g wireless access point and a stateful packet inspection firewall. Network address translation (NAT) and support for Universal Plug and Play (UPnP) also come as standard, with URL filtering and a refreshingly simple setup routine for rapid deployment.

Installation is quick. Having plugged in the various leads, we pointed a browser at the default IP address and were guided through the setup process by a wizard. This asked for our ADSL login details followed by the wireless channel and SSID to use and that was it. The router was automatically restarted and began work straight away, using default settings appropriate for most small businesses.

Of course, one size doesn't always fit all, so it was good to find a surprising amount of customisation was possible. We were able to configure virtual web, email and other servers accessible across the firewall using the public address assigned by our ISP. We also found it easy to open or block specific ports, set up a logical DMZ (demilitarised zone) and either block or allow access to specific URLs from inside the Lan.

Another plus is the ability to configure the wireless interface for mixed or separate 802.11b/g access, with either WEP or the latest WPA (Wifi-protected access) encryption and optional Radius user authentication.

There's a lot of competition in this market but this combines just about everything needed for Lan and Internet connectivity.

DETAILS

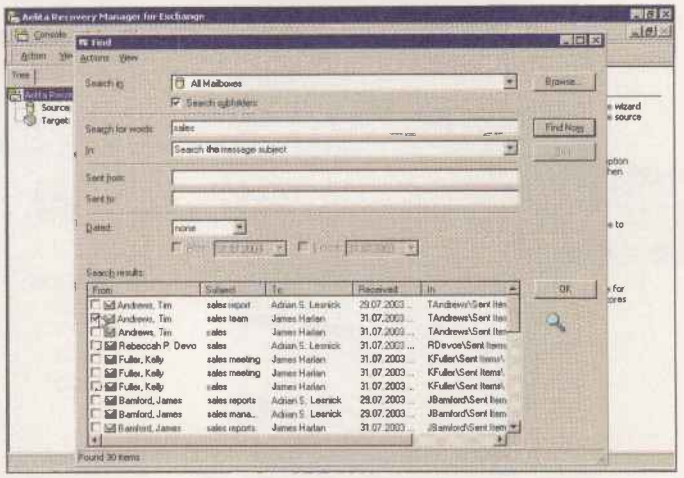
PRICE £135.13 (£115 ex VAT)
CONTACT 3Com 01442 438 000 www.3com.com
SPECIFICATIONS
ADSL router with built-in modem • four-port 10/100 Ethernet switch • 802.11g wireless access point • Stateful packet inspection firewall • URL filtering • WEP and WPA encryption • Supports 128 wireless and 253 wired connections
PROS Quick deployment; firewall management; wireless encryption
CONS No support for power over Ethernet
VERDICT
Affordable and feature-packed

PERFORMANCE	★★★★★
FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★

EXCHANGE RECOVERY

Aelita Recovery Manager

Time-saving for Exchange administrators



Aelita Recovery Manager for Exchange can be used to recover individual messages from ordinary bulk Exchange backups

Restoring Exchange Server mailboxes and individual lost messages can be a complex and time-consuming task. One approach calls for a separate recovery server to be configured and maintained, another for message-level backups to be prepared in advance. Aelita Recovery Manager (ARM) for Exchange does away with both, enabling individual mailboxes, messages and other information to be recovered to an operational server from ordinary backups.

The Aelita software can recover contents from any MTF (Microsoft tape format) tape produced using Microsoft backup tools or third-party applications. Support is included for tape libraries, and it's possible to restore selective mailbox content including contacts, public folders, notes, calendar entries, and messages.

Individual attachments can be recovered using the Aelita software, with a built-in search tool to locate information using criteria such as subject, date, recipient and/or sender and keywords in the text. An Outlook interface also allows messages to be previewed and selected items can be recovered direct to an online Exchange server or to an Outlook .pst file. Recovery Manager will replay log files to include items not committed to the message store when the backup was taken.

Recovery Manager for Exchange can be used with Exchange 5.5, 2000 and Exchange Server 2003. It is installed on a Windows 2000 host or later and managed using a Microsoft Management Console (MMC) plug-in, with wizard interfaces to guide you through the main processes.

Some practice is needed, but it's easier and quicker than the alternatives built into Exchange.

DETAILS

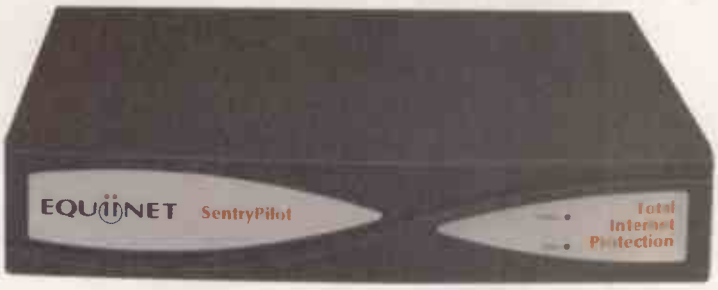
PRICE From £7.64 (£6.50 ex VAT) per mailbox
CONTACT Aelita Software 0118 902 6690 www.aelita.com
SPECIFICATIONS
200MHz Pentium • 256MB Ram • 20MB disk space • Windows 2000 SP3 • XP or Server 2003
PROS Recovers individual messages; no recovery server needed; works with Exchange 5.5 up
CONS Of less value with the improved Recovery Storage Group in Exchange Server 2003
VERDICT
Good for Exchange admins with 'accidentally' deleted messages

FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
EASE OF USE	★★★★★
OVERALL	★★★★★

SECURITY APPLIANCE

Equiinet Sentrypilot

Great value for small enterprises



Equiinet Sentrypilot addresses key security concerns on networks with up to 100 users

Sentrypilot is a neat Linux-based security appliance providing a good mix of anti-virus, anti-spam and URL filtering tools in one easy-to-deploy device.

The hardware looks like a small desktop PC. Inside is a Celeron processor, 1GB of memory and an 80GB hard disk. There's no screen or keyboard, and setup management is done via a browser.

Dual 10/100Mbits/sec Ethernet interfaces connect the appliance to the local network and the Internet, with the option of using Sentrypilot as a gateway, if required. Boot-up takes about a minute, after which a configuration wizard guides you through the initial setup with straightforward menu-based tools for more detailed management.

Rather than bundled Linux services, Equiinet has opted to use branded security tools, starting with Sophos Anti-virus. This can trap viruses downloaded by users browsing the web and scan incoming email traffic. The usual facilities to quarantine and/or delete suspect files are provided, with automatic updates from Sophos servers every hour.

Sentrypilot can be used with any local or web-hosted SMTP mail server, including Exchange, and, alongside the anti-virus protection, it provides two spam-filtering tools. The first of these, Spamcop, is used to trap messages from known spammers with a second utility, Spam Assessment, to rank remaining messages against a set of known spam characteristics. Those with a high score can be deleted at the server or marked as spam for later removal by users.

Content filtering is done using N2H2. Updates for all the utilities are included for a year. An extra year's subscription is £1,500 ex VAT, with three years for £3,000.

DETAILS

PRICE £3,519.13 (£2,995 ex VAT)
CONTACT Equiinet 01793 603 700
www.equiinet.com
SPECIFICATIONS
2.4GHz Celeron • 1GB DDR333 memory • 80GB hard disk • 2 x 10/100 Ethernet interfaces; Sophos Anti-virus • Spamcop and Spam Assessment • N2H2 URL filtering
PROS Setup and management; good mix of security tools
CONS Limited scalability (around 100 users); no intrusion detection
VERDICT
Good value for small enterprises looking to address their principal security concerns in one hit

PERFORMANCE	★★★★☆
FEATURES	★★★☆☆
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★☆

NETWORK MONITORING

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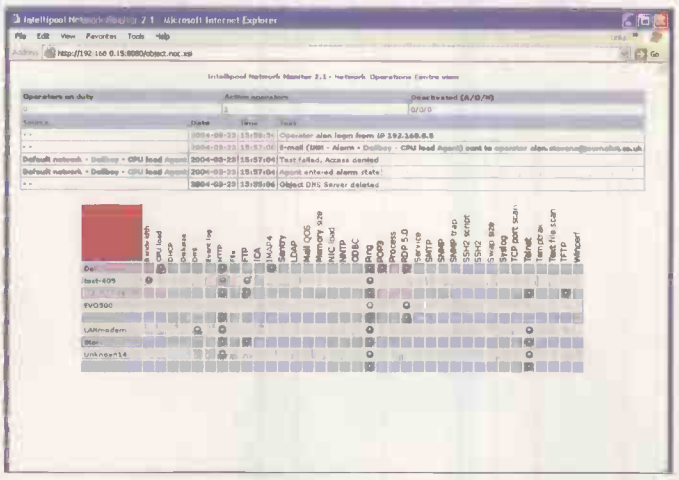

Intellipool Network Monitor can be used to monitor the status of a range of network and externally hosted services without the need for client software

Intellipool Network Monitor (INM) is an inexpensive network-monitoring tool that can be accessed and managed from any PC with a browser. It can monitor a range of network protocols and services without client software – even outsourced services hosted by ISPs and other third parties.

Hardware requirements are modest, just a Windows 2000 or XP PC with a network connection. The software installs as a background service, is multi-threaded and, like other monitoring tools, can automatically discover devices and applications to monitor.

Nothing needs to be added on the target systems, built-in agents enabling the software to work with a range of applications including HTTP, FTP, SMTP, POP3, DNS, and IMAP4 servers. An SNMP agent allows a range of devices to be monitored, and the software can monitor firewalls, collect data using Windows perfmon, and handle Linux, Unix and Windows systems.

The usual thresholds can be set and customisable action lists defined to initiate alerts when events occur, with support for email and network messaging as well as pager and SMS alerting. Events can also be logged to an XML file, Syslog server, Windows Event log, or ODBC database, and reports generated containing charts plus other information from a variety of sources.

There's no network-mapping facility – unlike conventional SNMP consoles – event consolidation isn't easy and the web interface can be sluggish. It can take a while to get to grips with, and the manual, translated from Swedish, is hard-going in places. Overall, though, the ability to transparently monitor external services more than makes up for shortcomings.

DETAILS

PRICE From £133.61 (£113.71 ex VAT) for five monitored objects
CONTACT Zen Software 0845 058 9058
www.zensoftware.co.uk
SPECIFICATIONS
800MHz Pentium III • 128MB Ram • 20MB disk space • Windows 2000 with SP3, or XP • Ethernet interface • Javascript-enabled browser
PROS No client software required; monitors externally hosted services
CONS No network mapping; web interface can be slow to update
VERDICT
Attractive if you want to monitor outsourced services

FEATURES	★★★☆☆
ENTERPRISE VALUE	★★★☆☆
EASE OF USE	★★☆☆☆
OVERALL	★★★☆☆

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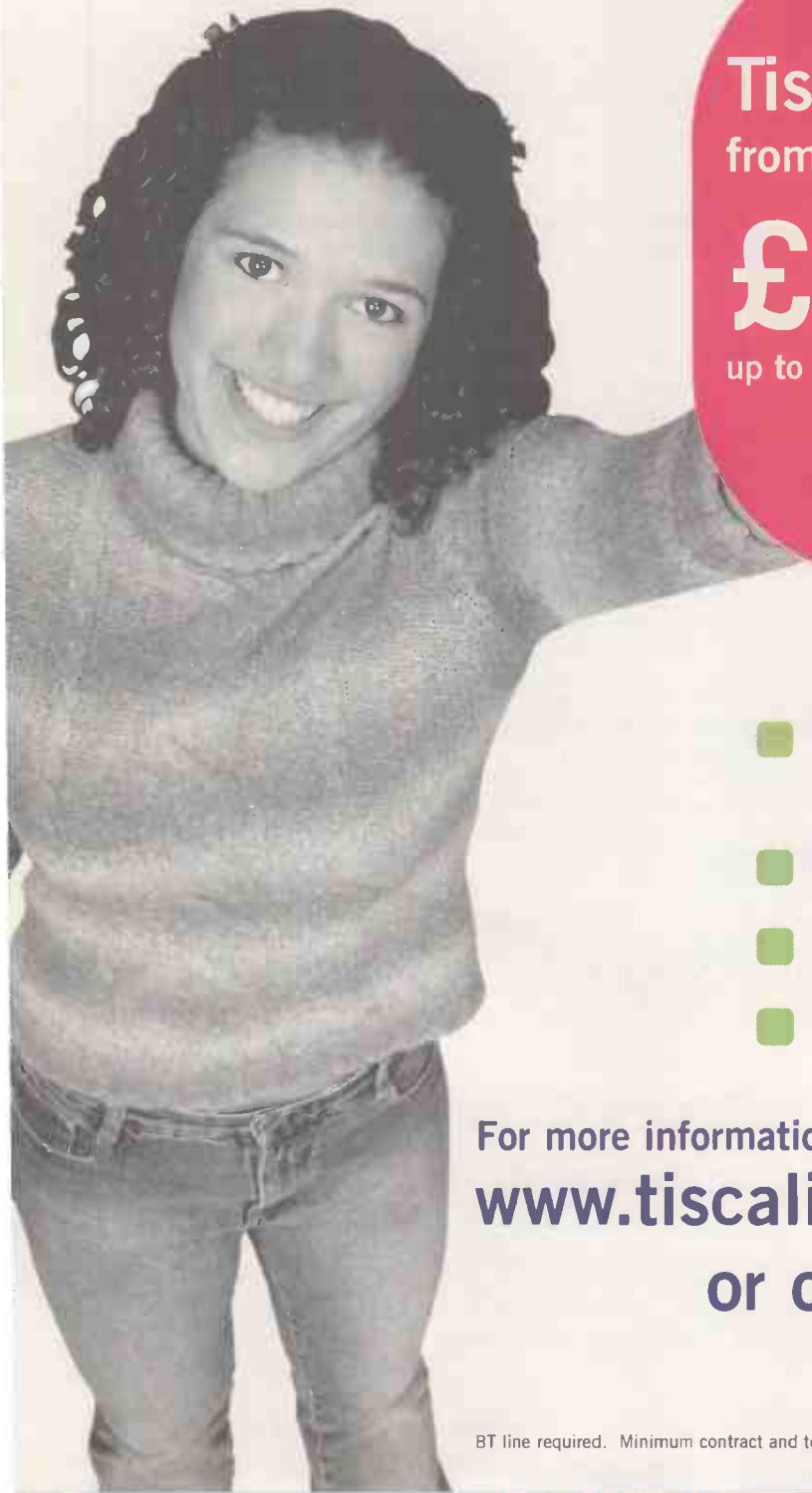

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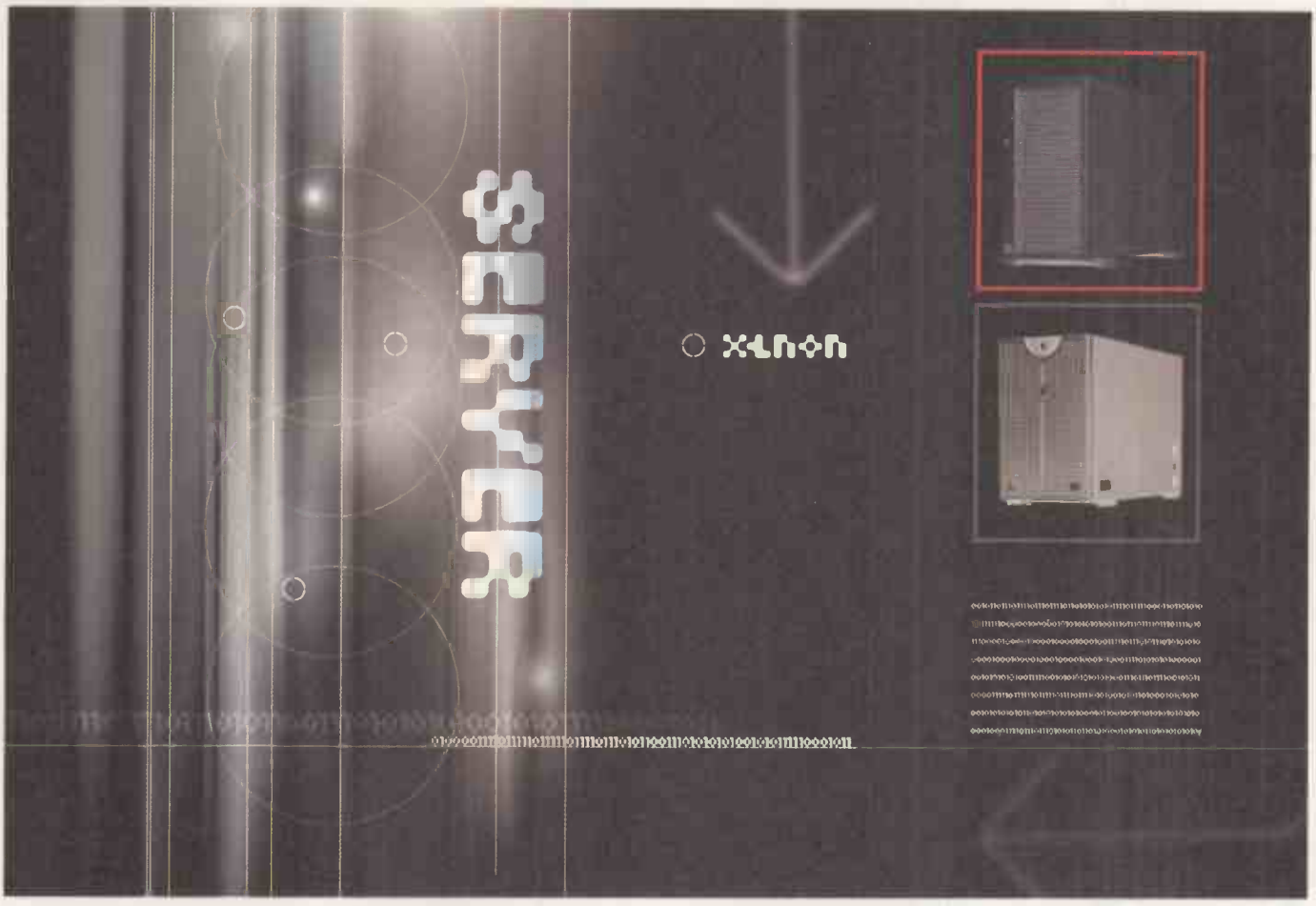

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Editor's Choice

Host with the most

WORDS & TESTING : ALAN STEVENS

If you're looking for a network server to host a variety of applications, from email to databases, you may find the answer with one of these dual Xeon devices

Network servers are multi-functional beasts that can be used for file and print sharing and as a platform for databases, email servers and other applications. Both uses are important but it's the latter we're concerned with here, as we take a detailed look at a number of high-specification dual Xeon servers.

We asked leading vendors for servers suitable for use by a medium-sized company or large enterprise workgroup. Each server should be able to act as a host for a mix of local web-based applications, an Exchange email server and SQL database engine.

A dual Xeon configuration is currently the preferred platform for such duties, supported by at least 1GB of memory and fast Raid-protected storage, all of which we requested. We also asked for Windows Server 2003 to be pre-installed for our performance tests, after which we left the rest of the specification up to the supplier.

One or two vendors were unable to get products to us in time but we ended up with a representative sample from four of the leading vendors. All were well up to the task but, although supplied to the same basic specification, they differed in a number of key areas, from processor speed to storage configuration. Likewise the amount of redundancy built in varied considerably and there were significant differences, too, when it came to management options. All of which we've put into context in the following pages.

The biggest of the four servers in this group test, the Poweredge 4600 from Dell was also the most comprehensively specified

Dell Poweredge 4600

In the past few years Dell has successfully applied the direct-selling model it uses for the desktop market to servers. As a result it's now seen as one of the top two vendors in this arena (HP is the other), especially when it comes to the kind of mid-range workhorse system featured in this group test. There's nothing exceptional about Dell's products, at least not in terms of technology. Rather the company sells on its reputation for supplying functional and well-built hardware with plenty of configuration options, backed by a high level of service and support.

The reputation for functionality was displayed well in this group test, with Dell submitting a Poweredge 4600 which turned out to be both the biggest and most comprehensively specified of the bunch. Indeed, it took two people to lift the large metal chassis, which is clearly made to be rackmounted, although the unit delivered to us was configured as a free-standing tower, as we requested. It came with four hot-swappable 300w power supplies, each sliding conveniently into place at the front of the unit, with sockets for two AC cords at the back for additional resilience. Dell also included an uninterruptible power supply (UPS) for good measure.

As with all the servers in this group test, the front door on the Poweredge is lockable and can be removed completely for access. The cooling fans are hot swappable and there's a small hinged door in the side giving quick access to a set of six hot-plug PCI-X expansion slots, something usually only found on high-end servers.

Inside the layout is well planned, with the two processor sockets on a highly integrated motherboard based around the Serverworks Grand Champion High End (HE) chipset. This provides the necessary SMP support, together with four-way memory interleaving, which enhances performance when the Dimms are configured in sets of four. These, in turn, are fitted in sockets on a pair of riser cards which together can accommodate a massive 24GB. Not that you'd need that amount, unless you're running a very large database. The review machine came with a more than adequate 4GB using PC2100 Registered DDR modules (two per riser) with ECC protection.

On the negative side, the Dell server was fitted with Xeon processors with a 400MHz front-side bus (FSB), compared to 533MHz on the other three servers we looked at. This, though, didn't seem to hold it back in our tests, largely because of the high-specification components used elsewhere.

When it comes to storage, the Poweredge 4600 can be very well specified, with the ability to accommodate up to 10 hard disks inside the chassis. Eight of these can be fitted into a set of hot-swap bays at the bottom of the unit, with two more in a separate pair of similar hot-swap bays above. Ours came ready to support this configuration, but the two extra bays are optional and replace the more usual fixed drive bays used, for example, to accommodate an internal tape drive. Use of those bays, then, necessitates the specification of an external tape drive instead; Dell included a fast Quantum SDLT320 drive with the review system for just this reason.

A number of disk capacities and speeds can be specified, enabling the Poweredge 4600 to be equipped with up to 1.46TB of internal storage. There's also a choice of integrated (Adaptec) and Dell plug-in storage controllers with flexible cabling to suit a range of requirements. With both performance and resilience in mind, the review system came with two 36GB 15,000rpm disks, configured as a mirrored pair, to hold the operating system and application code. These were managed using the built-in Adaptec controller while, for the data, Dell provided a set of four 73GB 15,000rpm drives configured as a Raid 5 stripe set. This array was managed using a Dell PERC4/DC Raid controller with a neat battery-backed cache module that can be removed from the adapter without losing its contents.

A pair of integrated Gigabit Ethernet interfaces are provided for network connection, to which Dell added a dual-port Intel Server adapter. There's also a remote management card with onboard modem and independent power supply. Dell Openmanage software is another standard inclusion.

The Poweredge 4600 can be preloaded with Windows or Red Hat Linux. Dell also offers a custom factory integration service where it will install and configure third-party hardware and software. Finally, you get a three-year on-site warranty, with additional service and support packages available to improve on the basic next-day service.

DETAILS

PRICE £6,082 (£7,146.35 ex VAT)
CONTACT Dell
0870 152 4699
www.dell.co.uk
PROS Up to 24GB memory; four-way memory interleaving; fast storage with lots of configuration options; 10 hot-swap disks; hot-swap PCI; remote management
CONS Very large, heavy chassis; 400MHz FSB
VERDICT
A top performer and highly configurable, this looks very expensive, but when you factor in all the extras it's good value

PERFORMANCE	★★★★☆
FEATURES	★★★★★
ENTERPRISE VALUE	★★★★☆
OVERALL	★★★★☆

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Based on Intel server building blocks, the Silveredge 1000HG from Evesham matches the big-name competition in terms of functionality and performance

Evesham Silveredge 1000HG

Evesham does what most of the smaller vendors do, which is to build servers using off-the-shelf components, supplied chiefly by Intel. In most cases that means the processors, motherboard, chassis, power supplies and extras such as management software, all of which benefit from Intel's three-year warranty. The company then offers a range of storage and networking options, from Intel and other manufacturers, together with a choice of pre-installed software and its own service and support packages. As such, despite lacking the R&D facilities of leading vendors, Evesham can still compete in technical terms with the big boys. It can also get a lot closer to its customers, with the result that it always scores highly in our customer satisfaction surveys.

The Silveredge 1000HG is typical of the type of product offered by Evesham. The main components are all from Intel, starting with a substantial metal chassis with three hot-swappable power supplies for extra resilience. The front door is lockable and there's a quick, access panel on the side of the unit to give easy access to hot-swappable fans. On the downside the 1000HG is pretty heavy even when lightly configured, but there's a rackmount kit which helps lift it off the ground and allow for easier servicing if needed.

A highly integrated server motherboard, based on Intel's E7501 SMP chipset, is fitted inside the 1000HG. In our case, this accommodated a pair of 3.06GHz Xeon processors with 512KB cache each and a 533MHz FSB. These can be accompanied by up to 12GB of ECC-protected memory with dual memory channels for performance. Evesham fitted 2GB for our tests, using four DDR266 Dimms.

Dual integrated Gigabit Ethernet interfaces provide the networking connectivity and there's plenty of scope for further expansion with six PCI slots on three independent buses. Three of these are 64bit PCI-X compatible, of which two are clocked at 100MHz and one at 133MHz. Hot-swap PCI isn't supported.

On the storage front there are lots of options, with room for up to 10 internal hard disks inside the chassis, holding up to 1.46TB of information. These can all be hot-swappable and, as on the Dell server, there's a large cage of eight drive bays in the base of the unit to which can be added a second pair above. When specified, these extra bays replace the fixed drive slots used, primarily, to take a local tape backup drive. Our server came without the extra disk bays, and Evesham fitted an internal Sony AIT-2 tape drive which we felt was a good choice on a server of this size.

With integrated dual-channel Ultra320 SCSI controllers the Evesham server can easily cope with a full complement of disks, with a choice of cabling options. However, there's no built-in Raid support, so for our tests Evesham fitted an LSI Megaraid adapter with 64MB of onboard cache in one of the 64bit expansion slots. This was then used to manage a set of three 73GB Ultra320 SCSI hard disks configured as a Raid 5 stripe set, on which were configured both the system boot and data partitions.

Maxtor drives were used here, with 10,000rpm spin speeds. They aren't quite state of the art but are reliable and good performers – and a lot cheaper. We prefer the Dell approach with separate, mirrored, disks for the operating system and the 15,000rpm disks are slightly quicker than those used in the 1000HG. However, the Silveredge scored highly in our labs tests, coming out top overall, marginally ahead of the more expensive Poweredge 6400. For our tests we had Windows Server 2003 installed but earlier versions of Windows and an alternative Linux installation can be specified.

The usual server monitoring hardware is built into the Intel motherboard, along with a baseboard management controller that allows for in-band and out-of-band remote management without the need for additional adapters. The motherboard ships with Intel's own server management software and other tools to aid in troubleshooting and server administration.

As already mentioned, the Intel components are all covered by a three-year warranty, as is the server as a whole, with on-site support as standard for the first two years. Evesham then offers a range of service and support packages to improve on response time and other warranty terms, and the company employs its own workforce to service such agreements. It also offers network design, installation and other specialist services to match the offerings available from the bigger vendors.

DETAILS

PRICE £4,111.33 (£3,499 ex VAT)
CONTACT Evesham
0870 160 9500
www.evesham.co.uk
PROS Top spec Intel components; up to 12GB of memory; up to 10 internal disks; 133MHz PCI-X expansion; AIT-2 tape backup; built-in remote management
CONS Large chassis; no battery backup for cache on Raid controller
VERDICT
The top performer in the labs, the Silveredge 1000HG is a good example of an Intel OEM server from one of the UK's top independent vendors

PERFORMANCE	★★★★★
FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★

Now in its third generation, the venerable Proliant ML350 is still a solid performer, with a specification to match more recent competitors

HP Proliant ML350 G3

One of the most important things to understand about HP is that it prefers to sell its products through partners, not direct like Dell or Evesham. It's also one of the longest established of the vendors, having recently celebrated the tenth birthday of its Proliant server brand. The company sells its servers on availability first and performance second. That doesn't mean Proliants are particularly slow – far from it – but the company feels that it's a lot easier for customers to configure in performance than reliability. That approach has won HP a lot of business over the past decade.

With that in mind, we weren't that surprised when HP submitted a Proliant ML350 server for this group test, a model that's been around for a couple of years or more. However, despite being in its third generation (hence the G3 label), the specification has been kept up to date, such that it's more than a match for what the competition now has to offer.

Proliant ML models are all designed to be free-standing with the ML350 housed in fairly compact metal tower casing with a lockable front door and removable side panel for access. A single power supply was fitted in the review system, but there's space for a backup if required, and both are hot-pluggable. Fans can't be hot-plugged, though, and there's no hot-swapping of PCI adapters on this model. However, a rackmount kit is available and, as on the full rackmount products, blue identification lights can be lit up under software control to locate servers needing attention.

Inside the casing the layout is neat, with a compact yet highly integrated HP motherboard featuring a Serverworks Grand Champion LE chipset. This is capable of supporting Xeon DP processors with a 533MHz FSB, clocked at up to 3.06GHz. The review server, however, came with the slightly slower 2.8GHz processors fitted, with 512KB cache per CPU.

Up to 8GB of ECC-protected memory can be installed into the four Dimm slots arranged alongside the processors, the chipset used supporting two-way interleaving. We were sent 2GB for our tests fitted as two 1GB PC2100 DDR modules running at 266MHz.

Unfortunately, networking isn't quite as well served as on some of the other products, with just one integrated Gigabit interface on the ML350 motherboard. Still, it's easy enough to fit plug-in Lan adapters with one 32bit/33MHz PCI expansion slot and four 64bit/100MHz PCI-X slots available. On the base model all these slots will be empty and the storage is managed using an integrated dual-channel Ultra320 SCSI controller. However, on Raid-equipped models, such as the server we reviewed, at least one of the slots will be occupied by a hardware Raid controller to interface to the hard disks.

In our case the adapter was HP's Smartarray 532 cabled to an array of three 36.4GB, 10,000rpm disks, also from HP. These were configured as a single Raid 5 stripe set holding both operating system and data partitions. An extra three disks can then be added using the standard six hot-swap drive bays, and a second two-drive cage can also be fitted.

That's still fewer disks in total than on the Dell and Evesham servers, which can both hold 10 disks. However, with support for the latest 146.8GB disks internal capacity is still just over a terabyte. Although the HP disks weren't as fast as the 15,000rpm units on the Dell, they didn't cause the Proliant to lag much behind the Poweredge in our performance tests.

A tape drive wasn't included with the server, but HP offers a wide range of internal and external products. Just about every format is catered for, including the latest DAT 72 and LTO Ultrium drives, to match the backup capacity required.

On the management front, the Proliant Essentials Foundation Pack contains HP's Insight Manager server management application, together with Smartstart to help install operating system software if not pre-installed. Other Proliant Essentials packs can then be added to help with large-scale deployment and manage complex environments, for example. You can also add remote management using HP's plug-in Remote Insight Lights-Out Edition adapter.

A three-year on-site warranty comes as standard, with the Proliant providing pre-failure protection for important components such as the processors, memory and disks – and the management software warns you if any of these look likely to fail. Additional service and support packages can then be bought to improve on the terms of the base cover, with network planning, installation and support packages available, too.

DETAILS

PRICE £3,378.13 (£2,875 ex VAT)
CONTACT HP
0845 270 4222
www.hp.co.uk
PROS Long-established and well-supported brand; good range of built-in and add-on management options
CONS Tape drive extra; single integrated network interface
VERDICT
Nobody ever got fired for buying an HP server and the Proliant ML350 is no exception, offering a good mix of availability and performance features at a reasonable price

PERFORMANCE	★★★★★
FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★

Aimed at companies looking for processing power on a budget, the NEC Express5800/120Ef was the cheapest server in our group test

NEC Express5800/120Ef

You might associate NEC more with desktops and notebook PCs than servers, however the company has been in this market for a number of years selling a range of products under its Express5800 brand. These are based largely on Intel building blocks, just like the servers supplied by Evesham and other OEMs, although NEC does a lot more in terms of customisation to identify its offerings. In the UK the Express5800 servers are available direct, through the NEC-online website, and the company provides its own support and service. In addition it sells through business partners, which add extra value in terms of things like application support, network planning and installation and other services.

There are several servers in the Express5800 family, and the 120Ef we tested is aimed at the medium-sized workgroup or company looking for dual-processor power at an affordable price. The hardware is housed in a compact tower chassis with an optional rackmount kit available and, although the review server had just one power supply, a second hot-swap supply can be fitted for extra reliability. Similarly, redundant fans can be specified (these can't be hot swapped) while, as on the other servers, the controls and storage are all protected by a lockable front cover.

The motherboard in the 120Ef features a Serverworks Grand Champion SL chipset capable of accommodating two 3.06GHz Xeon processors with a 533MHz FSB. Our test server came with a pair of 2.8GHz processors onboard, with 512KB of cache per CPU. A gigabyte of ECC-protected DDR266 memory was also supplied, the NEC server having a relatively modest memory limit of just 4GB. That's a lot less than the others reviewed here (the Dell Poweredge, for example, can be configured with six times that amount) and could be an issue when it comes to memory-hungry database applications. If this is the case, a different Express5800 model, with greater expansion potential, would be a better starting point.

The storage side of the equation needs careful consideration too. Although the NEC server can be specified with Ultra320 SCSI disks, like those used on the other systems in the group test, the model we looked at came with Serial ATA (Sata) storage configured. This makes the end product a lot cheaper, as Sata drives cost a fraction of the Ultra320 devices. However, with a spin speed of just 7,200rpm, compared to up to 15,000 with Ultra320, and a lower transfer rate, Sata disks currently lack the performance of SCSI. It therefore came as no surprise to find the 120Ef eclipsed by the other three servers in our Labs tests.

On the plus side NEC fitted a Promise Fast Trak Raid controller with 128MB of battery-backed cache, which certainly helped bolster throughput in our tests. So, even though significantly slower than the others, the 120Ef still turned in respectable figures for a server in its price bracket. The Promise adapter also enabled the four 120GB disks to be configured as a fault-tolerant Raid 5 array, with the disks installed in four out of the six hot-swap bays located at the front of the chassis.

Configured this way the 120Ef certainly provides affordable storage for a small to medium-sized workgroup or business, the NEC server coming in at a much lower price than the other three. However, the number of disks can't be expanded when Sata is used and for maximum performance and flexibility we'd recommend the more expensive Ultra320 SCSI configuration. Similarly, we felt the AIT-1 tape drive fitted was a little on the small side (35GB) given the capacity of the disks involved although, again, it helps keep the overall price low.

There's just one integrated Gigabit Ethernet interface on the 120Ef motherboard, and NEC complements this with a second, plug-in, Lan adapter. Both are from Intel with drivers that support interface teaming. With the Raid card that meant two of the five expansion slots were occupied, with four 64bit slots and one 32bit connector provided, all clocked at a slightly disappointing 33MHz. Interestingly the Raid controller was in the 32bit slot, which may also have contributed to the low performance results.

In its favour, the Express5800/120Ef is a well-constructed server with the usual circuitry for hardware monitoring built onto the motherboard. You also get a copy of NEC's own ESMPRO Windows console for in-band management. Windows or Red Hat Linux can be pre-installed and there's a three-year on-site warranty which can be improved upon by purchasing one of several NEC Ultracare packages.

DETAILS

PRICE £2,701.33 (£2,299 ex VAT)
CONTACT NEC 0870 010 6328
www.nec-online.co.uk
PROS Price; good support services
CONS 4GB memory limit; Sata storage limits performance and capacity; low-capacity tape drive; single integrated Lan interface
VERDICT
A lightweight compared to the others in this group test, the Express5800/120Ef can be enhanced with SCSI storage and, given its specification, is good value for money

PERFORMANCE	★★★★★
FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★

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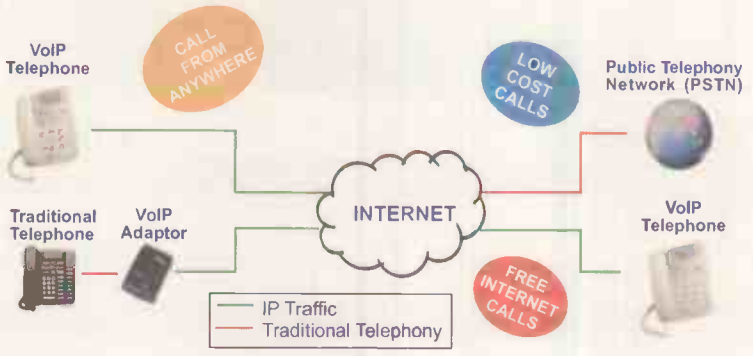

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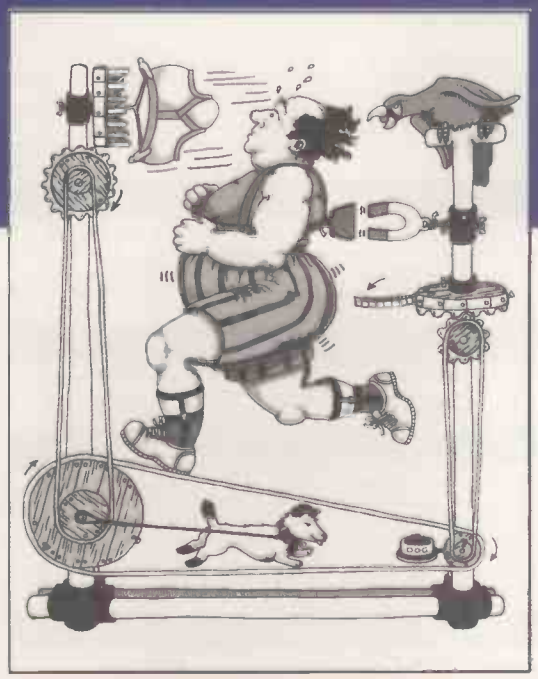

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Table of features

MANUFACTURER	**DELL**	**EVESHAM**	**HP**	**NEC**
PRODUCTS	**POWEREDGE 4600**	**SILVEREDGE 1000HG**	**PROLIANT ML350 G3**	**EXPRESS5800/120EF**
Price inc VAT (ex VAT)	£6,082 (£7,146.35)	£4,111.33 (£3,499)	£3,378.13 (£2,875)	£2,701.33 (£2,299)
Telephone	0870 152 4699	0870 160 9500	0845 270 4222	0870 010 6328
URL	www.dell.co.uk	www.evesham.com	www.hp.co.uk	www.nec-online.co.uk
CHASSIS				
Rackmount option	✓ (6U)	✓ (5U)	✓ (5U)	✓ (5U)
Redundant power	✓	✓	Option	Option
Hot-swap fans	✓	✓	✗	Option
PROCESSORS AND MEMORY				
Processor type	Intel Xeon	Intel Xeon	Intel Xeon	Intel Xeon
Processor clock speed	3GHz	3.06GHz	2.8GHz	2.8GHz
Motherboard chipset	Serverworks GC HE	Intel E7501	Serverworks GC LE	Serverworks GC SL
Front-side bus	400MHz	533MHz	533MHz	533MHz
Installed memory	4GB	2GB	2GB	1GB
Maximum supported memory	24GB	12GB	8GB	4GB
NETWORKING				
Integrated Ethernet interfaces	2	2	1	1
Additional Lan adapter fitted	✓ (2 x Gigabit)	✗	✗	✓ (1 x Gigabit)
STORAGE				
Maximum number of hard disks	10	10	6	4
Hot-plug disks	Option	✗	✓	✓
Maximum internal storage	1.46TB	1.46TB	1.174TB	626GB
Disks tested	2 x 36GB/4 x 73GB	3 x 73GB	3 x 36.4GB	4 x 120GB
RPM disks tested	15,000	10,000	10,000	7,200
Storage interface tested	Ultra320 SCSI	Ultra320 SCSI	Ultra320 SCSI	Sata
Tape drive	SDLT320	AIT-2	Not specified	AIT-1
RAID SUPPORT				
Raid card fitted	Dell PERC4/DC	LSI Megaraid	HP Smartarray 532	Promise Fast Trak S150 SX4
Cache memory on Raid controller	128MB	64MB	64MB	128MB
Battery backup	✓	✗	Option	✓
EXPANSION				
PCI slots	1 x 32bit/33MHz	3 x 32bit/33MHz	1 x 32bit/33MHz	1 x 32bit/33MHz
PCI-X slots	6 x 64bit/100MHz	2 x 64bit/100MHz; 1 x 64bit/133MHz	4 x 64bit/100MHz	4 x 4bit/33MHz
MANAGEMENT, SERVICE AND SUPPORT				
Server management software	Dell Openmanage	Intel Server Management	HP Insight Manager	NEC ESMPRO
SNMP support	✓	✓	✓	✓
Remote management	✓	✓	Option	Option
Standard warranty (years)	3	3	3	3
SCORES				
Performance	★★★★½	★★★★★	★★★★½	★★★½
Features	★★★★★	★★★★½	★★★★½	★★★
Enterprise value	★★★★½	★★★★★	★★★★★	★★★★½
Overall	★★★★½	★★★★★	★★★★½	★★★½

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THE PC COMPANY THAT DELIVERS LOWEST PC PRICES AND CUSTOMER SATISFACTION

Tiny.COM is well known for having the lowest PC prices, but you may not be aware that the company relies on recommendations from existing customers to generate most of its sales. Below is an interview with David Hotson, Tiny.COM Customer Service Director, who explains how customer satisfaction is achieved whilst still keeping costs low.

Tiny.COM customer services

David Hotson
Customer Service Director
Tiny.COM

How big is the Tiny.COM services department?

DH: We have over 300 staff working in technical support, customer services and service centre. The support department is structured by team with each team specialising in the different aspects of support. All Tiny.COM staff have a comprehensive knowledge base that is constantly updated as new products and technology develop. The majority of staff are located at our Headquarters in Burnley.

A unique advantage we have is that the support teams are located in the same building as our other operations including sales, manufacturing, service centre, despatch and product development. This enables us to quickly resolve any questions and drive customer satisfaction improvements through real time communications.

How do you monitor the quality of your support?

DH: We have a number of initiatives to ensure our advisors maintain the standards we set at recruitment and training stages. Initially we are very selective due to our conclusive recruitment process. This involves CV analysis, telephone and face-to-face interviews, technical tests and then placing the prospective agents in the front line listening to calls. They are then trained and tested before moving into an Academy where our Coaches support them whilst they take calls. This quality focus continues when they go live with Coaches and with Team Managers checking a number of calls each week. Calls are recorded in order for us to continually develop better service for our customers.

All these staff must be very costly. How can you call yourself the low cost PC Company?

DH: 12 months return-to-base warranty and free customer service is included in the price of the PC. However, in order to ensure high quality of service and still keep our prices low, technical support and tutorial training is available for purchase at extra cost. We can provide support to most of our customers for up to 5 years and are now also able to offer a 24-hour support service, seven days a week

"We try to meet expectations by telling customers exactly what they will get or will not get"

The majority of our sales are to customers who want a replacement or additional PC and many do not wish to pay for support or training as they are familiar with PCs. Support packages are however, convenient for first time buyers and we recommend that customers take advantage of this additional service at extra cost.

By offering technical support as an option to the customer we can help contribute a little towards keeping our prices low, but the main reasons why Tiny.COM has low prices are:–

1. Huge component buying power – our group has the largest component buying power in Europe.
2. Manufacture in the UK, which cuts out depreciation and transport costs
3. Low overheads such as marketing – we don't advertise on TV and don't have expensive retail stores.

Tiny had poor perception for customer service many years ago. How have you changed this?

DH: At the time, Tiny was owned and run by OT Computers Ltd and this parent company went into administration leaving customers unsupported. Tiny was bought by our parent group and we have continued to service and support millions of customers affected by the administration, even though, we were not legally obliged to do so. This has helped change the perception of the new Tiny and resulted in a lot of our new business generating from previous Tiny PC owners.

With Tiny.COM, we are focused on keeping our prices the lowest possible, and to deliver on our promises. We try to meet expectations by telling customers exactly what they will or will not get. I am pleased to report that we are meeting customer service expectations in addition to customers receiving a 'cracking' low price! That's the reason why so much of our business comes from customer recommendation.

Why don't you offer on-site service?

DH: We have offered onsite services before and our experience is that onsite service usually results in lower customer satisfaction. The main reason is that there are usually a minimum of two visits required to the customer's home to fix the PC. This can be inconvenient for the customer, as they usually have to wait at home for the engineer to visit. By collecting the PC, fixing it in our service centre and returning to the customer, we can offer a far better service, particularly as our engineers are very familiar with the products and have a full range of spares available to enable a first time fix.

Tiny.COM have over 300 employees working in support services

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E-Code: 00874

- **XP2800+** AMD Athlon XP2800+ Processor
- **512MB** DDR RAM
- **80GB** 7200 RPM Hard Drive
- **17"** SVGA CRT Monitor (16" Visible)
- **DVD-Rw** 8x Multiformat (+/-) DVD Rewriter Drive
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- **128MB** nVidia GeForce 4 Graphics (with TV Out)
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Plus standard Features including 6 Channel Sound Onboard, Multimedia Keyboard, Wheel Mouse, Tiny Stereo Speakers, 1.44MB Floppy Drive, USB 2.0 Ports x4, Parallel and Standard Ports, Dedicated high speed Supanet optimised 56k modem* (MODEL 2127)

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Tiny Home 3000-64

E-Code: 00852

- **Athlon 64** AMD Athlon™ 3000 Processor
- **512MB** DDR RAM
- **80GB** 7200 RPM Hard Drive
- **15"** TFT Flat Panel Monitor
- **CD-Rw** 52X CD-RW Rewriter/ CD-Copier Drive
- **DVD** 16x DVD-ROM Drive
- **128MB** ATI 9200SE Graphics (with TV Out)
- **10/100** Ethernet Port for Networking

Plus standard Features including 6 Channel Sound Onboard, Multimedia Keyboard, Wheel Mouse, Tiny Stereo Speakers, 1.44MB Floppy Drive, USB 2.0 Ports x4, Parallel and Standard Ports, Dedicated high speed Supanet optimised 56k modem* (MODEL S2422)

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Tiny Home 3000 Demon

E-Code: 00814

- **XP3000+** AMD Athlon XP Processor
- **512MB** DDR RAM
- **80GB** 7200 RPM Hard Drive
- **CD-Rw** 52X CD-Rewriter/ CD-Copier Drive
- **DVD** 16x DVD-ROM Drive
- **9800** ATI Radeon 9800 with TV Out & DVI
- **PC-TV** with remote control
- **Firewire** 1394 Firewire Ports

AMD Athlon XP

Plus standard Features including 10/100 Ethernet Port, 6 Channel Sound Onboard, Multimedia Keyboard, Optical Mouse, 1.44MB Floppy Drive, USB 2.0 Ports x4, Parallel and Standard Ports, Dedicated high speed Supanet optimised 56k modem* (MODEL 2420)

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AMD 64 Athlon™

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Tiny Power 3000-64 E-Code: 00853

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- **1024MB** DDR RAM
- **200GB** 7200 RPM Hard disk
- **DVD-Rw** 8x Multi-format (+/-) DVD-Rewriter Drive
- **DVD** 16x DVD-ROM drive
- **256MB** ATI Radeon 9200 All-In-Wonder graphics (with TV Out & DVI)
- **15"** TFT Flat Panel Monitor
- **PC-TV** with Remote Control
- **FIREWIRE** 2x 1394 Firewire Ports
- **10 in 1** Multi-Format Card Reader

Plus standard Features including 10/100 Ethernet, 6 Channel Sound Onboard, Multimedia Keyboard, Optical Mouse, 2.1 Subwoofer Stereo Speakers, 1.44MB Floppy Drive, USB 2.0 Ports x4, Parallel and Standard Ports, Dedicated high speed Supanet optimised 56k modem* (MODEL S2822)

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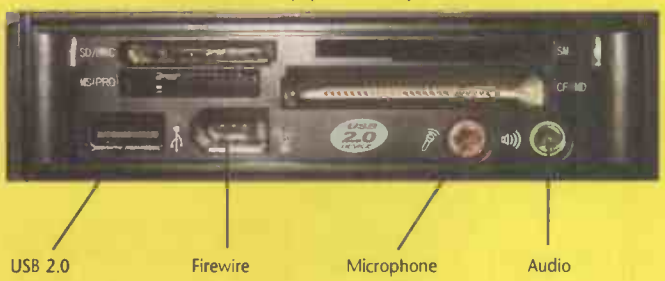

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- **400GB** 7200 RPM Hard disks (2x200)
- **DVD-Rw** 8x Multi-format (+/-) DVD-Rewriter Drive
- **DVD** 16x DVD-ROM drive
- **9800** ATI Radeon 9800 128MB graphics (with TV Out and DVI)
- **17"** TFT Flat Panel Monitor
- **PC-TV** with Remote Control
- **FIREWIRE** 2x 1394 Firewire Ports
- **10 in 1** Multi-Format Card Reader

Plus standard Features including 10/100 Ethernet, 6 Channel Sound Onboard, Multimedia Keyboard, Optical Mouse, 2.1 Subwoofer Stereo Speakers, 1.44MB Floppy Drive, USB 2.0 Ports x4, Parallel and Standard Ports, Dedicated high speed Supanet optimised 56k modem* (MODEL S2822)

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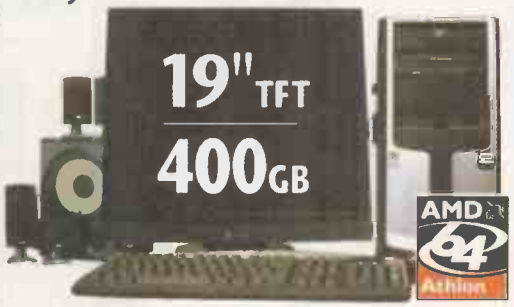

- **Athlon 64** AMD Athlon™ 64 3400+ Processor
- **1024MB** DDR RAM
- **400GB** 7200 RPM Hard disk (2x 200GB)
- **DVD-Rw** 8x Multi-format (+/-) DVD-Rewriter Drive
- **DVD** 16x DVD-ROM drive
- **9800** 256MB ATI Radeon 9800 XT Graphics (with TV Out & DVI)
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- **10 in 1** Multi-Format Card Reader

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Tiny Mediabook U2800+

E-Code: 00879

AMD Athlon XP-M

XP2800+ AMD Athlon™ Mobile Processor
512MB DDR RAM
40GB Hard Disk
15" XGA TFT Screen (1024x768)
DVD/CD-Rw DVD-ROM and CD-Rewriter Combo drive
64MB Integrated Graphics
3-in-1 Multiformat Card Reader
Wi-Fi 802.11b Wireless Adaptor

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Tiny Mediabook U3000+ 1024

E-Code: 00880

AMD Athlon XP-M

XP3000+ AMD Athlon™ Mobile Processor
1024MB DDR RAM
40GB Hard Disk
15" XGA TFT Screen (1024x768)
DVD-Rw Multiformat DVD Rewriter drive
64MB Integrated Graphics
3-in-1 Multiformat Card Reader
Wi-Fi 802.11b Wireless Adaptor

Plus standard features including 10/100 Ethernet, 56k modem, TV-Out, 1394 Firewire Port, Advanced keyboard and Two Button Track Pad, Built-in 1.44MB Floppy Drive, Twin Speakers, 4x USB 2.0 Ports, Li-ion Battery and AC charger, PCMCIA. (Model N2515)

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Tiny Mediabook MK64 3200

E-Code: 00840

AMD 64 Mobile Athlon

Athlon 64 AMD Athlon™ 64 3200 'mobile' CPU
1024MB DDR RAM
80GB Hard Drive
15" SXGA+ Ultra-High Resolution TFT Screen (1400x1050)
DVD-Rw Multiformat DVD Rewriter drive
128MB ATI Radeon 9600 dedicated Graphics
3-in-1 Built-in multiformat card reader
Wi-Fi 802.11b Wireless Adaptor
XP Pro Microsoft® Windows XP Professional edition
12 Cell Long Life Li-Ion Battery

Plus standard features including 10/100 Ethernet, TV-Out, 1394 Firewire Port, 56k V90 modem, Advanced keyboard and Two Button Track Pad, Built-in Microphone and Twin Speakers, 4x USB 2.0 Ports, AC charger, PCMCIA. (Model N2912)

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Tiny Mediabook MCW1.7 Pro

E-Code: 00842

intel inside centrino MOBILE TECHNOLOGY

Intel Pentium-M Mobile 1.7GHz Processor – Intel Centrino Technology
1024MB DDR RAM
80GB Hard Drive
15.4" WXGA+ Ultra-High Resolution TFT Screen (1280x800)
DVD-Rw Multiformat DVD Rewriter drive
64MB Intel Integrated Graphics
56K V90 Modem
Wi-Fi 802.11b Wireless Adaptor
XP Pro Microsoft® Windows XP Professional edition
Multi Format Card Reader Built-in

Plus standard features including 10/100 Ethernet, TV-Out, 1394 Firewire Port, Advanced keyboard and Two Button Track Pad, Built-in Microphone and Twin Speakers, 3x USB 2.0 Ports, AC charger, PCMCIA. (Model N2914)

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How we tested

Given the high specification of these servers, there was little point in running file sharing tests. All four are more than capable of servicing the file and print sharing needs of a large network and, when it comes to such tasks, Lan bandwidth is a much bigger limiting factor than server specification.

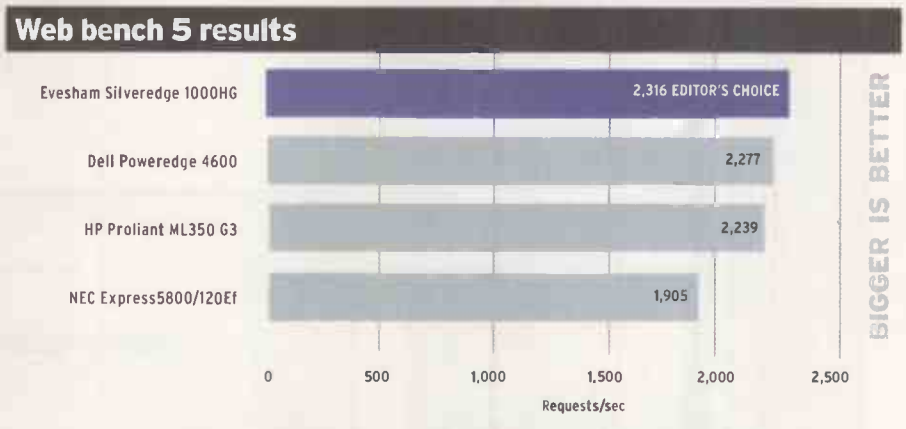
Instead we concentrated on application hosting performance, which is dictated by the server processor and memory configuration together with the type of storage in the host server and the way it's configured. To get an objective measure we ran web-based application sharing tests using the Web bench benchmark. This measures the number of client requests that can be processed by the server using a test suite that requires a mix of server-side processing, network and disk access. A full complement of 48 clients was used, representing just under 500 virtual users.

The best performer overall was the Silveredge 1000HG from Evesham (see graph). However, it was only marginally quicker than the Dell Poweredge 4600 and HP Proliant ML350 G3, with the NEC Express5800/120Ef a distant fourth.

The fact that there was no clear winner is to be expected given the similar specs of the servers. What was interesting, however, was how important it was to get the right mix of processor, memory and storage technologies. On the Dell server, for example, the slower FSB was compensated for by a very fast and well-configured storage subsystem. Equally, the components in the Evesham server were well matched, enabling it to outpace the Dell even though it was equipped with slower spinning disks.

Of course, you can always tinker with hardware and either add or change components to get the performance you need. However, there are limits and, if nothing else, these results show how important it is to get the basics right before you consider doing anything else.

The Silveredge 1000HG from Evesham came out top in our application sharing tests. However, it was a close-run thing, with the Dell and HP servers only marginally behind.



Editor's Choice

Servers are important network components that need to be measured on a number of criteria. These include not just performance and capacity, but also their ability to keep running no matter what, together with the level of backup and support provided by the vendor.

Larger enterprises will, invariably, buy chiefly on reputation first and specification second, sticking with one top-tier vendor such as Dell or HP. If this is the case, then either of the servers submitted by those vendors would suffice as an application-hosting platform.

Equally the Dell Poweredge and HP Proliant would be good choices for companies that don't have a specific vendor preference. Admittedly the Proliant ML350 is starting to look a little long in the tooth, but it's well specified, a good performer and is very well supported by HP and its partners. Similarly, although the Poweredge 4600 we looked at was over-engineered and therefore on the expensive side, cheaper but equally impressive configurations are available from the direct seller.

Evesham Silveredge 1000HG

Another major benefit with a big name such as Dell or HP is that you know exactly what you're going to get and can assume a high level of service and support. However, much the same can be said if you buy from companies such as NEC or Evesham that offer servers based on standard Intel building blocks. The Intel input is key here, conferring leading-edge performance and a high degree of proven reliability on the end result. Moreover, Intel covers its components with an independent warranty which gives peace of mind.

With that in mind we've not gone for a big name for our **Editor's Choice** in this month's group test. Rather we've awarded the honour to **Evesham's Silveredge 1000HG**. The company may not be a market leader, but that doesn't stop the Silveredge 1000HG being an excellent server, offering a good mix of performance, features and functionality at an affordable price. The UK company also has an enviable reputation among its desktop users for quality service and support, and we've no reason to doubt its ability to achieve similar results when it comes to servers too.

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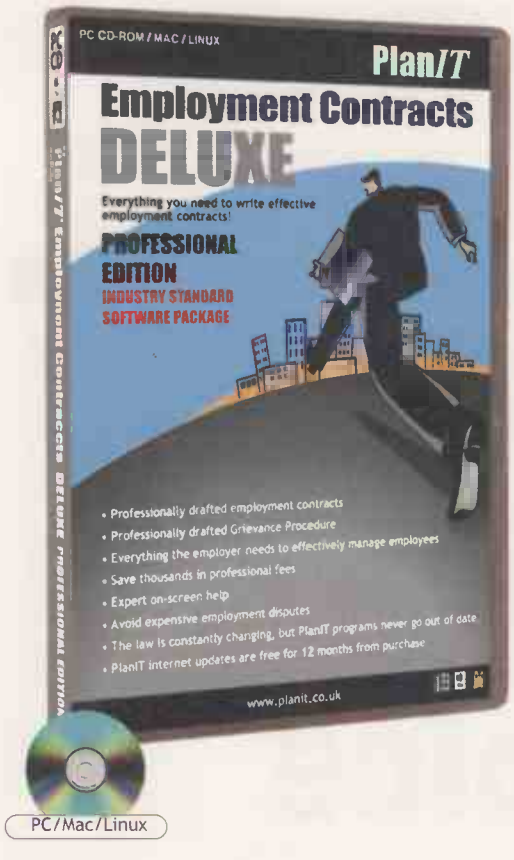
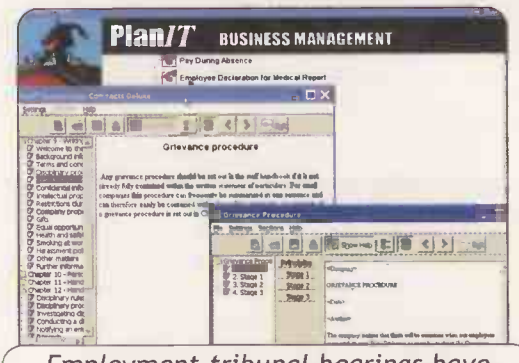


PC/Mac/Linux



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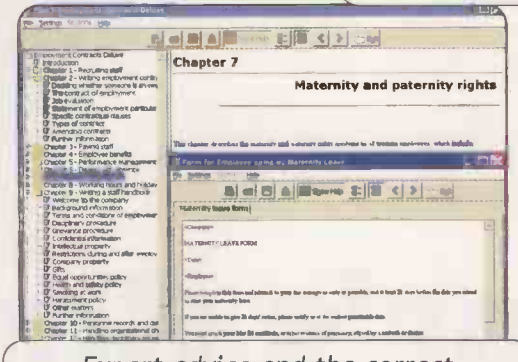

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Hands on

EDITED BY NIGEL WHITFIELD

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More queries answered in this month's Question time

Tweak your Tivo with a little help from the Hardware column

Turn your camcorder into a webcam – see Digital imaging and video for how to do it

July's Hands on section is full of the answers to questions both simple and obscure. In Question time, you'll find the solutions our experts have found for your problems – and if you still have niggling things wrong with your PC, just email one of our contributors; you'll find all their addresses at the end of Question time.

Network users will find plenty of troubleshooting tips in this month's column from Alan Stevens, while those with Wifi can find out the truth about throughput from Guy Kewney in his Mobile computing column – you can finally see beyond the myth of 11 or 54Mbits to the real speed. And if your living room is graced by a Tivo, take a look at Gordon Laing's Hardware column, where you can find out how to add a network card, upgrade the disk or control it over the Internet. In Digital imaging Ken McMahon looks at the difference between Cmos and CCD sensors and what they mean for creative types. And he's got helpful tips on how to recover that once-in-a-lifetime shot that you've just accidentally deleted from the memory card.

In the world of Windows, Tim Nott explains the source of the gid files that can appear on your hard drive, looks at tricks with Favourites and provides a useful round-up of the command line enhancements in Windows XP. Tim Anderson gives developers the lowdown on programming Microsoft's Windows Media Player in Visual programming, and takes a look at the new features in Filemaker Pro 7. And still in the world of media players, this month's Web development column puts a smile on the face of those who want to do presentations on the web with Quicktime or Real One players.

There's more media too, with tips from Niall Magennis on how to tidy up the tags in your mp3 files, while in Word processing we revisit tabs in tables of contents and take a look at the tricky issue of date calculations.

Dates are a key topic elsewhere too, with Stephen Wells explaining how you can pick them from a calendar in your spreadsheet, and how Excel's dates can affect your data, thanks to Mark Whitehorn's Databases column, where you'll also find a cunning solution to data entry mistakes.

Finally, Barry Shillday takes a look at file handling and system calls for Linux users, and Terence Green explains how to back up Internet Explorer and Outlook Express information under Windows 2000.

Nigel Whitfield

Advice from our experts

Our Hands on experts answer your questions and solve your problems

Digital imaging

Q I was given a (rather old) Mustek 1200 UB (USB) scanner recently by someone who never used it. I downloaded the XP drivers from the Mustek website, and Windows confirms that it is working OK. The problem I have is the two setup CDs that came with the scanner are Windows 95/98 compliant only and I have Windows XP Home. Where can I get (preferably for free) some software that I can use to scan something? Nothing fancy, I just want to be able to scan a picture?

Dave Corston

A Pretty much any image-editing application you care to mention should have support for Twain drivers, which will allow you to scan and import the image into the application for editing. If you have an image-editing application installed go to the File menu and look for an Import command – your Mustek scanner should be listed here. If you don't have an image editor, go to **www.pcw.co.uk/download/1154515** and download a free 30-day trial version of Paint Shop Pro 8.

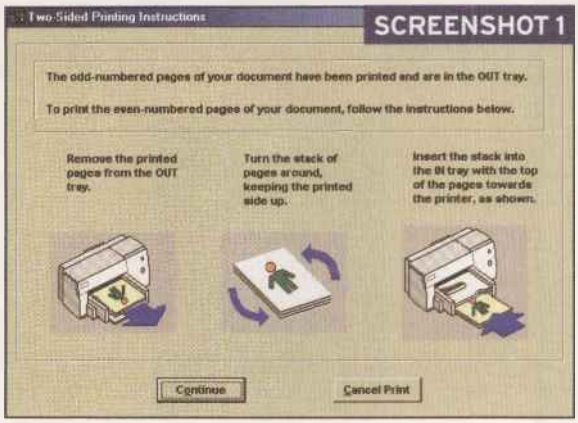
Q I reside in the UK where I purchased a Sony laptop (PCG-GRT816S) and a Sony Digicam TRV33E. At present I am living in Canada. Is it possible with this equipment to show my captured video on TV or DVD players here? My laptop has a CD/DVD burner.

Alan Melville

A The Canadian TV system uses the NTSC standard and the UK uses the Pal system. You would need to convert your Pal format DV to NTSC, which uses a different frame rate and resolution, but it's far from simple. If you want to give it a try take a look at Firestore DV standards converter at **www.focusinfo.com/products/firestore/dvconversionsuite/dvcsuite.html**.

Databases

Q I'm using Access and most of the time I need to insert today's date into the Invoice data field. However sometimes I want to insert another date, so I don't want to set today's date as the default. Is there some key combination I can use to insert today's date?



Excel helps you print worksheets to open like a calendar

Hilary Johnson

A Yes, is the simple answer. Ctrl & ; (hold down the Ctrl key and press the ; key) will insert the date taken from your system's clock. Ctrl & +: will insert the current time.

Spreadsheets

Q Is it possible to print all the worksheets in an Excel workbook in a landscape format that prints both sides of each sheet of paper and lets me bind the sheets so they lift up like a calendar?

Emma Aldridge

A This option is built in. Make sure the number of columns you are using fits on a sheet. Then on the File menu choose Print and under 'Print what' choose Workbook. Up at the top of the dialogue box choose Properties and then the Features tab. Under Two-sided Printing choose Tablet, and under Orientation choose Landscape. Click OK. Half-way through you'll see a dialogue box as shown in screenshot 1 that tells you how to turn the paper.

Q Having recorded a macro, I find it doesn't always perform in the way intended. Given the keyboard command End Up, then down one cell, the final move is recorded in the macro as Range("E16").Select. I don't want it to do that, because next time I run it, I want it to go to E17, and the next time E18, etc.

Richard Hart

A If you do a Search of your hard disk for a file called Samples.xls you will find it includes the macro code for a Loop. This will help solve your immediate problem.

Q Within our golf club we have a smaller group of 30 players who like to play together in foursomes. Is there a way to figure out in Excel the number of permutations for groups of four people within a population of 30?

Simon Staffurth

A I assume you are referring to permutations in a conversational sense. There is indeed a PERMUT() function but Excel defines permutations differently from combinations. That function would give you an answer of 657,720 permutations. I suspect you need the COMBIN(number,number_chosen) function. COMBIN(30,4) gives an answer of 27,405 combinations which should be more than enough.

Q Following the item on inserting the last user's name in an Excel spreadsheet (March 2004), how do I display the logged on user?

Eric Davidson

A Press Alt & F11. Choose Module on the VBA Insert menu and type in:

```
Private Declare Function ↙
GetUserName Lib ↙
"advapi32.dll" _
Alias "GetUserNameA" ↙
(ByVal lpBuffer As ↙
String, nSize As Long) _
  As Long
    Function UserName() ↙
As String
    Dim Buffer As String ↙
 100
    Dim BuffLen As Long
    BuffLen = 100
    GetUserName Buffer, ↙
BuffLen
    UserName = Left↙
(Buffer, BuffLen - 1)
End Function
```

(Key: ↙ code string continues)

In the cell where you want the user name to appear enter =UserName().

Q Can you help me set up the final placings for my sailing club races using an Excel formula? The problem is how to drop the worst two results from your season's placings. For example over a season of, say, 12 races you may be allowed to drop your two worst (highest) placings so if your results were 2, 5, 20, 7, 1, 3, 10, 6, 3, 2, 19, 11,

then you would drop the 20 and 19. This would give you a finishing score of 50 rather than 89.

David Carruthers

A If you enter the 12 results in the range A1:A12, then in A13 enter:

```
=SUM(A1:A12)-LARGE↵
(A1:A12,1)-LARGE(A1:A12,2)
```

This tells Excel to total all the placings then subtract the largest and the next largest. Simple.

Q I'm studying French and am used to the key combinations in Microsoft Word to write é, è, û, etc. To keep track of my French vocabulary, I use an Excel spreadsheet and those key combinations don't work. How can I enter accented characters in an Excel cell, using the keyboard?

David Mason

A *Bon jour, monsieur.* Ctrl & Alt & e produces an é in recent versions of Excel. Or choose Symbol on the Insert menu and pick your characters there. Or press F2 to edit the cell, turn on Num Lock, and then press the following keys on the numeric key pad: Alt & 0233 for é; Alt & 0232 for è; Alt & 0234 for ê; and Alt & 0251 for û. More of these numeric keypad shortcut numbers are shown in the Symbol dialogue box (see screenshot 2).

Word processing

Q I would like to extract some jpg images that have been inserted into a Word document and save them as freestanding files. What is the best way?

Will Pinder

A The easiest way is to right-click on each image and copy, paste into an imaging application and then save. However this has two drawbacks: depending on your version of Word, Windows and the imaging program you may just get the visible, resized image rather than the original. In addition, it can be tedious to process lots of images in this way. So, the smart way is to create a new folder and 'Save as...' HTML. This will give you a subfolder containing all the jpgs, in both full-size and the cropped or reduced versions as seen in the document.

Q My custom dictionary in Word 2002 contains a large number of proper names, technical terms, unusual words, and foreign words. I recently got a message saying that it was full, and no more entries were accepted. To create some space I deleted some of the entries, but this is only a temporary measure. Is it possible to extend the capacity of the custom dictionary? I didn't have this problem with Word 97, which I used for several years, but this might have been because I didn't make so many entries.

Les Pook

A This can happen for two reasons. First find the Custom.dic file. If it is less than 64KB in size, then it is probably corrupt. Edit it in Notepad so that you have a plain list of words, one to each line with no blank lines. If this isn't the case, then you have indeed run out of room. The trick is to create a second custom dictionary, which will give you another 65,593bytes-worth of entries. Go to Tools, Options, Spelling and grammar and click the 'Dictionaries' or 'Custom dictionaries' (Word XP/2003) button. Click 'New' and you will be able to create another custom dictionary, either with a different name in the same location or the same name in another location (see screenshot 3).

Q I've recently bought a new laptop and have installed Word 97, but want to carry over the Autocorrect entries from my main PC instead of having to retype them all. Is there an easy way to do this?

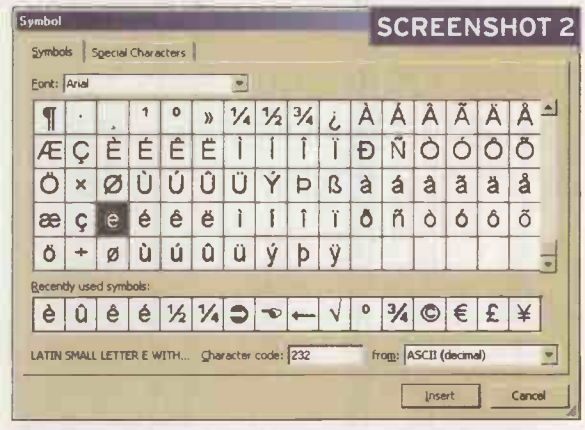
Martin Dennet

A Yes there is – search for files with the extension .acl. The locations and file names will vary with the version of Windows and Word, whether you have multiple users enabled, and what proofing languages you have installed. You can find which are being customised by adding an entry then checking the 'last modified' date of the .acl files.

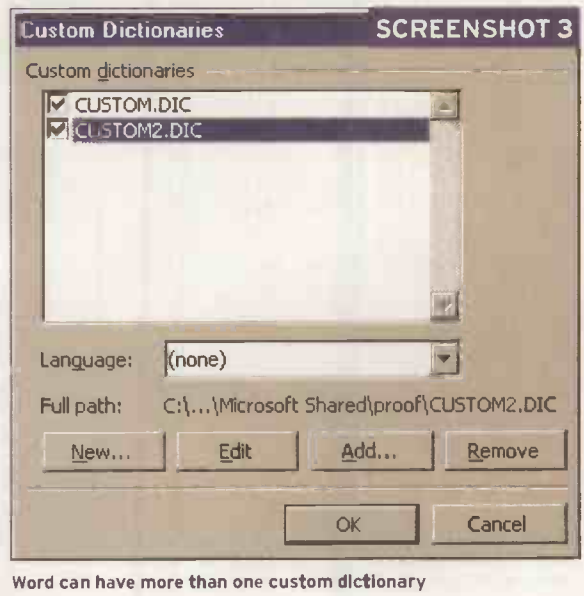
Q I am trying to create a new custom menu in Word. I can do this by dragging 'New Menu' from Tools, Customise, Commands on to the menu bar. However, whenever I try to add commands to this menu, they get added to the menu bar instead.

KP Nair

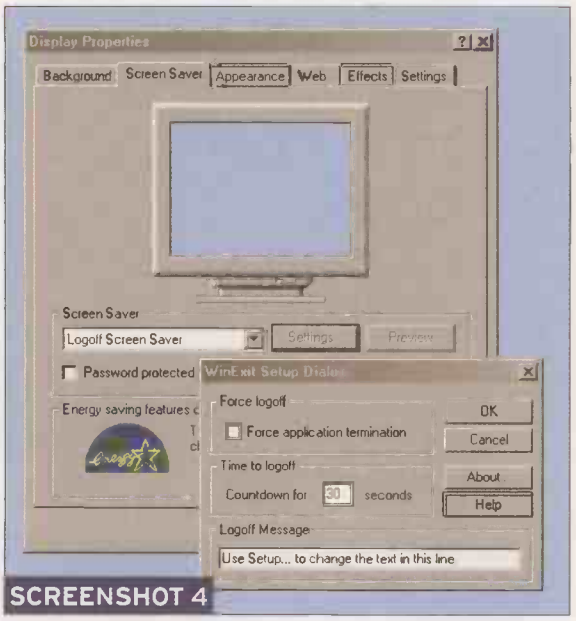
A There's a knack to this. Having created the new menu, drag a command onto its title and wait for the menu to open: the first time you do this you will get just a small blank square below the menu title. Keeping the mouse button pressed, move the cursor down on to this square and release.



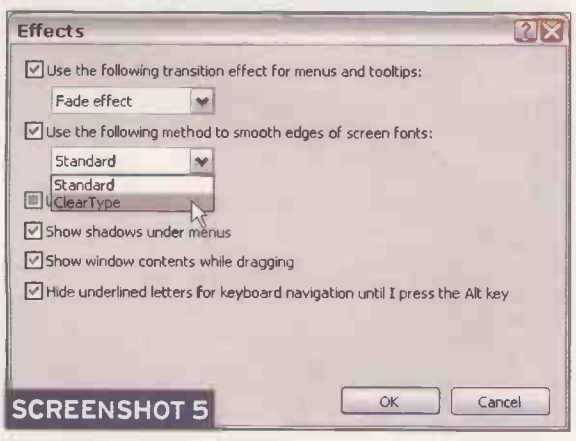
The Symbols dialogue box shows the shortcut keys for accents



Word can have more than one custom dictionary



Setting up Winexit to automatically log off users



Font smoothing options in XP

Windows 2000

Q I administrate several PCs running Windows 2000 and have set up the winexit.scr screensaver to log off people who leave their PC without logging off. It works well for administrator user accounts but with power users the program halts with a message about permissions.

Derek Logan

A The Winexit screensaver supplied with the Resource Kits for NT, 2000, XP, and Server 2003 ships with an inadequate help file which doesn't explain why it doesn't work properly in non-Administrative users accounts. Google produced one reference to a Knowledgebase article applying to Windows NT and several web references which appear to repeat the advice in that article. Unfortunately, it is obtuse and does not accurately describe the Windows 2000 situation. Most likely this is because Winexit is treated as a freebie and so considered unimportant.

To correct the problem for power users you have to adjust permissions for the Control.ini folder at the Registry location, HKLM\Software\Microsoft\Windows NT\CurrentVersion\IniFileMapping. In order to adjust security permissions, run regedit32.exe rather than regedit, with administrative rights. Either log in as an administrator, or use Run As to start regedit32.

Locate the Control.ini folder and click on it to select it. From the menu bar, select Security/Permissions and highlight Power users in the Permissions window. Click on the 'Advanced' button to open the 'Access Control Settings for control.ini' window. Ensure that Power users is selected, and click on the View/Edit button. In the permissions window, place a tick in the check boxes for 'Set value' and 'Create subkey'. Click on OK until all windows are closed and exit regedit32.

This will fix the error for members of the power users group. To enable Winexit for users in other groups, either add those groups or the Everyone group in the Permissions window and adjust the permissions as for power users (see screenshot 4).

Hardware

Q I have an Advent 3308 desktop PC with a Trigem Cupertino motherboard and 1.9GHz Pentium 4 processor. What's the fastest processor I can use in this motherboard? Alternatively, could I fit a different motherboard in order to use a faster processor?

M Fleet

A According to the specifications of the Trigem Cupertino it has a Socket 478, which can support both the Willamette and more recent Northwood versions of the Pentium 4 processor. The only limitation is that it can only support processors with a 400MHz front-side bus (FSB), and not the faster 533 or 800MHz bus models. The fastest Northwood Pentium 4 processor Intel produced with a 400MHz bus was the 2.4A model running at 2.4GHz; the A refers to its 400MHz bus. This model is hard to buy now though, so you may have to check the second-hand market. Since your motherboard is a standard ATX form factor though, it should be straightforward to swap it for a more recent ATX model which could support the latest Pentium 4s running beyond 3GHz with 800MHz buses. These would require new memory though, making this upgrade a pricier option.

Q Are some hard disks more reliable than others? I've had two from the same manufacturer fail after just two years. Is this normal?

Christopher Richards

A Hard disk manufacturers quote reliability in terms of MTBF (mean time between failure). Modern drives from well-known brands should offer similar levels of reliability but, while all disks will eventually fail, you should be getting more than two years of normal use. Disks, especially those with higher RPMs, do run very hot and, if not adequately cooled, could suffer from reduced lifespans. Try and ensure some airflow passes over your disk, and where possible avoid fitting another drive immediately alongside. If you take these precautions, your disk should last many years. But remember, they won't last for ever, so always make appropriate backups.

Q I've noticed many older PCs including my own have a turbo button on the front of the case. What's it for? In my system it's not even connected to anything.

Quinton Wells

A Software used to be written for processors of specific speed, and faster models could cause incompatibilities. Turbo buttons were put on faster PCs to solve this. When activated the PC ran at its normal top speed, but when deactivated it would fall to match older models for backwards compatibility; therefore unless the software demanded a drop in performance, you'd want 'Turbo'

mode activated all the time. Modern PCs have other ways to control and exploit speed, so the button is redundant. Older cases often still have the button, but it's not connected to anything and today's motherboards have nowhere to plug it in.

Windows

Q I have tried several times to connect to www.connectix.com, as you suggest on page 172 February 2003 issue *PCW* but am unable to make contact. Please are you able to suggest an alternative?

Dennis Anstey

A Microsoft was obviously so impressed with that column that it bought the Virtual PC technology from Connectix shortly afterwards. You can now find details at www.microsoft.com/windowsxp/virtualpc. Alternatively, take a look at a similar product, VMware Workstation at www.vmware.com.

Q In *PCW* June 2002 you stated that Cleartype could be found at Control Panel, Display, Effects. My Display does not show Effects – only Themes, Desktop, Screensavers, Appearance and Settings. I am using XP Home. How can I find Cleartype?

Wilfen

A It's still there in XP, but hidden. Go to the Appearance tab and click the Effects button. You'll then find a dropdown list entitled 'Use the following method to smooth edges of screen fonts'. This should give you the choice of Standard or Cleartype (see screenshot 5).

Q In Windows 98 I was able to back up my Dial-up Networking details by dragging the icon out of the DUN folder, which created a text file containing all but my ISP username and password. Dragging this back restored the settings, which I believe are stored in the Registry. This doesn't work in XP – all I get is a shortcut. Is there another way of backing up dial-up settings?

Craig Norman

A Yes, though it takes some finding. Go to C:\Documents and Settings \All Users \Application Data \Microsoft \Network \Connections \Pbk and you'll find a rasphone.bpk file. This opens in the Remote Access Phonebook application, ie, the dialler, but it is actually a plain-text file that you can copy elsewhere for back-up. You'll still need a separate record of your username and password.

Q How can I stop Internet Explorer displaying the set of four icons on top of every image? They are obtrusive and don't seem to offer anything that I can't do by right-click on the image.

Amy Steele

A Go to Internet Options, either through the IE Tools menu or via Control Panel, and turn to the 'Advanced' tab. Scroll down to the section headed 'Multimedia' and uncheck the box for 'Enable image toolbar'. While you are there you may want to turn off the equally irritating 'Enable automatic image resizing' (see screenshot 6).

Q Whatever happened to the Clipboard viewer in Windows XP? I can't find it anywhere on the Start menu.

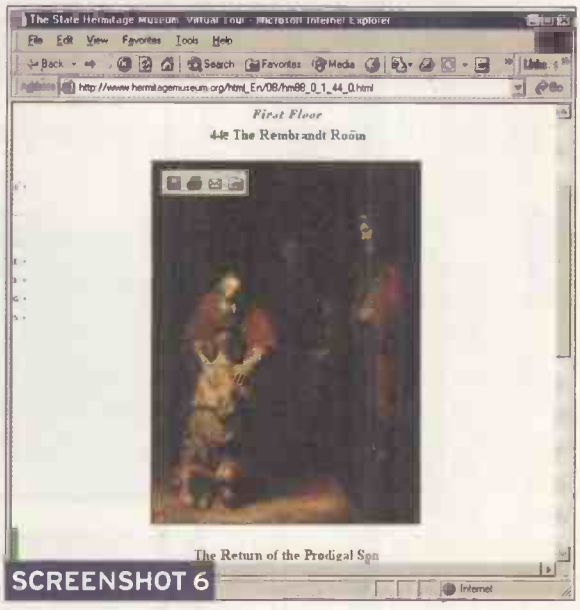
Graham Berry

A Having checked on both an XP Pro and Home installation it seems that Microsoft forgot to put a shortcut for it on the menu. To check that it is installed, Start, Run, Clipbrd.exe. If this fails, go to Control Panel, Add or Remove Programs, Add/Remove Windows Components. Select 'Accessories and utilities' from the list and click the 'Details' button, then in the next box select 'Accessories' and click details. In the next dialogue tick 'Clipboard viewer'. OK back out of all dialogues then 'Next' and 'Finish' the Wizard. Once you are sure the Clipboard viewer is installed you can create a shortcut to it (Windows\Sytem32\clipbrd.exe) in the location of your choice (see screenshot 7).

Q After closing Outlook Express and using other programs, when I shut down Windows XP an error message appears titled 'MSImn.exe – Application Error' and containing: 'The instruction at "0x77f83907" referenced memory at "0x009a4dd4". The memory could not be "written". Click "OK" to terminate program.' How can I sort this out?

John Waters

A This seems to be a common problem and there can be several causes. However, the most common is that Outlook Express (MSImn.exe) is still in memory as the option to log onto Windows Messenger is ticked. If you go to OE Tools, Options, General and untick the 'Automatically log on to Windows Messenger' box, this may cure the problem.



SCREENSHOT 6

Get rid of that intrusive image toolbar

SCREENSHOT 7

Fossilised, but still around – the XP clipboard viewer

CONTACTS

All of our experts welcome your queries, simply respond to the appropriate address below:

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Web development:	webdev@pcw.co.uk
Windows:	win@pcw.co.uk
Windows 2000:	win2000@pcw.co.uk
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Gordon Laing
has been a hardware enthusiast ever 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

Tweaking your Tivo

Tips and tricks on how to upgrade your Tivo system and a test on Memory Stick Pro

In last month's column I described the theory behind upgrades which can be performed on the Tivo Personal Video Recorder (PVR), as suggested and implemented by several *PCW* readers. Thanks again to Ian Silvers, Jeremy Parsons, Matthew Finch and Pete who all emailed to describe the various modifications they'd carried out on their own Tivos. As promised last month, I hoped to try them for myself in the future, but didn't quite know when, not being a Tivo owner myself.

Then quite fortuitously a long-term Tivo-worshipping friend called out of the blue. His Thomson Scenium Tivo, while delivering sterling service over the years, had recently given up the ghost. Worrying grinding sounds heralded a disk failure, leaving him with two options: a replacement unit costing £120 or swapping the disk himself.

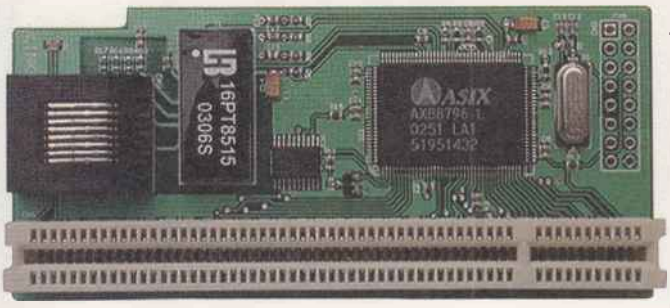
He'd read about upgrades on various forums and wondered whether I could assist. Before you could say red rag to a bull, I devised a three-part upgrade plan which would not only bring his Tivo back to life but equip it with the features evangelised to me earlier.

First I'd fit a new hard disk, tripling his original capacity and copying the software from the old disk, or a third-party backup if it had truly died. Second I'd fit an Ethernet port, allowing the Tivo to be accessed over a local network and even the Internet. Third – and finally – I'd install a number of utilities allowing the Tivo to be remote-controlled by a PC and even stream or copy its recordings over the network, where they could then be authored into DVDs without any conversion to analogue.

Luckily all these processes are well explained on a number of websites and forums. If you'd like to swap or upgrade a Tivo hard disk, head to the detailed Hinsdale pages at **www.newreleasesvideo.com/hinsdale-how-to**. Since discussions about extracting video from Tivos are banned at the Tivo Community forums, browse the Deal Database at **www.dealdatabase.com/forum**.

Upgrading a Tivo disk

The first step was to upgrade the hard disk. There are three main configurations: swap the old disk for a new one, add a second disk to complement the original or fit two entirely new disks. The only limitation is Tivo's Bios which (without complex tweaking) will only recognise disks up to 137GB in capacity.



The Turbonet card equips Series 1 Tivo PVRs with an Ethernet port. You can then connect it to your PC to update settings, schedule remote recordings and even extract video

Like most Tivo upgraders I opted for a 120GB disk – luckily the units don't seem to be fussy about disk brands or models. So, knowing it was quiet from earlier PC tests, I opted for a Seagate 7200.7 120GB UDMA 100 costing £58 ex VAT. This would triple the recording time of the original Quantum 40GB disk.

Tivo's operating system and software is stored on its hard disk like a PC, so if you're replacing the original disk, you'll need to copy the important files onto your new one. The easiest way to do this is to connect your original and new disks to a PC and use it to do the copying. Unfortunately for Windows users, Tivo uses Linux, preventing you from copying the files using Explorer.

Fortunately it's simple to perform the process using Linux, and an appropriate boot CD containing the required tools is available from **http://hellcat.tyger.org/MFS/2.0/mfstools2noJ.iso** or by following a link in the Hinsdale tutorial; the download is 10.3MB. Then simply use Nero or similar to burn the ISO image to a CD.

Of course you'll have to remove the disk from your Tivo, and as with most consumer appliances, part of the initial challenge is actually getting inside. You'll need a Torx 10 screwdriver to remove the screws at the back of the unit, after which the lid will slide off, albeit very stiffly. Inside you'll see many familiar PC components and the disk mounted on a bracket; depending on your model you may also need a Torx 15 to remove the disk.

Before connecting your Tivo disk to your PC, enter your PC's Bios and set it to boot from the CD drive. Now test it with the Linux boot CD created earlier to ensure it starts properly, as accidentally booting into Windows with the Tivo disk connected could modify crucial files. Once you're happy, power-down and connect your Tivo disk to your PC's Secondary IDE channel. It will be the Master of this channel, so ensure your optical drive is set as the Slave.

After booting from the Linux CD and hitting Enter to get the # prompt, type:

```
mkdir /mnt/dos
```

followed by:

```
mount /dev/hda1 /mnt/dos
```

to mount your C drive. This will need a Fat-formatted partition; since my Windows XP installation used NTFS, I temporarily swapped it for an old Fat-formatted disk. Now type:

```
mfsbackup -6so ↙
/mnt/dos/tivo.bak ↙
/dev/hdc
```

(Key: ↙ code string continues)

to perform a backup of your Tivo OS and preferences. The Hinsdale tutorial explains how to back up your recordings too if desired. Finally, to unmount the disk, type:

```
umount -f -a  r
```

then press Ctrl & Alt & Del and as the system reboots, switch it off.

Now you've backed up your Tivo software, you need to restore it to your new disk. With your PC powered-down, disconnect the old Tivo disk and replace it with your new one; again as the Master of the secondary channel. After booting the Linux CD and mounting your C disk, type:

```
mfsrestore -s 127 -zpi ↙
 /mnt/dos/tivo.bak ↙
/dev/hdc
```

at the # prompt to restore your backup image onto the new disk.

This will, however, only allow the Tivo to see the first 40GB of your new disk. To allow it to exploit the full size of the new disk, type:

```
mfsadd -x /dev/hdc
```

Finally unmount the C drive and reboot as before. With your PC powered-down, remove your new disk and reconnect to your Tivo box.

This technique assumes your original Tivo disk is alive and well.

Since my friend's disk had failed, I had to download an existing Tivo backup file from a friendly Tivo owner on the web. Once copied onto the new disk though, it inherited the donor's preferences. In this case, just re-run the Tivo's full setup routine as if you'd bought it new.

Install a Turbonet card

In order to connect your Tivo to your network, you'll obviously need some means to fit an Ethernet port. Clearly Thomson had this in mind when it designed the hardware though, as the motherboard has a PCI slot – see photo below. Well, not quite: rather than a slot, the Tivo motherboard sports a male PCI edge connector. The network card therefore requires a female PCI slot and drivers for the Tivo itself.

The most popular solution is the Turbonet card, which slots straight over the edge connector (see picture left). You can then feed a Cat 5 Ethernet cable out of the back of the Tivo box through a hole to the left side of the fan as viewed from the back; just snap off the metal tab that's there. The Turbonet card is available from Laser Business Systems at www.laser.com for £55 ex VAT.

To install the software, you'll need to reconnect your Tivo disk back in your PC and boot from the supplied Linux CD. An automated setup then configures the card and allows you to modify the network settings, including the Tivo's IP address. You'll also need to ensure the Gateway address is correct: the default install used 192.168.1.1, whereas my friend's router (like many) employs 192.168.0.1.

With the disk back in the Tivo, network cable connected and unit rebooted, you'll be able to FTP or Telnet into your Tivo using a PC. This allows you to reconfigure the card or install additional utilities without ever opening your Tivo again. By changing your Tivo's dialling prefix to ",#401" it will also make its daily call over your network – speedy if you've got broadband.

Installing utilities

A wealth of utilities is available for the Tivo, but the two most popular are Tivoweb (see screenshot 1) and mfs_ftp. Tivoweb allows you to control your Tivo using a PC-based web browser, while mfs_ftp will dish up your recordings as mpeg2 files straight across your network (see screenshot 2).

Before installing them, use an FTP program on your PC to browse the contents of your Tivo's disk, then create a folder called hack inside the existing 'var' folder; it's important to name the folder 'hack' because some utilities will specifically look for it. Next, while you could download the utilities on your PC and FTP them across, it's much more interesting to get the Tivo to download them itself.

First Telnet into your Tivo by selecting Run from your PC's Start Menu and typing telnet followed by the IP address of your Tivo. At the bash prompt, type:

```
cd /var/hack
```

then:

```
http_get -T 0 -C 0 -D ↙
/var/hack -U
http://199.240.141.↙
102:80/tivoweb-tcl-↙
1.9.4.tar.gz
```

This will instruct your Tivo to download the Tivoweb file itself.

To decompress the file, ensure you're first in the right directory by typing:

```
cd /var/hack
```

followed by:

```
gzip -d tivoweb-tcl-↙
1.9.4.tar.gz
```

To extract the file, type:

```
cpio -H tar -i < tivoweb-↙
tcl-1.9.4.tar
```

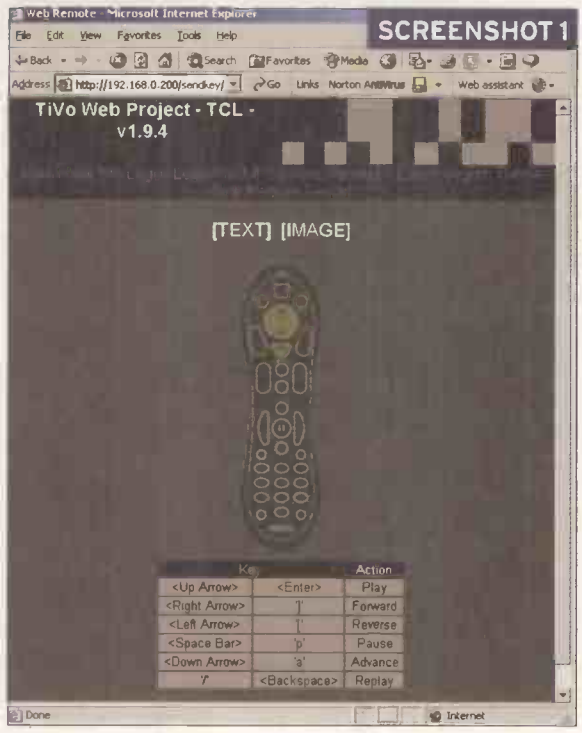
then to start the program, type:

```
/var/hack/tivoweb-↙
tcl/tivoweb console
```

Now wait a few seconds until it says Accepting Connections. This and other processes are explained in detail in the superb tutorial at http://tivo.stevejenkins.com/network_cd.html. Now you can point your PC's web browser at the Tivo's IP address and remotely control it or even modify the recording settings for better quality.

To install mfs_ftp, go to the Deal Database forums at www.dealdatabase.com/forum and enter the Tivo Extraction forum. Find the sticky thread about mfs_ftp where you can download the file onto your PC, unzip it, then FTP over to your Tivo's var folder. Then follow the instructions to unpack and start the file using Telnet.

Once executed, both Tivoweb and mfs_ftp will remain running in the background unless your Tivo is restarted. If your Tivo has to restart you can either manually execute the utilities again using Telnet, or modify a startup file to execute them automatically. This is described in Steve Jenkins' guide.



The Tivoweb utility allows you to remote control your Tivo using a web browser interface

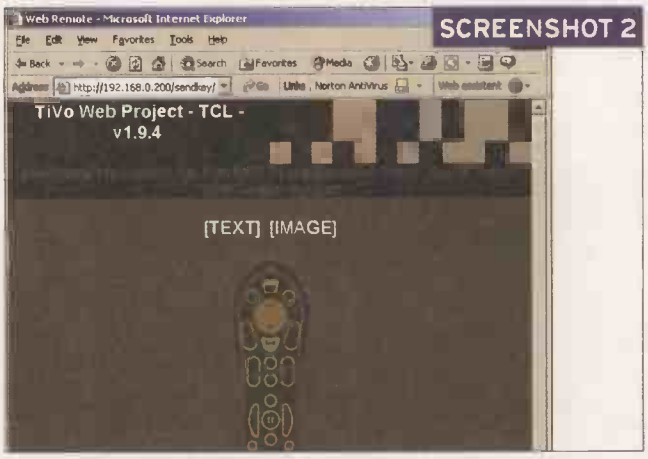
Inside the Thomson Scenium Tivo personal video recorder. Note the standard IDE hard disk with provision for a second alongside. The PCI expansion slot is in the upper right corner of the motherboard

Extracting video

Mfs_ftp allows you to extract recordings from your Tivo onto your PC, where they can then be archived or prepared for authoring onto a DVD without any loss of quality. Mfs_ftp does all the hard work for you by presenting your recordings in a variety of formats across an FTP interface. Once again point your PC's FTP program at your Tivo's IP address, but to use mfs_ftp, change the port from 21 to 3105, then login anonymously.

Rather than seeing your usual Tivo folders, mfs_ftp presents a series of folders with your recordings. If you want to use recordings on your PC, copy them out of the TY folder. Once transferred, rename the file extension to mpg and you've got a standard mpeg2 file which will play using DVD software on your PC.

The Tivo's standard audio codec may not be what your DVD software is expecting, resulting in silence. In this case



SCREENSHOT 2

The mfs_ftp utility presents your recordings using an FTP interface. These TY files can be renamed mpg on the PC and can be played with any mpeg2/DVD software

either download an appropriate audio codec, or use utilities like those at www.tmpgenc.net to up-convert it. If you intend to regularly author DVDs of your recordings, consider using Tivoweb to modify the recording settings to match the DVD specification.

Fantastic results

Thanks to the great forums and guides online, upgrading a Tivo really is well within the capabilities of any PC enthuslast, and the results are nothing short of fantastic.

Longer recording capacities are always welcome, but the ease with which you can control and extract recordings over a standard Ethernet network are a revelation.

If you don't want to get your hands dirty, several people on Ebay offer replacement disks with all the utilities pre-installed and ready to run. Alternatively if you're tempted but don't have a Tivo, remember they're still available from Tivoland (www.tivoland.com) for £239 plus postage or more in pre-modded configurations.

Memory Stick Pro

Sony announced its Memory Stick Pro format back in January 2003, but it's only now we're seeing products which can exploit both its larger capacities and improved performance. Sony's latest Cybershot DSC-F828 camera is one of the first to fully exploit the format, as opposed to the earlier F717 which could exploit the capacity, but not the speed. So what sort of differences can you expect? I tested Pro and traditional blue sticks in both cameras to find out.

Annoyingly it's not possible to directly compare the two types of sticks using the same capacity, since the older ones are sold in sizes of 128MB or below while the newer Pro versions are sold at 256MB or higher. Consequently it was a case of comparing the closest matches: a 128MB old blue stick versus a 256MB Pro stick.

The most obvious first test was to see whether the Pro cards improved actual camera handling and operation. From what I could tell, there seemed to be no measurable difference between using Pro and normal cards in either camera for normal shooting. Both seemed to become ready for their next shot in the same time using both cards, although it has to be said the F828 is a considerably faster camera to use than the F717, and in fact it is one of the quickest I've ever tested.

It is, however, important to note that Pro sticks are essential if you want to use the F828's best-quality movie mode, which offers 640 x 480 video at a smooth 30fps. Indeed while all of Sony's 2004 camera range also offer this movie mode, they too require a Pro card to support it. Older sticks will be limited to 640 x 480 at the jerkier 16fps.

The second test was to see if the Pro format improved data transfer between the camera and computer; both the F717 and F828 sport USB2 interfaces, thereby eliminating this as the bottleneck. Starting with the older blue stick, 52 files measuring 108MB were transferred in 93 seconds using the F717 and 86 seconds using the F828, thereby giving speeds of 1.16Mbytes/sec and 1.26Mbytes/sec respectively.

Switching to the Pro stick containing 236MB worth of data in 62 files, the F717 transferred them in 195 seconds, while the F828 sped ahead in just 90 seconds. These translate into data rates of 1.21Mbytes/sec and 2.62Mbytes/sec respectively. Just out of curiosity I tried both sticks in a USB1.1 card reader: as expected it failed to recognise the Pro stick, but copied the older blue stick's contents in 134 seconds, giving a data rate of 0.81Mbytes/sec.

The results for the F717 confirm what Sony described in its original announcement: while the camera will recognise the Pro sticks, it won't be able to exploit their extra speed. Consequently owners of the F717 (or the V1, which is in a similar technological position) should only buy Pro sticks if they desire the additional capacity. The results also show the older blue sticks performing similarly in both the F717 and F828, although both cameras' USB2 interfaces eeked out faster rates than the USB1.1 card reader.

Sony's Memory Stick Pro format currently offers capacities up to 1GB and claims higher performance than older sticks; but how much extra can you expect?

The results for the F828 thankfully show some difference between the two types of sticks, with the Pro version delivering read speeds over twice as fast as the older blue stick. While this extra speed is beneficial to anyone copying large amounts of data from sticks onto their PCs, it's hardly the quantum leap we'd hoped for. Since Sony's specifications for Memory Stick Pro are higher than measured in these tests, we can only assume the controller in the camera is currently the limiting factor.

That said, the 256MB Memory Stick Pro and 128MB blue Memory Stick cards typically work out at the same price per megabyte. While this should make the Pro card a no-brainer to those who desire larger capacities, Sony also offers a 128MB x 2 card with a pair of switchable 128MB banks. This delivers 256MB for around 25 per cent less than the 256MB Pro card. This is therefore the sensible choice for owners of older Sony cameras who want larger capacities but can't exploit the speed of Pro.

While this card can also be used in the 2004 Sony camera range, remember it won't support their best-quality movie mode as discussed earlier. For that you'll need a Pro card. The choice is yours, but I'd say it's worth spending the extra for the smoother video.

Nanode preview

Here's a preview of the Nanode, a tiny system by Hoojum and Mini-ITX.com featuring one of Via's new Nano-ITX motherboards. Measuring just 12 x 12cm, the Nano-ITX form factor will allow all manner of projects we'll cover in future Hardware columns. The Nanode will be available this summer from www.nanode.com.

CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Email him at: hardware@pcw.co.uk. Please do not send unsolicited file attachments.

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Tim Nott
is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family

See you later, aggregator

How to manage RSS feeds, fiddle with favourites, and solve a print file conundrum

If you read May's Hands on Web development column, or February's Feeding time feature (**www.pcw.co.uk/Features/1152354**), then you'll know about RSS, the XML-based technology that lets readers know when a website has been updated. As Nigel Whitfield said, the Simple in Really Simple Syndication is something of a misnomer. There are, it appears, nine RSS standards and a rival, but similar, technology known as Atom. In addition, RSS, depending on whom you ask, either stands for Rich Site Summary or Really Simple Syndication. Fortunately, from the consumer's end we don't have to worry about any of this.

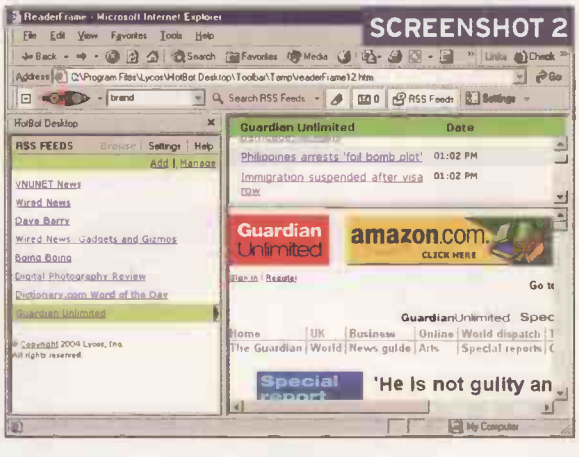
RSS, we should point out, is an abbreviation (like BBC) not an acronym (like Dos). What you need to access an RSS feed is a purpose-made RSS reader or 'aggregator', which can either be a standalone application or a plug-in for a browser or mail program. This month we came across a new contender, the Hotbot Desktop. The name is a tad confusing, as its main presence is an Internet Explorer toolbar. It's always been a personal ambition to have Internet Explorer completely filled with add-on toolbars, rather like the mirrors and lights on a mod's scooter, so this was a welcome addition to our browsing experience. The 'Desktop' part of things is explained by the presence of an icon in the System tray. This will index your History, RSS feeds, files and email. Once indexed, you will be able to search these from the Hotbot toolbar in IE. This is a Microsoft-only gizmo: you need Windows 98, ME, 2000 or XP; IE5.5 or later with scripting turned on; and if you want your email indexed, Outlook or Outlook Express.

Roll your own RSS feeds with Hotbot

The toolbar, as you might expect, has the usual customisable search facilities, so you can look things up in a dictionary or search Ebay with one click. It's also got essentials such as a pop-up blocker and a highlighter. Returning to where we came in, the RSS feeds are controlled from a panel on the left of the browser, rather like the History and Favourites panes. Click the 'Add' button at the top and you'll find a lot has been set up for the lazy surfer, with checkboxes for feeds ranging from the Christian Science Monitor to Slashdot, taking in Dilbert and Dave Barry on the way. Inevitably there's a US slant to the sources, though the BBC and The Guardian are both represented, but it's easy enough to add your own.

The URLs of RSS feeds usually end in .rss, .rdf or .xml. If you open one of these in a browser, you'll just see a load of unformatted text and code. Copy and paste one into the Hotbot subscription box, however, and that will subscribe you to the feed. For instance, if you type '**www.pcw.co.uk/rss**' in the box and hit the Subscribe button you'll find you are then subscribed to VNUnet News (see screenshot 1).

Not for those with small displays



It's also worth checking the sites already on the list. You'd expect Wired News to be on the A-list, as both Wired and Hotbot are part of the Lycos network. But if you make the effort to hunt around the Wired site itself you can cherry pick, and have feeds on individual topics such as medical science, multimedia or gadgets and gizmos.

Having subscribed to a feed, clicking on a feed title in the left pane will produce a split in the right-hand pane of IE, with a list of stories at the top. Click on a story and you'll get a short synopsis in the pane below. You may also get one or more 'sponsored links' which may, or more likely may not, be relevant to the story. For example, a Guardian article on affluence in the US, titled 'Land of the free and home of the millionaire', appeared with three adverts from US realtors selling 'land', and an article on Mel Gibson's *Passion* film came appended with adverts for the perfume of that name.

The final step is to click on the headline of the story in the bottom half of the pane, when the full page will appear. Or rather it won't because by now we are heavily into the 1966 Vespa preservation society look, so you'll probably just see the masthead and the first few words of the headline (see screenshot 2). So now's the time to close the left pane, but this still leaves the main pane split between the list of stories and the actual story. You can dig through the options and tick the box to 'Open in new window' but this only works in the bottom half of the pane – you can't open a story directly from the list. Presumably this is to ensure that everyone reaps the benefit of the sponsored links, but it's a poor piece of interface design. You can find the Hotbot Desktop at **www.pcw.co.uk/download/1154514**.

News providers' sites such as VNU or the BBC aren't the only ones playing the RSS game. As Nigel Whitfield showed us in May, anyone with a website can create a feed, and

many do, particularly bloggers. Which brings us to an interesting twist in the RSS game, which its originators describe as 'searching in the future'.

If you go to www.pubsub.com you can 'filter over one million weblogs and information streams to find the content you're looking for'. First you need to create a subscription. To do this you enter some search terms, just as you would in a search engine. You also need to give your email address so that Pubsub can send you a confirmation message: the site states that Pubsub 'will never give your email address to anyone, except as required by law'. Having received your email confirmation, click on the link therein and you'll be able to pick up an RSS URL from the website. Feed that to your aggregator and, whenever a blog or other feed comes up with your chosen keywords, you'll be notified. You can have more than one subscription and, although you may be inundated with hits for well-known keywords, it's an effective way of keeping up with minority interests such as advances in ferret breeding or the fortunes of the Cheltenham football team.

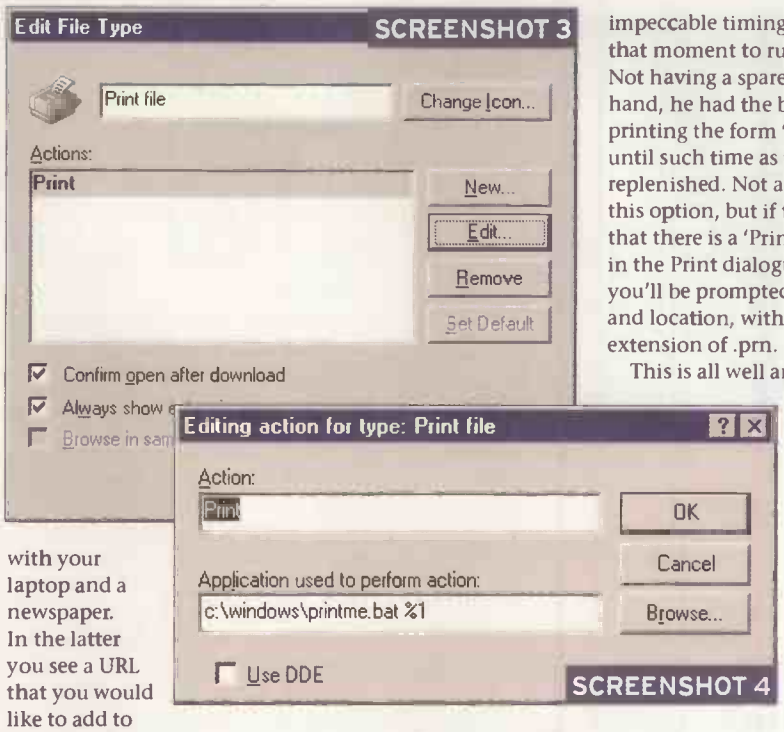
Favorite things

Internet Explorer 'Favorites' is not one of my favourite things. For one thing it's spelt wrong. For another thing it's in the wrong place: I want to be able to back it up with the rest of My Documents. And finally one has to be online in order to add sites to it. Fortunately, it isn't too hard to put these things right, and you don't need to delve into deeply hidden options or the Registry.

First make sure Internet Explorer is closed. Right-click on the Windows\Favorites folder and rename it to Favourites, or Bookmarks, or whatever takes your fancy. You may get an anxious message asking if you really want to rename the system folder. You do. Having done that, the menus and toolbars in IE are still going to say 'Favorites' – if that's still unbearable then consider Mozilla, Opera or another browser.

The next step is to pick up the folder with the cursor (I like to imagine it wriggling its little legs helplessly at this point, but maybe I'm just vindictive) and drop it somewhere more sensible. Mine's on the E:\ drive in the folder that is the target of 'My Documents' – or would be if I hadn't renamed that to something less irritating as well.

Now for the last bit. Say you are far away from any Internet access, but with your laptop and a newspaper. In the latter you see a URL that you would like to add to the former, preferably in your favourites (or whatever it's called) folder. If you try to launch IE when disconnected, then you'll discover the catch. You can type the URL into the address bar, but you can't 'Add to favourites' unless you have the page up. Which, of course you can't, as you aren't connected. So instead open your folder of cherished bookmarks in its chosen location. Right-click and choose 'New'. You'll get the usual list of new things that you probably don't want, such as Excel spreadsheets, bitmap images and so on, but also Folder and Shortcut. Choosing the last does not look very promising at first, as it's the standard new shortcut wizard prompting you for a command name or to browse around your disk. Humour it by typing in the URL – just as in the browser you won't need the http:// bit. Things brighten up at the next screen, as although this is titled 'Select a title for the program' you'll see that the name box has been filled in with 'New Internet Shortcut'. Change this to something more informative, hit the Finish button, and you're there.



Top: Setting up an association...

...for prn files (bottom)

'Internet Explorer Favorites is not one of my favourite things. It's spelled wrong and it's in the wrong place'

The joys of PRN

Reader Roger King was online and wanted to print a form. With impeccable timing his printer chose that moment to run out of ink. Not having a spare cartridge to hand, he had the bright idea of printing the form 'to file' for keeping until such time as the ink supply was replenished. Not all applications offer this option, but if they do you'll find that there is a 'Print to file' check box in the Print dialogue. Tick this and you'll be prompted for a file name and location, with the default extension of .prn.

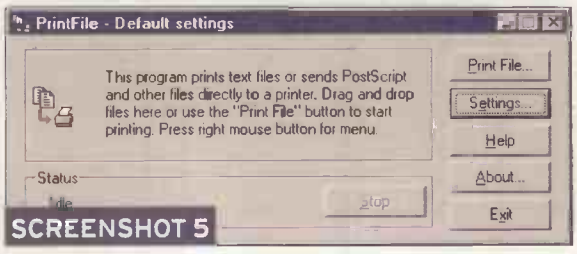
This is all well and good, but what do you do with the prn file? Roger dragged his onto the printer icon only to be told that 'This file does not have a program associated with it for performing this action. Create an association in the Folder options control panel'. He then tried opening the prn in Word, where it appeared as gibberish. Intrigued, I tried the same thing and got the same message. It seems that Microsoft has never got round to finishing this useful feature. If you just want to do this on a one-off basis, then you can open an MS-Dos window in the folder where you've saved the prn file and type: Copy myfile.prn lpt1 /b.

Where myfile.prn is the name of your file, lpt1 is the port to which your printer is connected, and /b is a switch to tell the copy command to expect a binary file. This is the reason that a prn file is unintelligible to a word processor – it's the binary code sent by the printer driver to the physical printer.

For a more permanent solution you need to do two things. One is to create a batch file with Notepad containing just the line:
Copy %1 lpt1 /b

The %1 here is a placeholder for whatever file is fed to the batch file. Save this as: C:\windows\printme.bat. Now go to Explorer, View, Folder Options (Windows 95 and 98) or Tools, Folder options (Windows ME). Turn to the File types tab. In Windows 95 or 98 hit the

This works for USB, too



SCREENSHOT 6

Where fts files come from

'New type' button. Give the new type a suitable description – eg, 'Printer file' and the associated extension prn. Leave the content type (Mime) box empty and click the New button below the currently empty list of actions. In the next dialogue type 'Print' in the Action box and 'C:\windows\printme.bat' in the 'Application used...' box. Leave the DDE box unticked.

Windows ME users have to take a slightly different approach. In the File types tab of Folder options, click the New button then add the new extension, prn. Click OK and you'll see the extension appear in the list with a default file type name such as FT000003. Click on the 'Advanced' button below, and you'll be able to edit that name and define a new action as per 95/98 (see screenshots 3 and 4).

You've now associated files with the prn file with your batch file. There just remain a couple of cosmetic points. Before you leave the Edit file type box, hit the 'Change icon' button and find a suitable icon for prn files. The last touch is to find your printme.bat file, right-click on it, and on the Program tab of its properties, tick the 'Close on exit' option. This does what it says, so you won't get the MS-Dos window hanging around when it has done its job.

This is a fairly retrograde piece of engineering and you should be aware of its limitations. First, if you have more than one printer attached to your PC you must use the same one to create the file and print the pages – otherwise you'll just get many pages of garbage. Second, this only works with printers connected to a parallel port or shared on a network. You can't copy a prn file to a USB port using a Dos command or batch file. There is, however, a utility that will send prn files to a USB printer. It's called Printfile, it's written by Peter Lerup, it works with all versions of Windows from 3.1 to XP and it's free. You'll find it at www.lerup.com/printfile (see screenshot 5).

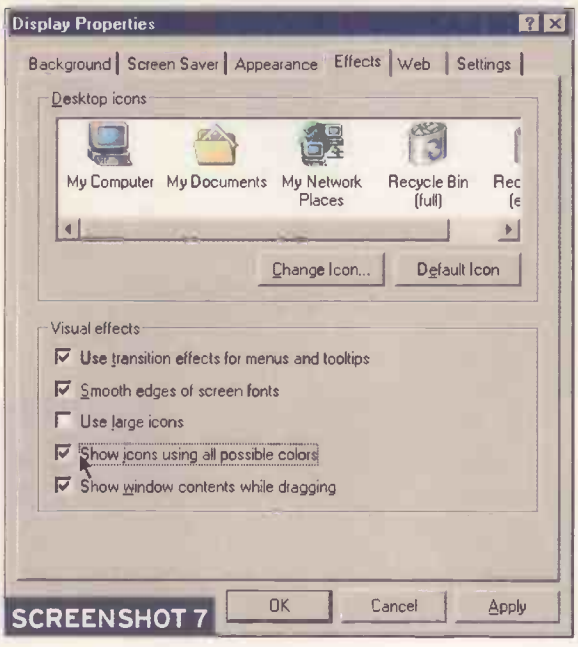
Giddy up

What, asked reader Anne Appleby, are gid files? Her cleanup software says they are temporary files and can be safely deleted. So why doesn't Windows do this bit of spring cleaning by itself?

The answer to the first question is that they are part of the help system as originally seen in Windows 95. Most of Windows and third-party application help has moved to compiled HTML format since then but the system is still supported. If you open an old-style help file then a gid file, if it doesn't already exist, will be created. This will have the same name as the HLP file, so that opening MSPaint.hlp for instance will create MSPaint.gid. This file contains the headings and subheadings you see in the help contents. You can delete the file but there's little point as it will come back again when you next access that help file. If you click on the Find tab of a help dialogue, you may also get the 'Find setup wizard' appearing. This will offer you various options in constructing a search database (see screenshot 6). This will create another file with the fts extension: it may take a little while. Again, you can delete this file, and again there's little point, as you'll just have to sit through the 'Find setup wizard' again next time. The only possible reason for deleting an fts file is if you want to change the options you chose in the wizard. So, despite the pronouncements of cleanup software, we recommend the Quentin Crisp housekeeping approach to gid and fts in that they come back no matter how often you clean them, but after a while don't get any worse.

'Despite pronouncements of cleanup software we recommend the Quentin Crisp approach to gid and fts'

Show icons in more than 256 colours



SCREENSHOT 7

More colours

If you envy the prettier icons that come with XP, then you don't need to shell out for an upgrade to get a similar result. First you need to check that Display Properties, Settings shows 16, 24 or 32bit colour. Next you need some high-colour icons. Go Google for them; there are many free ones available. If you want to make your own, try resizing a photo down to 32 x 32 pixels in your favourite bitmap editor (Windows Paint will do at a pinch) then save as a bmp file, making sure the colour depth stays at 24bit. Now rename the bmp file so it has the ico extension. Finally go back to Display Properties and in the Effects tab tick the box to 'Show icons using all possible colours'. You'll need to reboot, after which your high-colour icons will glow like miniature paintings (see screenshot 7).

Over to you

Here's a little problem we haven't been able to solve. When you copy a folder and its contents, the created and modified dates of the files in the folder and its subfolders are preserved. The creation dates of the copied folder and subfolders, however, change to the current date. If you move the same folder, then the folder and subfolder creation dates are preserved. This appears to be a feature of the Fat16 and Fat32 file system, and one has to admit there is a certain logic to it.

But what if that's not what you want? Suppose the creation dates of the folders are important? Short of disk-cloning software, which is something of a sledgehammer/nut approach, or file attribute 'touching' software which would mean wading through every subfolder, can anyone come up with any bright ideas?

CONTACTS

Tim Nott welcomes your comments on the Windows column. Email him at: win@pcw.co.uk. Please do not send unsolicited file attachments.

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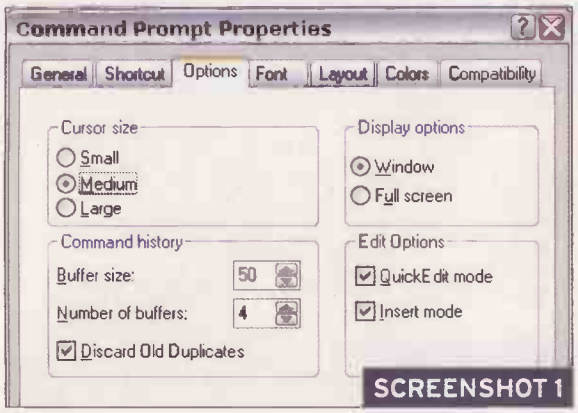
Tim Nott
Is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family

Command and Conquer

Tips and hints on how to enhance the command-line interface



Setting the command prompt history recall

Despite the fact that the Windows graphical user interface has been with us for 19 years, the command-line interface is far from moribund. As we've seen in past columns it can be used for purposes as varied as restricting a user's login hours to sending messages over a network. Back in June 2003 we looked at a couple of ways of customising the prompt window, changing the screen colours via the system menu and using TweakUI to enable autocomplete. If you've been used to the Windows 95/98 or ME version of the command prompt, brace yourself: the XP version derives from Windows NT and 2000 rather than MS-Dos and there's much more, not just in terms of command power, but also in terms of features designed to make the thing easier to use and more in keeping with the 21st century. Just to confuse matters, the old-style MS-Dos command interpreter, command.com is still included with XP, but we're going to concentrate on the NT/2000 version, cmd.exe. There is much more than we can cover in a single column, so this month we'll take a look at some of the interface enhancements.

Let's start by creating a shortcut to the command prompt somewhere readily accessible, such as the Quicklaunch toolbar or Desktop. Create a new shortcut, and in the 'Type location...' box of the Shortcut wizard put CMD. In the next step of the wizard, give it a suitable name, such as Command prompt, then click Finish. You now have a naked shortcut which you can customise and accessorise.

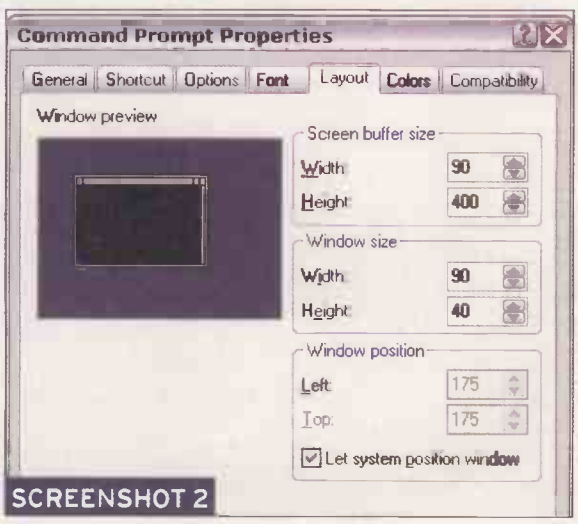
If you right-click on it and choose Properties, you'll see that, as well as the usual General, Shortcut and Compatibility tabs, there are tabs labelled Options, Font, Layout and Colors. Taking these in order, the two top sections of the Options tab control the cursor size and whether the display is full-screen or windowed. These should be self-explanatory but the two sections below are rather more arcane. On the left are the settings for the command buffer. This is the equivalent of the very useful but little-known Doskey function in the Windows 3.0 to ME versions of MS-Dos.

If you are working in a command prompt window, you can use the up and down arrow keys to recall previous commands. Alternatively you can press F7 to get a pop-up of the command history then choose a command by pressing F9 followed by the command number.

The options let you change the size of the buffer and the number of buffers, though for most users there's little point in doing this. More useful is the option – by default disabled – to discard duplicates. If you check this box then, for instance, if you are navigating through various directories and doing a DIR on each to get a list of the contents, you'll only get one DIR entry in the history list or when using the up/down arrows (see screenshot 1).

At the bottom right of the dialogue, the option for Quick Edit is similar to its MS-Dos predecessors – it means you can select text for copying in a command window with the mouse, without having to activate 'Edit, Mark' from the System menu.

Scroll back through previous screens



In Windows 98 and earlier, if you omitted a letter in a command, you had to arrow or backspace to the missing letter, then type that letter followed by the rest of the command, as overstrike was the default editing mode. The Windows ME version of MS-Dos changed this to default of insert – the remaining characters move along, as in any normal Windows text-editing situation. In XP, it's now an option: you can have it either way.

The Fonts tab is self-explanatory. You can choose a bitmapped font in a variety of sizes or the Lucida Console Truetype font in sizes up to 72point, though you won't get much information on the screen at that size. The Layout tab lets you control not only the size and position of the command window, but also the Screen buffer size. Unlike MS-Dos, when the command window fills up the information at the top of the window doesn't disappear into oblivion but just scrolls out of the window. At the default setting of 300 lines, this is equivalent to six screens full of the maximum MS-Dos window, and you can set this higher – up to 9,999. You can also, although there's little point in doing so, change the window width and buffer width to different values (see screenshot 2). The Colors tab should again be self evident. There are separate settings for the main screen and for pop-ups such as the Command history.

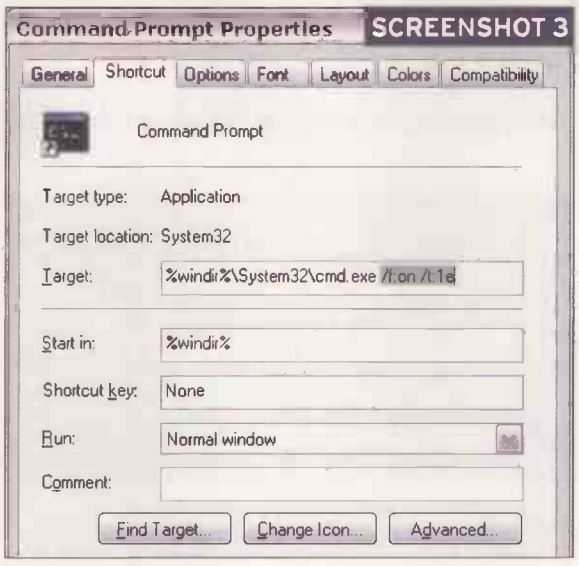
You can also get at all these options directly in a command window by right-clicking on the title bar and choosing Properties from the system menu. And this is where things start to get confusing. You may have already noticed that when you launch a command window from your shortcut, it inherits the name of the shortcut. In our example, this is 'Command prompt', but should you rename the shortcut (from the General tab of its properties) to 'George' for example, that is what will appear in the title bar. If you Start, Run... CMD, then the title will be C:\Windows\System32\cmd.exe on a standard installation. If you play around with the properties options you'll be asked if you want to set the options for the current session only or to modify the shortcut, which is evident enough.

However, if you Start, Run... cmd.exe and change an option, you'll be given the choice to apply the changes to the current window or 'future windows with the same title'. In addition, there's a similar set of options under the 'Defaults' item in the System menu. This contains an extra item on the Options menu: Autocomplete. When it works this is brilliant. Instead of having to type out folder or file names completely you just type one or more letters followed by, for example, a tab. The command processor will offer an autocomplete suggestion – for example if you are in C:\windows and you want to go to C:\program files type cd c:\p and then press the Tab key. If the suggestion isn't what you want, just keep pressing the Tab key until the right one appears.

This is fine in theory, but there can be problems getting it to work. Windows stores the various command processor options in a bewildering number of locations which interact in mysterious ways. Fortunately there are three ways of forcing the issue. The easiest way is to use the XP version of TweakUI, which you can download from **www.microsoft.com/windowsxp/pro/downloads/powertoys.asp**. This will offer you a wide choice of keystrokes for both file and folder name completion.

Other tweaking programs, such as Winguides Tweak Manager offer similar facilities. Alternatively, if you are feeling more adventurous you can edit the Registry directly, having taken the usual backup precautions. Go to HKEY_CURRENT_USER\Software\Microsoft\Command Processor. If there is no value named 'CompletionChar' then create a new DWORD with that name. Set its value to 9, which is the code for the Tab key. Repeat the process for the DWORD 'PathCompletionChar'. You can repeat the process for HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Command Processor, but remember that the current user settings always override the local machine settings.

If you'd rather not mess with the Registry or tweaking tools, there is a third way, which involves going back to the properties of the shortcut you created. On the Shortcut tab, in the Target box you should see the path to cmd.exe. There are a number of switches you can append to this, and the one we want is /f:on. Remember to leave a space before the slash, or the shortcut won't work. This will turn on autocomplete but you don't get a choice of completion key – you need to use Control & F to autocomplete file and folder names or Control & D for folders only.



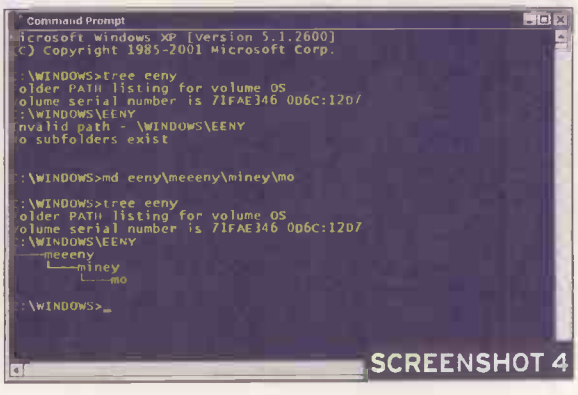
SCREENSHOT 3

Adding switches to the shortcut

There are several other switches you can use. For example /t:1e will set the background colour to dark blue and the text to yellow. You can stipulate other colours: the hexadecimal values range from 0 (black) to f (white), the first number after the colon being the background. If you want to use more than one switch, you need to leave a space between them (see screenshot 3).

Another switch worth remembering is /e: followed by on or off. This enables or disables 'command extensions'. These comprise another set of command-line conveniences ranging through a number of commands. To take a few examples, you don't have to enclose folder names with spaces in quotes when using the CD (change directory) command; you can create multiple levels of directories with the MD (make directory) command; and you can launch a file in its associated Windows application just by typing its name. Although the extensions are on by default they can be turned off in the Registry: since the command switches always override the Registry settings, this can be a good way of re-enabling them (see screenshot 4).

Create nested folders instantly with command extensions



SCREENSHOT 4

Falling off a log

Further to May's account of the XP Firewall Log file, the raw text output of pfirewall.log is anything but user friendly. One way to get a more legible display is to strip off the headers, import the file into Excel as 'space delimited', then format the columns. This, to put it mildly, is something of a fiddle and I've since discovered a simple but effective tool that turns the raw text of the pfirewall.log file into a neatly columned display. Robert McBride's XP Logger 2.1a can be downloaded from **www.majorgeeks.com/download.php?det=3307** and it's free.

Lost keys

It's a 'well-known fact' that if you lose your Windows XP, Office XP or Office 2003 product key – the 25-digit code printed on a yellow sticker somewhere on the packaging, then you are stuffed should you need to reinstall. Unlike previous versions, this information is not stored in the XP Registry in a human-readable form. However there's a utility called Belarc Advisor, that is free for personal use and is at **www.pcw.co.uk/download/1154513**. Run this and it will create a web page in your browser listing details of the hardware and software installed on your PC. This includes all Windows Hotfixes, third-party software versions, hard disk, motherboard, memory and other details all presented in a clear and non-technical way. And this information includes the XP and Office product keys.

Help: a cautionary tale

A gentleman, whose anonymity I will preserve, had an XP machine which when booted would sometimes start the Help Centre in the background. Then it would repeat the process, loading further instances of the Help Centre until Windows ran out of steam and expired. Having scoured MSCONFIG for any mention of the word 'Help', searched the MSKB and even renamed helpctr.exe the problem persisted. It was then he discovered that, sometimes, the F1 key jammed down. And the F1 key, as we know, summons the Help Centre.

CONTACTS

Tim Nott welcomes your comments on the Windows XP column. Email him at: xp@pcw.co.uk. Please do not send unsolicited file attachments.

Terence Green
has tussled with computers ever since starting as an IBM mainframe operator in 1979. Since 1981 he has documented the gap between what PCs claim to do and reality

A happy accident

We stumble across a tool for copying Windows installations, and help with an IE upgrade

The secret word for July is serendipity, meaning accidental discovery. The June column discussed obstacles to copying Windows 2000 while it is running. During March and April the topic was manipulating partitions. That prompted a reader query which sent us to the web, where we stumbled over a great tool for copying Windows installations.

BartPE **www.nu2.nu/pebuilder** is a bootable Windows CD which provides read/write access to NTFS drives. It gets better (or worse, depending on your job description), as BartPE can access drives on the local computer, attached or accessible over a network. This can be immensely useful, but is also a timely reminder for security administrators. Passwords – and even the encrypting file system – can only provide limited protection when someone has physical access.

BartPE has advantages over similar tools based on bootable Linux CDs, as it uses Windows NTFS drivers to access NTFS drives (see screenshot 1), whereas Linux boot CDs employ reverse-engineered drivers not considered as reliable. As it's a Windows boot CD, BartPE is also easy to use. We occasionally receive queries from readers who prefer file-by-file copies to hard disk, either because that's what they were used to doing under Windows 98, or because they are distrustful of Backup because they have had a bad experience with tape drives. Alternative solutions, as last month's column suggested, are to use drive-imaging software, or to install a second instance of Windows 2000. BartPE offers a third way, which is quicker and easier.

But there's a catch. While BartPE supports Windows 2000, and its setup program runs under Windows 2000, it requires a copy of either Windows XP or Windows Server 2003. The setup program, created by Bart Lagerweij, whose boot CD website has previously been featured in this column, extracts a cut-down version of Windows XP or 2003, and converts this into a bootable Windows CD image which you then need to burn to a CD. The process is clearly explained on the website.

Because it's Windows, BartPE supports all Windows drivers, thus enabling access to a variety of exotic and removable drives which would not be accessible from a Dos boot. By default BartPE is created with support for standard motherboard drive controllers. A few other drive types are supported by plug-ins, and other storage drivers can be loaded at boot time using the F6 Windows Setup menu.

PE Builder – 'cause being an Admin is hard enough...

In addition to drivers, plug-in support is also provided for a variety of administrative utilities and several Windows applications, including CD burning software (Nero), anti-virus scanners (F-Prot, McAfee), and remote control (VNC, TinyVNC). These applications are not provided, but if you already possess them, it is relatively easy to set them up to run under BartPE, enabling you to 'clean boot' from CD and run virus scans on NTFS drives or remote control other PCs. BartPE is preconfigured to run the Drive Snapshot drive-imaging tool which we mentioned in last month's column. Combined with Nero support, you can image drives with Drive Snapshot and burn the images to CD (see screenshot 2).

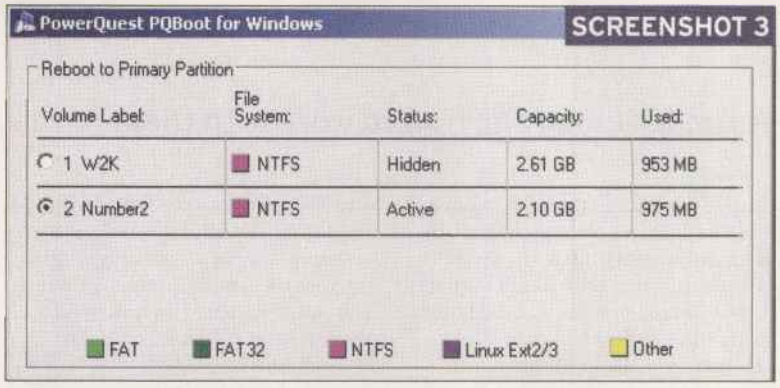
Active partitions

The fortuitous query which led us to discover BartPE was prompted by recent columns on multiple booting and partition management. Roy Wiseman works in testing for a large company and as a result spends a lot of time rebuilding various Windows environments. After reading the March and April columns, Roy wondered whether we were aware of a Dos utility which could be used from within Windows to toggle the active partition status. This would enable Roy to prepare a single hard drive with multiple primary partitions, each with a different Windows environment, and to automate the process of switching environments. Most people would use a boot manager for this purpose; many of them function by toggling the active status on primary partitions anyway. But, in a testing environment, there's a need to automate such processes, hence the requirement for a utility which can be scripted to run under Windows.

Diskpart **www.microsoft.com/windows2000/techinfo/reskit/tools/new/diskpart-o.asp** is a Windows 2000 Resource Kit tool which can be used to mark a partition active, and it can be scripted in a Command prompt window. But Diskpart is a heavy-duty disk management tool, and not really suited to the task of toggling active status. As Roy discovered, it can mark a partition active but it doesn't simultaneously remove active status from other partitions. This can lead to a situation where you have multiple active partitions which creates a high probability of boot failure. Diskpart, then, is worth knowing about, but not a suitable solution for the simple task of toggling active status.

In fact, the answer was hiding in the Powerquest Partition Magic folder, called Pqboot32 (see screenshot 3). It is one of a family of near-identical utilities, including both Dos and Windows versions. All Pqboot32 does is to toggle the active status. It runs under Windows and hides other active partitions by default, protecting against boot failure. It can also be controlled through command-line switches, allowing it to be scripted in a batch file or with Windows scripting. Symantec Ghost, another partition manager, includes a similar tool called Gdisk32. In keeping with the Symantec philosophy, Gdisk32 offers many more command-line options than Pqboot32. No doubt other boot managers like Acronis and Partition Manager have similar utilities.

BartPE includes its own file manager with ZIP support



Left: Toggling the Active partition with the Windows version of pqboot

Below: Discovering passwords with Dialupass and Protected Storage Passview

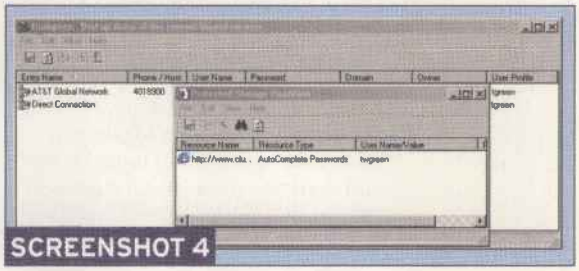
Upgrading to IE6

Noting the demise of support for the Internet Explorer version 5.5 browser (**www.microsoft.com/windows/ie/support/ie55exsupport.asp**) mentioned in April's column, Duncan Etheridge asked about upgrading to IE6. He wants to know whether he needs to uninstall anything before upgrading, and whether he needs to save his Internet Explorer settings, and if so, how.

Normally, the upgrade to Internet Explorer 6 automatically takes care of everything and you should not need to uninstall anything or save personal settings. That said, it's always advisable to have a backup of vital data, especially when making a big change such as this. The upgrade is unlikely to go wrong, but it's good to be prepared. You will want to save Outlook Express data too, as it will automatically be upgraded to version 6 at the same time. IE and Outlook Express versions advance in lockstep and it is not possible to retain an earlier Outlook Express version when upgrading Internet Explorer.

Unfortunately, the settings are scattered though the Registry and accessed from different points, including Internet settings and Network settings in Control Panel, and from within IE and Outlook Express. Data such as mail and IE favourites, cookies, and history, are by default stored in the user profile under the user account name in the Documents and settings folder. Microsoft doesn't provide a single point for users of standalone computers to gather and save all these settings in one fell swoop.

Websites such as Inside OE at **http://insideoe.tomsterdam.com** offer advice and utilities for backing up Outlook Express data. Ordinarily, Outlook Express saves the message store (for each individual user) in a single folder which can be located with Tools/Options/Maintenance/Store Folder. Making a copy of this for each user account is a useful precaution, and the Store Folder



option can also be used to move the message base, or to point Outlook Express at a saved message base. But this does not include settings or the address book. For a more complete explanation, peruse the Inside OE website. The FAQ explains where the data and settings are stored and there is a link to the OE Backup utility which will back up all data and settings.

There seems to be no easy way of doing the same for IE. The site at **www.backsettings.com/internet-explorer-backup.html** offers a free backup tool but we have not tested it in anger. Of the data it claims to save, favourites, cookies, and history can all be found in the user's profile under Documents and settings, and backed up from there if desired. As an aside, you can move (by dragging and dropping) Favourites to anywhere you like and Internet Explorer will automatically update its settings to use the new location. Proxy and connection settings, and Dial-up connection settings, except for passwords, are saved in individual rasphone.pbk files in each user profile. Use Start/Search/for Files and Folders to locate them.

Passwords and Autocomplete entries are stored encrypted in the Registry. Ordinarily these aren't accessible but there are numerous utilities uncovered by Google that claim to reveal them. Two we used come from Nirsoft **http://nirsoft.cjb.net** and, while we cannot guarantee their provenance, they certainly do what they claim. Dialupass instantly reveals Dial-up networking (DUN) passwords. It has to be run with administrative rights. Use RunAs if not in an administrative account. Although we were a tad paranoid when testing this, it does not seem to do anything untoward such as dialling out and broadcasting these passwords to the world at large (see screenshot 4).

The other Nirsoft utility, Protected Storage Passview, reveals the data stored by Autocomplete, which usually means web passwords and the like. You may find either or both of these tools setting off alarms in your anti-virus scanner or spyware detector. This is probably unfair. According to Symantec, Protected Storage Passview (pspv.exe) has been maliciously misused in a Trojan, but Symantec says that pspv.exe, as opposed to the backdoor code misusing it, is not detected, because pspv.exe is not malicious.

That said, the existence of these tools is fair warning as to the relative security of saved Windows passwords. If your computer is used by others, sent for repair, or otherwise accessed by people you don't know, you may want to make a note of sensitive passwords and delete Autocomplete entries first. You can delete dial-up passwords by deselecting the 'Save' option when using a connection. For a less insecure way to store important passwords, give Password Safe a whirl. Originally written by security guru Bruce Schneier, it can be found at **http://passwordsafe.sourceforge.net**. Do not confuse Password Safe (with a space) with Passwordsafe, a website claiming to store your passwords safely on the web!

Finally, the IE6 upgrade will change several default settings to improve security. See **http://support.microsoft.com/default.aspx?id=291387** and consult Inside OE for advice if you experience problems after upgrading. Also, see **www.microsoft.com/windows/ie/using/howto/security/settings.asp** for further security precautions.

As an addendum to our warning about the end of support for IE5, we have since discovered that support for IE5.01 SP4 on Windows 2000 SP4 continues until 31 March 2007. See **http://support.microsoft.com/default.aspx?pr=complifeport**. All other combinations are no longer supported. So, it seems that if you stayed with 5.01 and applied Service Pack 4 you are still supported, but if you upgraded to 5.5 you are not. Microsoft works in mysterious ways.

CONTACTS

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Filing system

Find out how files operate at a lower level under Linux and how to work with them

In the past couple of months we have seen some of the basic file commands in Linux and Unix; how to list, move and delete files. We've also seen how symbolic and hard links work and how to manipulate those. This month we will see how files operate at a lower level under Linux (and most forms of Unix) and use some C programming to work with files.

In the Linux world, the kernel is responsible for maintaining the system. This involves not only controlling access to the hardware devices, but also providing an environment for programs to run in. Each program (or process) is protected by the kernel so no other process can interfere with its running and, likewise, it prevents that process from harming another's operations. Consequently, every process has its own set of memory and resources and, as far as the process is concerned, has full and sole access to the machine. That's why if a program examines the memory it's using, you find it appears to be using the exact same memory as other processes. Of course this isn't the case – the kernel provides a virtual memory space for each process and only the kernel ever uses the real physical memory.

The same goes for file operations. Every process can have many files open at a time for reading and writing, but each process has its own list of files, each represented by a non-negative number, which is known as a file descriptor. When a process starts, the kernel automatically opens three standard file descriptors: standard input, standard output and standard error. These are given the numbers 0, 1 and 2, respectively. You've probably used these files many times before, maybe without realising:

```
$ ls -l | more
```

This simple, everyday action uses these files. When you run a command in a shell, the standard output is the shell window and the standard input comes from the keyboard. In the command above, the pipe (|) sends the standard output from the ls command to the standard input of the more command, providing a paged display of the directory contents. Standard error is used less frequently; this file is for outputting errors. It's useful to have a separate file for error messages – if standard output is used, the errors will get mixed in with useful output.

You can redirect the standard files using the < and > characters. For example, to redirect the standard output of the ls command to a new file:

```
$ ls -l >output.txt
```

Redirecting standard input is less common, but can be achieved in the same way. If you want to combine standard output and standard error into one file, use a special sequence:

```
$ ls -l 2>&1
```

Not the prettiest form, but it makes sense: redirect file descriptor 2 (standard error) to descriptor 1 (standard output). The ampersand is necessary or standard error would be redirected to a normal file called '1'.

File handling

There are two ways to open files using the system libraries. The most common way is to use the C library's functions. These are highly portable – if you write a program to open files in this way, it should work just as well on any operating system, even Dos. These functions are part of the standard C language, and we won't look at them here. Instead we'll see the alternative method, using kernel system calls. These are the low-level functions that allow communication between processes and the kernel and therefore the file systems. In fact, if you use the standard C functions, these themselves will ultimately make system calls on a Unix platform, but this is hidden away in the library code. As a result, system calls are for Unix-like platforms only – although other platforms may implement libraries to emulate them.

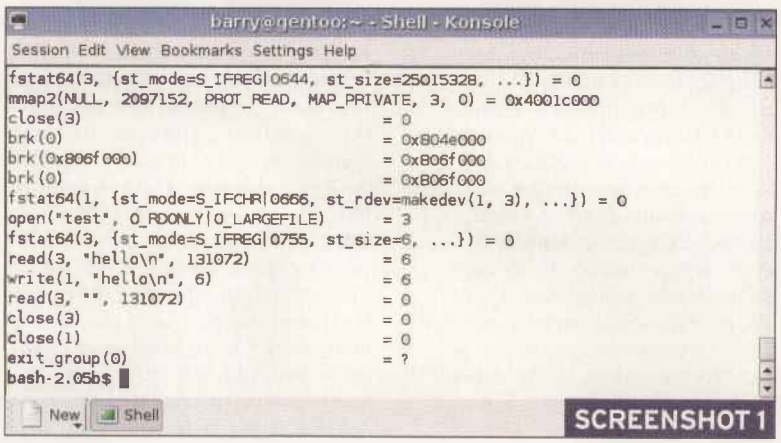
A good way to see what's going on is to use the 'strace' command, which allows you to trace the system calls a process makes. Try the following:

```
$ echo hello >test
$ strace cat test ↙
>/dev/null
```

(Key: ↙ code string continues)

Here, the word 'hello' is redirected to a new file called test. Next the cat command outputs the contents of the test file, but its system calls are traced. We redirect the standard output from the cat command to the null device so that it doesn't interfere with the information. Quite a lot of output is given, because each process automatically runs several system calls when it starts up. The interesting information is towards the end of the output (see screenshot 1).

The first system call of interest is 'open'. The filename is the first argument ('test') and the remaining option controls the method of opening (see later). On the right-hand side, the strace command usefully shows the result of the call, which in this case is 3. You may have guessed that since open opens a file for access, it would return the new file descriptor associated with that file. 0, 1 and 2 are already in use and 3 is the next available number. Next come the read and write system calls, which as you would expect control reading from files and writing to them. The read call takes the file descriptor 3, now associated with the test file, and the write command outputs to descriptor 1, which as we've seen is the standard output. Both file descriptors are then



The strace command lets you debug programs and gain information about system calls made

FIG 1

O_CREAT	Create the file if it doesn't exist.
O_EXCL	Fail if the file already exists and O_CREAT is used.
O_NOCTTY	Used only when the file is a terminal device.
O_TRUNC	If the file already exists, truncate the file (make the file blank).
O_APPEND	When writing to the file, append to the end.
O_SYNC	Write to the file synchronously, ie do not return until complete.

closed before the program exits. The strace command gives a good overview of how to use files at a low level. First they're opened and given a descriptor, which is used to access the files with other input/output calls. Once finished with, the file is closed with another call. So first up let's look at the 'open' call.

Opening files

Open takes either two or three arguments. The first is the path to the file, the second takes flags for controlling the open process and the optional third is for setting the mode on newly created files. If open is successful, it returns the file descriptor for the file. On failure it returns -1. The flag must be set to O_RDONLY, O_WRONLY or O_RDRW to determine whether the file is read only, write only or both allowed. Other flags can be combined – see figure 1 for a list of the main flags. So, as an example, create a new file called 'myfile', which should be open for reading and writing and must not be created if it already exists. Next open the same file for reading only.

```
fd = open("myfile", ✔
O_RDRW | O_CREAT | ✔
O_EXCL);
fd = open("myfile", ✔
O_RDONLY);
```

Reading and writing

Once the file descriptor is ready, use the read and write system calls to access the file. The file descriptor associates a pointer to the position in the file, which is initially at the beginning. Read takes three arguments: the file descriptor, a buffer to hold the data and the number of bytes to read. It returns the number of bytes read (not necessarily the same as requested) if it's successful, or -1 on error. The position in the file is advanced by the number of bytes read. An example:

```
char buf[100];
n = read(fd, buf, 50);
```

Here a buffer of 100bytes is allocated, and read attempts to copy 50bytes from the file into the buffer. The result of the call is held in n. A second attempt at reading 50bytes from the file would read the next 50bytes, since the file pointer has moved on.

Writing is performed similarly. Write takes three arguments: the file descriptor, the buffer holding the data to write and the number of bytes to write. On success it returns the number of bytes written, and again, -1 on error.

```
n = write(fd, "hello\n", ✔
6);
```

Here, six bytes are written to the file descriptor from a static buffer containing six characters. A normal buffer, as shown with the read example, may also be used.

You can read and write anywhere within a file, not just sequentially. This involves changing the file descriptor's pointer, and the lseek system call is provided for that purpose. Lseek takes three arguments: the file descriptor, an offset and a starting position. For convenience, there are three constants for the position: SEEK_SET – sets the pointer to the offset number. SEEK_CUR – set the pointer to the offset from the current position. SEEK_END – sets the pointer to offset from the end of the file.

So to set the pointer 25bytes into the file and 10bytes from the end of the file:

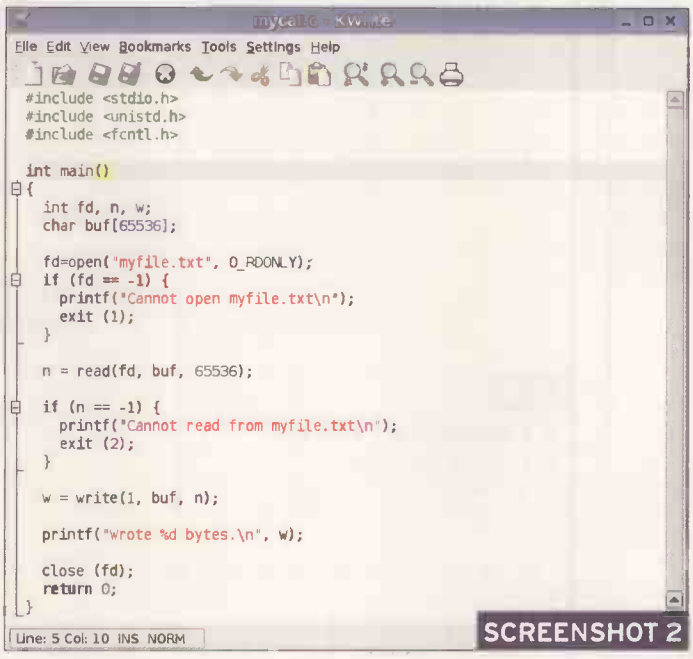
```
n = lseek(fd, 25, ✔
SEEK_SET);
n = lseek(fd, 10, ✔
SEEK_END);
```

lseek returns the new position if successful, or -1 on error.

So with these simple system calls, it's possible to write your own basic 'cat' command. You would open a file for reading, copy the contents into a buffer (either one large buffer or in repeated chunks) and then output the buffer to the standard output. See screenshot 2 for a real program.

This is an unrealistically simple program, but it works. The first three lines are needed to use the system calls. In the main function, the variables are declared, along with a 64KB buffer. Next a hard-coded file called myfile.txt is opened. If it fails, the program gives an error and exits. Otherwise, it attempts to read 64KB of data from the file. The actual number of bytes read is stored in n, which if equal to -1 means the read has failed, and the program exits. Finally, the program writes n number of bytes from the buffer to the standard output (file descriptor 1) and prints the number of bytes written. After this, the file descriptor is closed and the program ends. The program isn't very useful – it can only read 64KB from a fixed filename, but it could easily be modified to be more advanced. Compile the program with gcc as follows:

```
$ gcc -o myprog myprog.c
```



SCREENSHOT 2

An example C program to open a file and read its contents. The Kwrite editor performs some helpful formatting to aid program entry

More system calls

Unless you want to read or write to files, there's no need to open them. There are several other system calls for handling files this way. We've seen many commands for file manipulation including chmod, chown and ln. Many of these commands are simple front ends to system calls; in fact, quite often, the system calls have the same names as their respective shell commands.

To change access permissions you would use the chmod command or the chmod system call. This takes the file's path as its first argument and the new file mode as its second. So to change the file '/tmp/a.txt' to the mode rwxrw-rw- (mode 0755), the command and system call are as follows (see over the page):

```
$ chmod 0755 /tmp/a.txt
n = chmod("/tmp/a.txt", 0755);
```

Chmod returns 0 if successful or -1 on error. Similarly, the chown command is based upon the chown system call. In this case, it takes the file's path as first argument, the UID (user ID) as second and the GID (group ID) as third, with -1 to indicate no change. Unlike the shell command, you must use the numerical ID of the users and not their names, so if the user Barry has a UID of 1000, the following examples are correct:

```
# chown barry /tmp/a.txt
# chown 1000 /tmp/a.txt
n = chown("/tmp/a.txt, 1000, -1);
```

To create a new file, you simply call open as we've seen above. For directories, a different system call is needed because directories are special kinds of files. The shell command is mkdir, and there's no surprise for the name of the system call. Mkdir, like almost all file system calls, takes the file's path as its first argument and the mode for the newly created directory as its second. The shell command has an '-m' option to specify the mode:

```
$ mkdir -m 0755 mydir
n = mkdir("mydir", 0755);
```

For removing directories, the shell command and system call is rmdir. Only the file's path is necessary to remove a directory:

```
$ rmdir mydir
n = rmdir("mydir");
```

Both mkdir and rmdir system calls return 0 on success and -1 on failure. For a real example of mkdir see figure 2. Again, this program is simplified for brevity. First the program checks you have provided one argument (the command itself counts as one, hence the check for two).

Next the program calls mkdir to create the directory given on the command line with a mode of 0644.

Extensive documentation for programs, library functions and system calls is available in the man pages

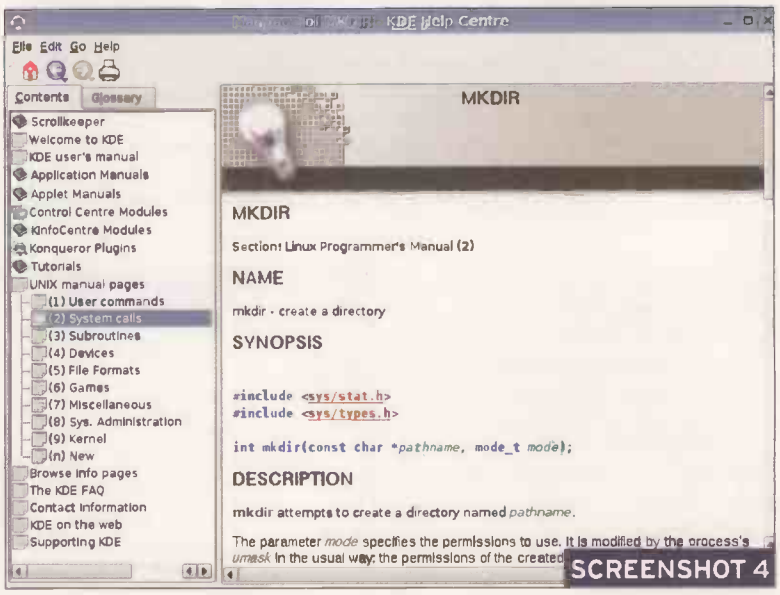


FIG 2

Example of mkdir

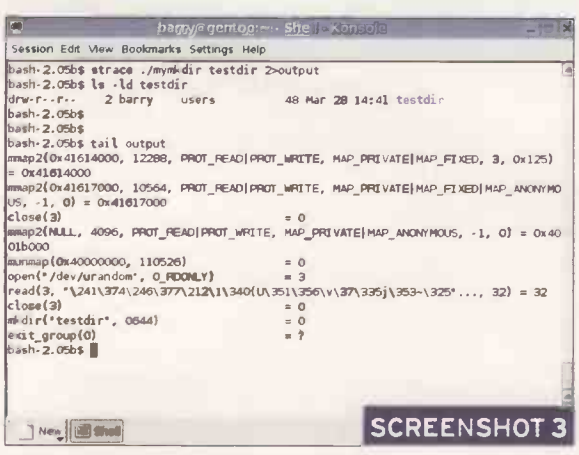
```
#include <stdio.h>
#include <sys/stat.h>
#include <sys/types.h>

int main(int argc, char *argv[])
{
  if (argc != 2) {
    puts("Usage: mymkdir <dir>");
    exit(1);
  }

  if (mkdir(argv[1], 0644)) {
    puts("Cannot create directory");
    exit(2);
  }

  return 0;
}
```

Tracing the system calls made by the test mkdir program



Now we can run the program to create the directory, and use strace to verify the system call is indeed made (see screenshot 3). Here we run the new program under strace and redirect the standard error, which contains all of strace's output, to a file. Next we check the directory exists with the ls command – the '-d' option tells ls to check the directory itself and not its contents. Finally, we examine the last few lines of strace's output with the tail command. As you can see, the mkdir system call is made exactly as expected and returns a 0 for success.

The system calls and library functions are very well documented in the Linux Man pages. You can view these in the shell with the Man command, or through a GUI like KDE's Help Centre (see screenshot 4). The Man pages are aimed at programmers so tend to be terse, but all the information is there, providing the function prototype (expected arguments and return type) and the necessary header files to include a detailed description of the call and cross-references to related pages.

Red Hat & Fedora

A number of readers have been curious why we haven't given much space to the new Fedora project in this column. Red Hat decided not to continue its Red Hat Linux distribution line late last year, and instead focus on Red Hat Enterprise Linux, its high-cost commercial offering. Red Hat Linux was one of the oldest, and most popular Linux distributions and was Editor's Choice in *PCW*'s Linux Group test in 2002.

The good news is that the distribution hasn't died completely. We now have the Fedora Project, bringing together a community-based effort from Red Hat and Fedora.us, originally an add-on set of packages for Red Hat Linux. Fedora Core 1 has already been released, and differs little from the final release of Red Hat Linux, save the removal of Red Hat branding. The first release has had some transitional pains and isn't really suitable for beginners. The second release, Fedora Core 2, is already in test status and will be available shortly, quite possibly by the time you read this. Once available, we'll take a more in-depth look at the distribution.

CONTACTS

Barry Shilliday welcomes your comments on the Linux/Unix column. Email him at: linux@pcw.co.uk. Please do not send unsolicited file attachments.

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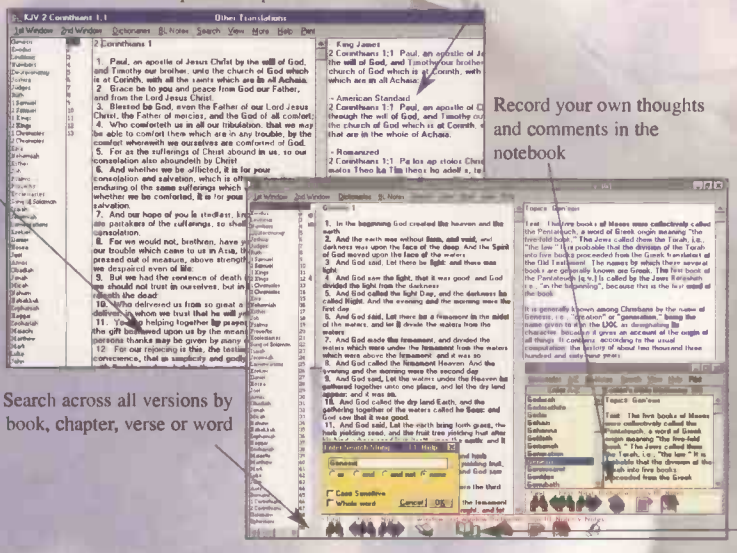

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Concordances of each Bible & each Reference	2	2
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Morris Chain Reference System	1	1
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Ellis Englishman's Concordances OT & NT for each Bible Version	0	2
1 Million Cross References / Treasury Scripture Knowledge	0	1
Dictionaries, References, History, Helps	12	18
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Personal notes linked to verses	1	1
Tutorial, Tips, Helps	3	3
Edersheim's Life and Times of Jesus the Messiah	0	1
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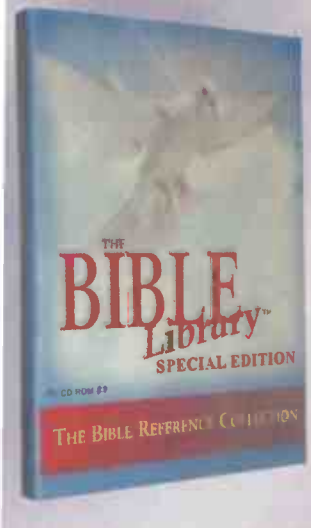

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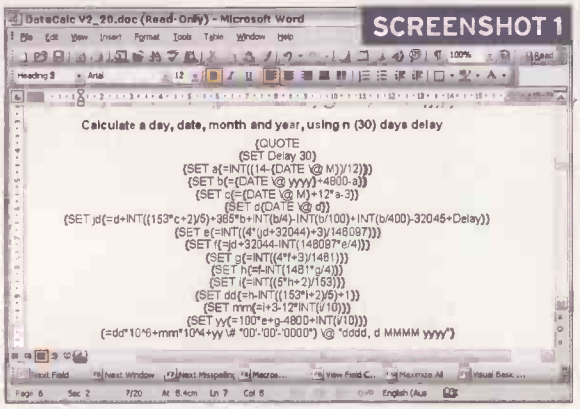
Tim Nott
Is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family

Back to the future

Setting invoice dates, formatting TOC tabs and a reader solution to a cryptic query

SCREENSHOT 1



Macropod's magnificent piece of fielding

A simple enough request from reader Kostas Papadopoulos caused a lot of head-scratching this month. He wanted to create an invoice template that inserted the current date at one point in the document and another, 30 days later, elsewhere. This sounds simple enough using fields and bookmarks, but the problem lies in adding the 30 days. It's easy in Excel – just add 30 and format accordingly.

This is not the case in Word, due to the way it stores dates in fields. The first date has to be converted to a Julian date number, the 30-day interval added, then the result converted back to a calendar date. It can be done with fields, but it is complicated. We found an excellent document covering all aspects of manipulating dates in Word at the WOPR site: go to **www.wopr.com/cgi-bin/w3t/showflat.pl?Cat=&Board=wrd&Number=249902** and click the 'Download' link at the left of the message.

Having downloaded the document you can toggle field codes to see the results or code and, as you see, the example to 'Calculate a day, date, month and year, using n days delay' runs to 32 nested and concatenated fields. However, you can copy and paste the fields into your own templates or documents and the author, aka Macropod, has produced an elegant and exhaustive resource (see screenshot 1). One thing we discovered was that you can use the line feed (Shift & Return) to break up field codes visually – making them far easier to read – without affecting the function of the field. The other advantage of the field approach is that it doesn't require any VBA code which may be an issue in a macro-protected environment.

If you want something quick and VBA based, then it's a lot simpler. The following morsel of code, for example will insert the current date plus 30 days at a bookmark named 'duedate'.

```
ActiveDocument.Bookmarks ↙
("duedate").Select
Selection.TypeText ↙
Text:=Format(Date + 30, ↙
"d mmmm yyyy")
```

(Key: ↙ code string continues)

Note that the calculated date is inserted as plain text, rather than a field, so it won't change.

Space oddity

In May's column, we looked at the problem of formatting tab leaders in tables of contents with spaces either side of the leaders. We only managed to do half the job, using a space from the Symbol font after each heading. Reader David Buley has come up with a more elegant solution using the search-and-replace feature in Word.

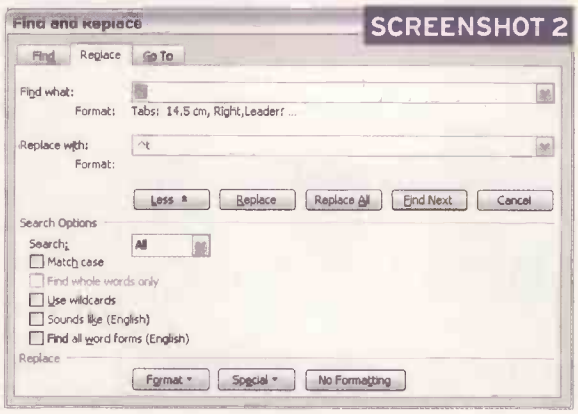
Make sure you have the 'More' button enabled in the Replace dialogue, then type ^t (the code for the tab character) in the 'Find what:' box. Now, with the focus still in the 'Find what:' box, click the Format button. You've got a choice here. First you can choose 'Style…' then select TOC1 from the list. OK the choice and you'll see that 'Style: TOC1' appears under the 'Find what:' box. Now type ^t with a space each side in the replace box, then hit the 'Replace all' button. You'll find that only the tabs with TOC1 style are replaced: all other tabs in the document will be left alone.

You need to repeat the search and replace for the other TOCn styles if you are using more than one table of contents level. Alternatively you can go to the 'Tabs…' entry in the Format button list and specify the formatting of the tab, which will be something like 14.5cm, right aligned with a leader. This will get all the leadered tabs in one swoop. It shouldn't be too hard to record this as a macro (see screenshot 2).

There's a slight complication here in that, as you doubtless know, a table of contents is a field and when fields are updated any user-defined formatting may be removed. This shouldn't be too much of a problem. First, you should leave the search and replace till last. Second if you manually update the field by selecting it and pressing F9 you'll notice you get the choice between updating page numbers only or the whole table. Select the first option and you won't lose your formatting. You'll also find that automatic updating of the field – such as when you print a document – just does a page number update. Finally, remember you can always 'unlink' a field, that is replace it with its current text content by selecting it and then pressing Ctrl & Shift & F9.

Putting spaces round tab leaders

SCREENSHOT 2



A lack of organisation

It's always rewarding to solve readers' problems, but it's even better when they solve them themselves. Jim Lambert is one such reader who found that the Organisation chart in Word 2000 had ceased to function. Having eliminated the usual rituals of 'Detect and repair' and reinstalling Office, both Jim and I were stumped. I couldn't find anything on 'Organisation chart' in the Microsoft Knowledgebase. Searching for 'Organization chart' produced lots of results, none of them relevant. However, a few days later, Jim hit the spot at another site which quoted MSKB article 238307 – which wasn't returned in the previous searches.

The problem, which also occurs in Powerpoint and Excel, is too many fonts. If you have more than 600 or so, then the Organisation chart may not work. I'm sure there's a rational explanation for this, but I don't think I want to hear it.

CONTACTS

Tim Nott welcomes your comments on the Word processing column. Email him at: **wp@pcw.co.uk**. Please do not send unsolicited file attachments.

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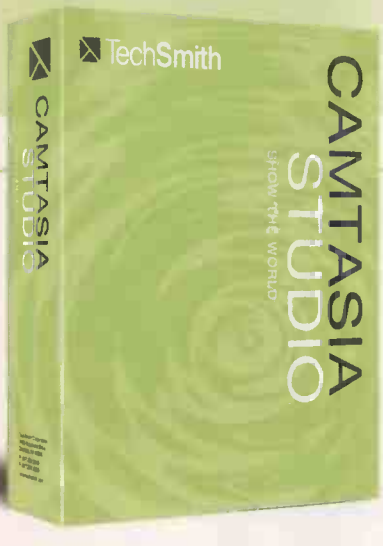

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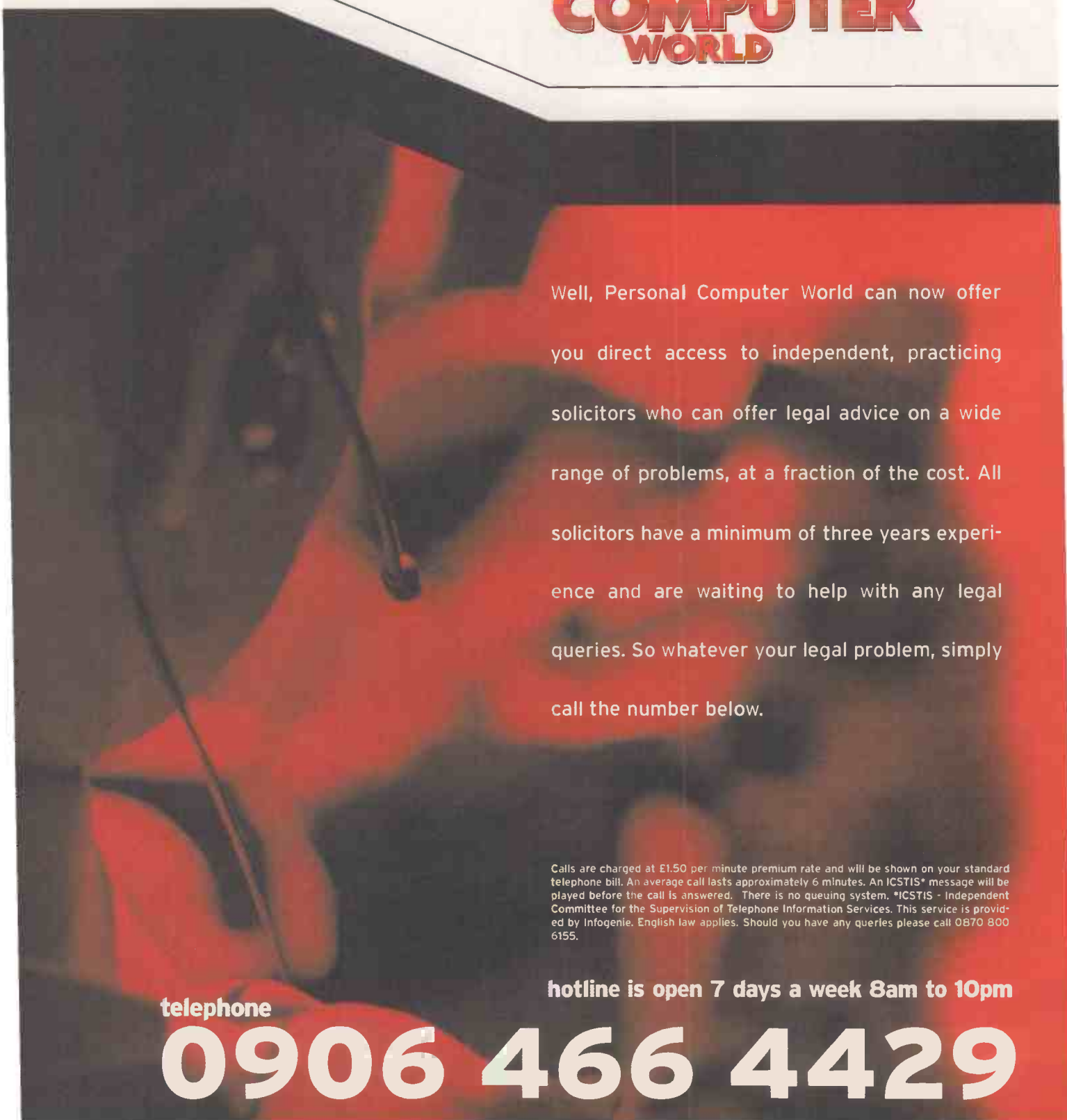

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Stephen Wells
is a freelance journalist and a regular contributor to computer magazines. He's been writing *PCW*'s Spreadsheets column for many years. A US citizen, he now resides on the Essex coast

Making a date

How to pick dates from a calendar, and a way to record employees' absence

Entering dates into a spreadsheet can be tricky, with scope for errors and format confusion.

Financial packages like Microsoft Money let you pick dates from a calendar when making transaction entries. You can have the same feature when creating spreadsheets if they are produced with recent versions of Excel (see screenshot 1). It's not only convenient but guarantees a valid date is entered.

Open a new workbook. Press Alt & F11 to start the VBA editor. On the Insert menu choose UserForm. A blank form and a Toolbox should open. If there's no Toolbox, choose Toolbox on the View menu. Right-click on a space in the Toolbox and choose Additional Controls. Scroll down until you find Calendar Control 9 or 10 and choose it. This adds another tool to the Toolbox.

Click on the Calendar tool and then draw a rectangle on the form. A calendar appears. Change the month to September and, with the size handles, enlarge both the form box and the calendar until the calendar looks right. Click on the form outside the calendar to select it and press F4. In the UserForm properties box change the Caption from UserForm1 to Calendar. Close the box, click within the calendar, and press F4 again. In the Properties box for Calendar, click in the area next to Backcolor. Then click the down arrow which appears, and the Palette tab. Choose a more cheerful background colour than the default grey. Close this box.

Press F7 and delete Private Sub UserForm_Click(). Enter the following two short macros instead:

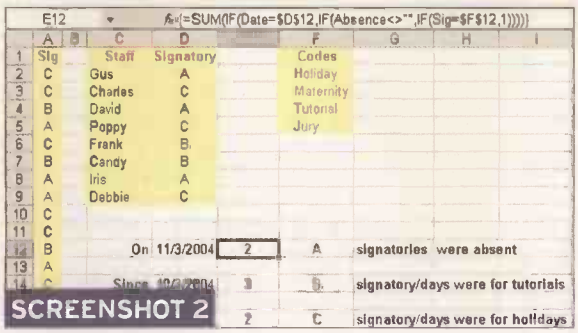
```
Private Sub ↙
Calendar1_Click()
    ActiveCell = ↙
Calendar1.Value
End Sub

Private Sub ↙
UserForm_Activate()
    Me.Calendar1.Value = ↙
Date
End Sub
```

On the Insert menu choose Module and enter this macro:

```
Sub ShowCalendar()
    UserForm1.Show
End Sub
```

(Key: ↙ code string continues)



Top: It's easier to insert dates in Excel using a calendar

Bottom: How to analyse a record of staff absences

Close the VBA editor to return to your worksheet and press Alt & F8. Choose the ShowCalendar macro. Click the Options button and enter a keyboard shortcut, like Ctrl & C and that's it. Now you can click on a cell where you want a date, press your shortcut and pick a date from the calendar. If you would rather display the calendar with a tool, refer to the *PCW* April Hands on Spreadsheets column on how to create new tools.

Who's missing?

Jonathan Atkins wrote with a problem about recording absences in his department. Every staff member has a signatory code, though they don't enter it on their worksheet. They only enter the date and their name if they were at work, plus a code letter representing the reason if absent.

Counting how many staff were on holiday on a particular day would be easy. Jonathan's problem was that he wanted to count how many category A staff members were absent on a particular date.

I suggested Jonathan keep separate the staff members' entries from his calculations and the analysis. To reproduce the solution, create two worksheets, one has Entry on the tab and the other has Data. On the Entry worksheet the dates are in column A, the staff names in column B and the absence codes in column C. A blank cell in column C means a staff member was present on that day. All the dates are given the Name, Date and the absence codes the Name, Absence. Screenshot 2 shows the Data worksheet. The range, C2:D9, Named Key, is a little lookup table with staff names in column C and their fictional codes in column D. To save space, just eight fictional first names are shown here.

Entries in column A are headed and Named Sig. Cell A2 has the formula:

```
=VLOOKUP(Entry!B2,Key,2,↙
FALSE)
```

and this is dragged down as many rows as have been used on the Entry sheet. The FALSE argument means the names don't have to be in alphabetical order. For each entry, the Sig range looks up the category of that staff member. It saves having another column on the Entry worksheet where the staff members would have to enter their code each time.

It's not essential for the calculations, but at the top of column F is a reminder of what the codes stand for, H for Holiday, M for Maternity, T for Tutorial and J for Jury duty.

If the date is entered in cell D12 and the category, A, is entered in F12 then the following formula in cell E12 will give Jonathan his answer:

```
=SUM(IF(Date=$D$12,IF↙
(Absence<>"",IF↙
(Sig=$F$12,1))))
```

It's an array formula so is entered with Ctrl & Shift & Enter and Excel adds curly brackets to acknowledge it knows what you want.

That formula is simple. It just says for the date in D12, if a cell in the Absence column isn't blank, and if the adjacent staff member has the code in cell F12, count them.

You could also count how many days that B signatories have spent at tutorials with the array formula:

```
=SUM(IF(Date>$D$14,IF↙
(Absence="T",IF↙
(Sig=$F$14,1))))
```

You could see how many days C categories have spent on holiday since a date entered in cell D16 with the array formula:

```
=SUM(IF(Date>$D$16,IF↙
(Absence="H",IF↙
(Sig=$F$16,1))))
```

CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Email him at: spreadsheets@pcw.co.uk. Please do not send unsolicited file attachments.

Ken McMahon
is a freelance journalist and graphic designer. His involvement with digital graphics began with a Commodore 64. He graduated to Macs and now works mostly with PCs. Draw your own conclusions

Getting the lowdown

Cmos sensors, using your camcorder as a webcam and retrieving lost pictures

This month's Hands on mailbox was full of interesting questions, so I thought I'd take the opportunity to answer them in more depth in my column rather than on the Question time pages. So if you've ever wondered why Cmos sensors are beginning to replace CCDs in digital cameras, want to use your camcorder as a webcam or have just accidentally reformatted a memory card and want to get your pictures back, read on.

CCD vs Cmos

Having read the review of the Canon EOS 300D in *PCW* March 2004, Saty Navalkar emailed to ask what the advantages of using a Cmos chip are compared to the CCD chips widely used by all other digital camera manufacturers.

Essentially, CCD and Cmos image sensors do the same thing – convert light into an electrical charge – but they differ both in their internal architecture and imaging capabilities.

CCDs were developed in the 1970s specifically for imaging applications. A CCD consists of an array of photosites arranged in a grid (in a flatbed scanner it's a linear array, which is passed over the document by means of a step motor).

Each photosite contains a photodiode which converts light into an electrical charge. This is in turn converted into a voltage and amplified before being turned into a numeric value by an analogue-to-digital converter. CCDs use shift registers to move the data off the chip (see figure 1). Parallel shift registers shunt the data up the chip a row at a time and when it reaches the top row a serial shift register pushes it out, making the top row available for the next parallel shift. This method is often referred to as a 'bucket brigade' process; it enables the production of highly sensitive sensors with low noise characteristics, but it's expensive to produce, requires a lot of ancillary electronics which can't be integrated on the chip and uses a lot of power.

Cmos sensors are more akin to an LCD flat-panel display. Like the CCD they comprise a grid of photosites containing a photodiode (see figure 1). Unlike the CCD however, each photosite contains its own amplifier and the matrix is overlaid with a metal grid which provides timing and readout signals. This means that each photosite is individually addressable and you can take values from a section of the entire sensor or even individual sites.

Unlike CCDs, Cmos sensors use the same manufacturing processes and can be produced in the same fabrication plants as memory, CPUs and other processors, so they're cheap to make, consume relatively little power and have the potential for integration of other circuitry on the Cmos chip itself.

Given these advantages, why don't all digital cameras use Cmos sensors? Well, CCDs have been around for some time, while Cmos sensor development is still in its infancy. Until fairly recently, the results from Cmos sensors were disappointing, the main problems being low sensitivity and high noise.

The 3.25megapixel EOS D30, launched in 2000, was Canon's first dSLR to use a Cmos sensor. Canon overcame the noise problem inherent in Cmos chips by using on-chip noise reduction technology to reduce fixed-pattern noise introduced by the photosite amplifiers.

Canon also tackled random noise by adopting a method of completely transferring the charge from photosites, eliminating noise caused by 'irregular fluctuation at the molecular level'.

The two cameras which laid to rest any doubts about the performance and quality of Cmos sensors were Kodak's DCS Pro 14n and the Canon EOS 1DS. Another benefit of Cmos technology that both of these cameras demonstrated was increased resolution – nearly 14megapixels in the DCS 14n and 11megapixels in the 1DS.

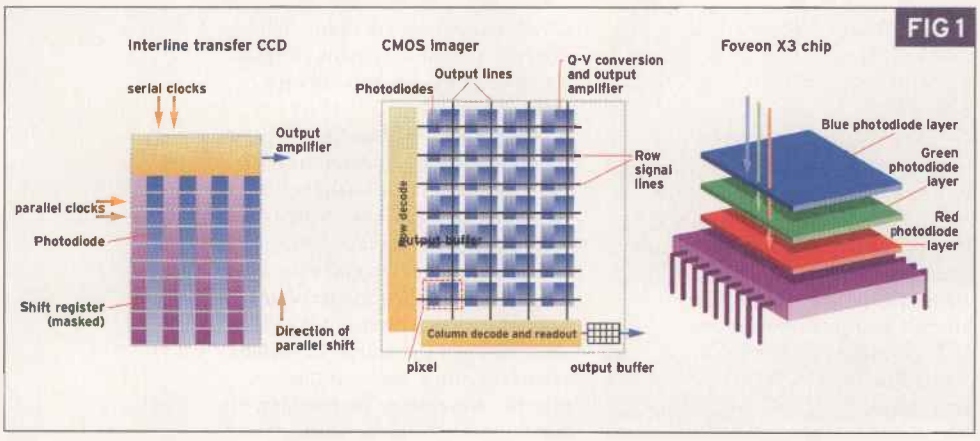
Although the 14n came in for some criticism of its noise levels when it was launched, that hasn't put Kodak off using a Cmos chip in its two new dSLRs – the DCS SLR/n and the Canon mount DCS SLR/c. Both of these cameras use a newly designed 14megapixel Cmos full frame sensor that incorporates what Kodak calls High Performance Low Noise (HPLN) technology.

Another development in sensor technology that holds promise is the Foveon X3 chip. Whereas conventional image sensors use a filter layer to produce an RGB image, the X3 (which is a Cmos chip) makes use of the properties of Silicon to capture red, green and blue light at each photosite. Silicon absorbs light of different wavelengths at different depths. By employing three photodiodes at different depths, the X3 can detect blue light at the surface, green in the middle and red at the bottom (see figure 1).

Because 'conventional' sensors use a filter layer, each photosite can detect light of only one colour – red, green or blue. The filter typically uses what's called a Bayer pattern, which alternates lines of blue-green and red-green rows. A demosiac algorithm then arrives at a colour value for individual pixels by comparing them with neighbouring pixels. The X3 doesn't have to do this and the result is sharper images that suffer from none of the colour artefacts associated with Bayer filtering.

Currently, X3 chips are used in Sigma's SD9 and SD10 dSLRs and Polaroid's x530, but are yet to gain a wider foothold in the digital camera

CCD, Cmos and Foveon X3 sensor architectures



market. One of the perceived drawbacks of the SD9/10 is that its raw format images can only be processed using the supplied Photo Pro converter software. The increased availability of high-capacity media and the quality advantages of Raw-based workflow make this less of an issue, but nonetheless put it at a disadvantage to cameras that offer Raw with embedded jpeg modes.

Camcorder webcam

Derek Heaton isn't the only one who wants to know if he can use his digital camcorder as a webcam. He's just a bit more frustrated, because he used to be able to use the analogue input on his Canopus DV Raptor card to connect his Sony DCR-PC100 camcorder and use it for videoconferencing with Microsoft Netmeeting.

One way, but not the only way, around this problem is to use Orange Micro's webcam DV application. We reviewed Webcam DV in *PCW* April 2003. At the time, it included a Firewire cable and sold for £29.36, making it only marginally less expensive than buying a dedicated webcam. You can download the software only for $20 from **www.orangemicro.com/webcamdv.html**, but it's still not the cost-free option most people who've paid a lot of money for a DV camcorder are looking for.

If you're running Windows XP and are up to date with service packs and updates you can use a DV camcorder as a webcam, but only with Windows Messenger. The original release of XP didn't include support for DV camcorders; Microsoft's Knowledgebase article 310507 explains how to fix the problem. Alternatively, running Windows Update from the Help and Support Centre will achieve the same result.

This update also enables Acoustic Echo Cancellation in Messenger, which eliminates echo and mic feedback, though it doesn't work with DV camcorders, so you're better off using headphones. The Webcam DV box includes a cable that runs from the camcorder headphone socket to the line in port of your soundcard, enabling use of the camcorder's built-in mic. I was anticipating having to do something similar, but this turned out to be unnecessary as Messenger was able to use the camcorder's built-in mic without the need for additional cabling.

This is great for Windows Messenger users, but doesn't solve the problem for Netmeeting or any other videoconferencing application. I have a webcam, but wanted to use my camcorder to talk to someone on a PC in another part of the house over a wireless Lan.

Setting up DV Driver to use a camcorder with Netmeeting

If you want to try and get a videoconferencing application other than Windows Messenger to work with a DV camcorder, I'd recommend **www.camcorderinfo.com/content/twelve_questions_three.htm** which is interesting, not so much for the article, as the discussion thread that follows it. There's a lot of talk, but if you want to cut to the chase search for the post from Jaguar, who recommends downloading and installing trackercam software. Trackercam manufactures robotic bases and software for webcams and camcorders.

The reason that most videoconferencing software has difficulty with DV camcorders is that many of them use older VfW (Video for Windows) drivers and Firewire uses WDM (Windows Driver Model). Jaguar reports that after installing Trackercam he was able to 'change the driver in the options menu from Microsoft WDM to Trackercam'.

Trackercam hasn't been slow to capitalise on this interest and has now released DV Driver (see screenshot 1). This costs $20, which gets us back to where we were with Webcam DV, but there is a free trial version. The Trackercam website is at **www.pcw.co.uk/download/1154517**.

Recovering data

The capacity of digital camera media cards continues to grow; Lexar's 4GB Type II CompactFlash card, released last year, might seem like the ideal storage solution, but its £900 price tag may not be the only downside.

All digital camera storage media carry the risk of failure and the bigger the capacity the more you stand to lose if things go wrong. Because they're physically small, media cards seem indestructible. Microdrives in particular are susceptible to rough physical treatment and are easily dropped and Smart Media cards are prone to dirty contacts and bending.

Despite that, you're more likely to lose data through bad housekeeping than any physical cause. I've dropped Microdrives without damaging them, but swapping them between cameras and using them as a quick storage solution for transferring PC files has rendered them unreadable. Other horror stories include camera batteries failing mid-write and inadvertently removing the card from the reader during a read or write operation.

Then there was the time I formatted a card thinking I'd transferred the files to my PC. For any of these eventualities Data Rescue's Photo Rescue application has in the past proved a reliable solution (see screenshot 2).

Photo Rescue comes in two flavours: there's a wizard-based version and an expert version. The wizard couldn't be simpler – it identifies removable drives and you simply select the problem card and it does the rest.

The advanced version allows you to input the card size and ignore directories and Fat structure if using them is proving a barrier to recovery. The recovery algorithms are optimised for jpeg, tif, gif and bmp files. Version 2 has added support for raw file formats and supports bigger cards with algorithms optimised for Fat 32.

Success – retrieving files from a formatted Microdrive with Photo Rescue

Xenofex 2's classic mosaic filter produces realistic results

If you have accidentally formatted a card, your chances of recovery will depend very much on the camera. Some cameras use aggressive formatting which overwrites data on the card, while others don't. According to the Data Rescue site, Nikon and Canon cameras do not usually erase cards, but owners of Olympus, Fujifilm and some Sony cameras may be less fortunate. I've managed to retrieve images from a formatted 512MB Microdrive used in an Olympus camera. Photo Rescue not only managed to retrieve the files I was after, but also dredged up a bunch of images that were on the card prior to a previous format operation.

You can download a trial version of Photo Rescue from **www.pcw.co.uk/download/1154516**, which will allow you to analyse a card and see if it contains retrievable images, but not save them. You can, however, save an image file backup which you can later open with the full version. The expert version and the Wizard version each cost $29 and are available for Windows XP and Mac OSX.

Plug-in of the month

After a short absence due to lack of space, plug-in of the month returns. January's was Alien Skin Eye Candy 4000 and this month's plug-in, Xenofex 2 (also from Alien Skin software) is the perfect complement to Eye Candy's suite of effects filters.

Xenofex 2 underwent a major overhaul last year and several new filters were added, including classic mosaic and rip open. Unlike most mosaic filters, which simply split the image up into regular tile shapes, classic mosaic analyses the background image and generates tiles which follow details. This generates a very realistic and natural result (see screenshot 3).

Rip open tears a hole in the middle of an image which can be filled with a flat colour or left transparent for an underlying layer to show through; the addition of a drop shadow effect adds to the realism.

Several of the existing effects from version 1 have been updated, including puzzle, electrify and lightning. As the name suggests puzzle applies a jigsaw puzzle effect. As well as the size of the pieces, the grooves in between can be adjusted, but without doubt the best feature of this effect is the ability to knock out pieces to give the effect of a part-finished puzzle.

Electrify applies 50,000volts to the subject, or at least it looks that way. You can control the thickness, jaggedness and branching of random sparks around a selection. Lightning works in a similar fashion to apply lightning bolts to a scene. Unlike the real thing you can control where the bolts begin and end, so it beats standing in the rain with a camera set on bulb and hoping for the best.

Another effect that's been greatly improved is the television filter, which not only adds a scan line effect complete with ghosting and static, but provides a curvature distortion to give a realistic pre-flat screen period feel.

Other stalwarts in the kit include burnt edges and flag. The last of these makes a flat image look like a rippled piece of fabric. Control is provided over wind direction and strength, and you can fix your flag at points along the edge, extending this filter's repertoire to banners, bedspreads and all manner of crumpled textiles. Each filter has a range of presets and a random seed button as well as a wide range of parameter controls. Xenofex is ideal for the quick fix, but can also be called upon to produce something that looks like a pair of underpants tied to a flagpole that have been struck by lightning.

Download a free 30-day trial from **www.pcw.co.uk/download/1154518**.

Stitcher 4's new interactive Quicktime preview offers a wide array of options

Stitcher update

In the February and March issues I looked at everything you need to produce 360 degree virtual panoramas using Realviz Stitcher. Realviz has now released version 4 of Stitcher and it includes some great new features and enhancements.

One of the frustrating things about producing panoramas is that it's not until you've rendered an image that you spot problems, then you have to go back and fix them in the individual files before rendering all over again. An alternative method is to export the panorama in one of the generic formats, do the image editing in Photoshop, then use Stitcher's panorama conversion command to create the QTVR file. The drawback with this approach is that the file is flattened and opens as a background layer in Photoshop, making it difficult to edit the overlap where problems can occur. All that has now changed with the introduction of layered file export in version 4. In the exported file, each stitched image occupies its own layer, making removal of artefacts and problem areas much easier than before.

The other big improvement is the introduction of interactive QTVR previewing (see screenshot 4). QTVR provides a lots of parameters which determine the behaviour of the movie, including window width and height, maximum and minimum values for pan, tilt and field of view. The movie still has to be rendered to produce the preview, but the ability to do this within the Stitcher application streamlines the testing process considerably.

Four new interpolation methods have been added and the artefact removal tool has been upgraded and renamed the stencil editor. It now has a marquee tool which you can use to define and eliminate problem areas and a crop border with which you can trim out extraneous overlap and unwanted details like your tripod.

There's also a vignetting option to deal with the problem of light fall-off at the frame edges. This can be a problem with some digital cameras and extreme wide angle lenses, leading to the appearance of darker bands at intervals in the image, corresponding to the overlapping segments.

Stitcher costs £293.63 inc VAT, the upgrade from version 3.5 is £89.95 from **www.red-door.co.uk**.

CONTACTS

Ken McMahon welcomes your comments on the Digital imaging & video column. Email him at: digitalimaging@pcw.co.uk. Please do not send unsolicited file attachments.

Guy Kewney
has been reporting on all aspects of IT since long before the first personal computers arrived on the scene. He now believes the wireless revolution will change the world

Testing for speed

Why you won't get 54Mbits/sec through an 11g link; and how to test the speed of a network

Recently, a friend amazed me by complaining that he was getting 'only about 5Mbits/sec throughput' from his wireless network.

I told him that if he had ideal conditions, 5Mbits/sec is what I'd expect. 'Not at all, I'm using an 802.11g link' he said.

My friend is a regular reader of this column. I've often alluded to the 'payload' of Wifi radio, without eliciting any comment from him, and so I was baffled. Surely, he realised the throughput you get from 802.11a, b and g is nothing to do with the numbers on the box?

Apparently no; and so I thought it was worth explaining why you won't get 54Mbits/sec through an 11g link. Not ever. Here's the explanation, and an experiment you can try at home to check it out.

The explanation

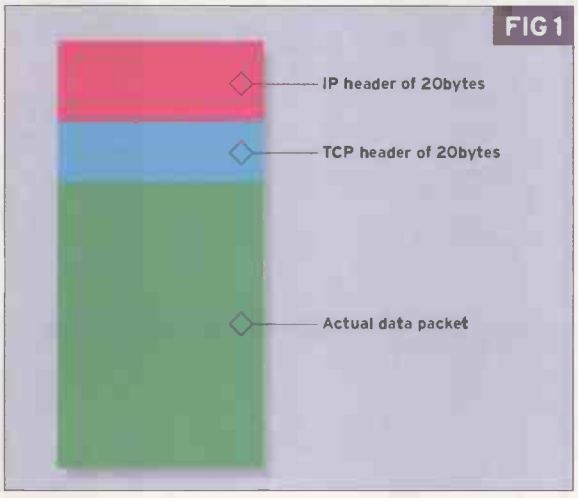
Here's the assumed common knowledge about Wifi.

There are three standards. There's 802.11b, which is the oldest and runs at 11Mbits/sec; 802.11g, which is the newest and runs at 54Mbits/sec. And there's the confusing 802.11a – which will ship officially in Europe's ITU territories, with some important improvements to the US-originated standard, as 802.11i – which also runs at 54Mbits/sec.

But everybody who knows this is wrong. In reality, 802.11b is a standard which includes speeds of 1Mbit, 2Mbits, 5Mbits and 11Mbits/second. But that's not the amount of data you, as a user, will get out of it. You come second: the most important part of any Ethernet IEEE 802 standard is the protocol.

I'm going into some detail here, and it is confusing. But what you have to bear in mind is that the protocol doesn't measure bits, it measures time, and the faster you are trying to transmit, the more bits you lose every time there's a delay. A delay of 200 microseconds loses very little data at one megabit; it loses 11 times more data at 11Mbits.

There has to be a protocol, because Ethernet is a shared link system and it doesn't work at all, unless there's a strict and foolproof way of making sure only one user is ever using the link at any moment.



This means several things. First, you have to know when anybody starts sending data; you need to know how much data they're going to be sending and you need to know when they've finished.

Next, you need to know that if you start sending data, and someone else starts sending data at the same time, that there's a way of making sure one of you stops and leaves the ether clear for the other.

Finally, you have to have built-in delays, so messages can be passed around about who is using the network, who should stay clear and for how long.

Figure 1 shows a standard TCP/IP datagram. Your data, anything from one to 64KB (but usually well under 2KB, because routers tend to break up packets if they're any bigger) is wrapped up in a bundle with two headers, the TCP header and the IP header, describing it.

But of course, that's just the data that the receiving computer will get from the TCP/IP handler. It doesn't say anything about the Ethernet system. So when your communications software hands that over to the network card, a whole lot more stuff has to get wrapped around it, making an 802.11 'frame'.

First, the network card identifies itself, using its 30byte MAC (media access control) header and then it adds the Logical Link Control (LLC) of 3bytes and a Sub Network Access Protocol (SNAP) header of 5bytes. Finally the TCP/IP datagram comes and then, to finish off, there has to be a 4byte frame check sequence (FCS).

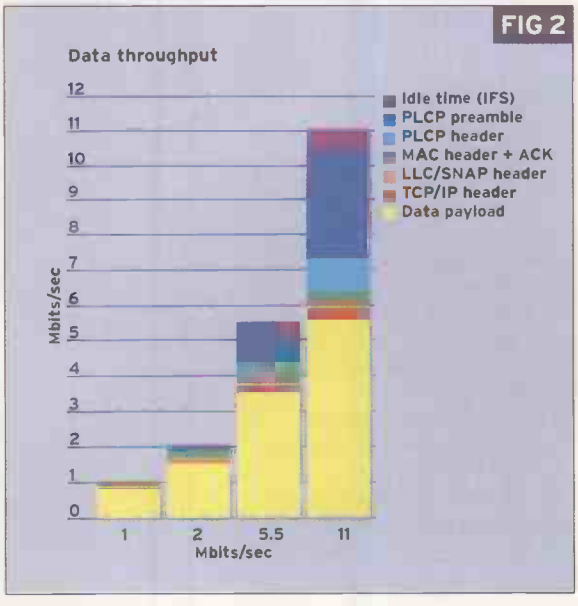
And that's just the PLCP Service Data Unit or PSDU. Before that is transmitted, it too has to have headers: a 6byte physical layer convergence protocol (PLCP) header of 6bytes and before that, the PLCP 'preamble' and finally, you have your complete PLCP Protocol Data Unit (PPDU) comprising the PLCP plus the MAC Protocol Data Unit (MPDU) (see figure 2).

Now your data is ready to transmit. Your 1,500bytes (typically) has around an extra 100bytes of control padding; but it can't just go. This is Ethernet and polite protocol is absolutely essential.

As a rule of thumb, you will never get more than 70 per cent of the nominal bandwidth of an Ethernet system in real payload. If it says it's a 10Mbit network, you'll get 7Mbits; if it says it's 100Mbits, you will never get more than 70Mbits/sec. But that's wired Ethernet – with wireless, there are extra problems.

It's all a bit like comedy: timing. You have to wait before you send for a specified interval. You have to send, then wait for acknowledgement. And if there's flow control (and there often is) then there are delays for RTS and CTS signals.

An awful lot of these delays are specified in microseconds. The worst, without doubt, is the PLCP preamble and header, because the standard assumes that there might be a legacy 802.11b card around. So the



preamble is transmitted at a speed which the standard knows even the earliest 802.11b cards will understand – 1Mbits/sec.

You can see in figure 2 just how little data is lost at 1Mbit – the basic standard of the original Wifi cards – and how much goes out the window at 11Mbits – half the data.

As a rule of thumb, a single user, sitting a foot away from the access point, without any wireless interference, will get an absolute maximum of half the 'official speed' out of any wireless Ethernet standard. If it says 11Mbits/sec, be sure your absolute maximum throughput is 5Mbits. If it says 54Mbits, it's going to be somewhere between 22Mbits and 25Mbits/sec.

And of course, as soon as you move away from the access point, the signal gets weaker and the speed will drop back. Also, when someone else joins the network, you have to share with them. If they start listening to Internet radio or downloading video clips, your share of the bandwidth will drop noticeably. When you get a dozen or so people, the ether fills with interference, everybody is sharing it and the load goes up proportionately.

Of course, if you are sitting in a hotspot at Paddington station, none of this will concern you. You'll be talking to the Internet via someone else's 512K broadband link, and any slowdown in the wireless Ethernet will still mean you have more Wlan bandwidth than the Internet can provide.

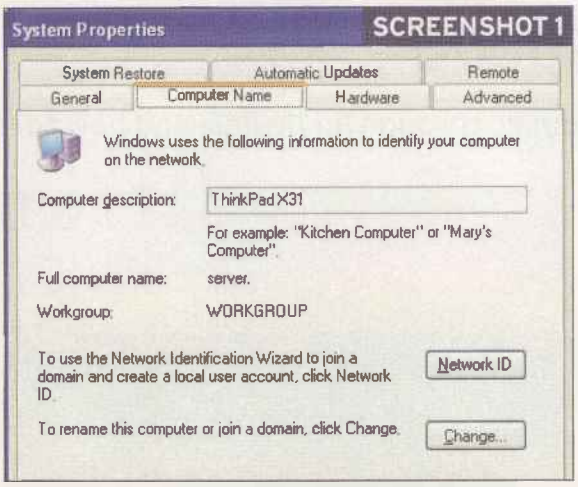
But if you're trying to back up a big file from your notebook to the desktop PC upstairs at home, you'd better allow more time than you think. And if you're trying to do the same backup at work, with 40 other users in the room, you should probably start the backup and go to lunch.

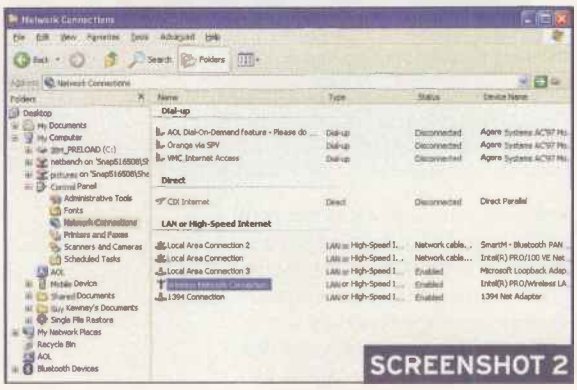
Don't hurry back

It's perfectly possible to test the raw link speed of your wireless network: run a benchmark. For this article, I'm catering only for Windows users.

The software we use in the *PCW* Labs includes a suite of tests called Netbench, which is a vast overkill for the job, but you don't have to run the whole set. There is a subset of the Netbench suite which is the network interface card test – that will give you the maximum throughput.

The software is available free, and comes in two parts: download it from **ftp://ftp.pcmag.com/benchmarks/netbench/nb703cl.exe** for the client files and **ftp://ftp.pcmag.com/benchmarks/netbench/nb703co.exe** for the controller files.





Top: All test machines must be part of the same workgroup or domain, and must be named the way the benchmark expects

Bottom: The wireless network must be running when you set up the IP address

To describe the procedure as unfriendly probably understates the problems. There is a full explanatory section at **www.veritest.com/benchmarks/netbench** which you may well have to plough through. But even with its help, you stand a good chance of getting confused. For example, you might imagine that you run the 'client' software on your notebook with the network card in. Not at all. It's best to install this machine as the server and the client is probably the machine you think of as your desktop machine. And strictly speaking, you need a third machine on the network to act as controller.

The instructions never tell you what the server is; and you may imagine you need to have a machine with Windows Server 2003 on it. Not so: all you have to do is set up your laptop to be called 'server' by going to the Windows Explorer, right-click on My Computer and select 'properties' from the popup menu.

Whatever the name you have set, make a note of it – you'll probably want to change it back later. The same applies to your controller machine. Change the name to controller and make sure all the machines are on the same domain or in the same workgroup (see screenshot 1).

Finally, you have to find a file called Hosts, open it in a plain text editor like Notepad and change it. Be warned, this is a system file, and you'll have to watch out for some versions of Windows, which will do their best to save it as 'Hosts.txt' when you've finished, and not the file really called Hosts with no dot-anything. The file is normally in the Windows directory or the I386 sub-directory; your best bet is to use the search facility to find it on your hard disk.

'Modify the Hosts file on each client so it includes the name and IP address for the controller,' says the FAQ. In other words, you need to know the name and IP address for each machine.

The best way to deal with this is to set up your network temporarily with hard-coded IP addresses for client, server and controller. Go to your network connections section of Control Panel and set all three machines to use a specific IP address, without DHCP (see screenshot 2). An example of a useful address would 192.168.1.101 and 102 and 103. Most of us, however, have networks with addresses assigned by the wireless access point or router, in which case you just have to find out what they are.

The way to do this is to open up a command console, either an MS-Dos box or going to the 'run' command and entering 'CMD' – and then running IPconfig to see what the wireless network card has been assigned. Feed that into Hosts and hope that when you reboot, the same addresses are assigned.

At the end, what you'll have is a figure which is the absolute ceiling on your wireless network's performance.

In actual use, you'll never get close to that. Try transferring one very large file from one PC to another and you'll be lucky to get half that; the file system itself spends too long thrashing around, finding sectors, loading cache and filling buffers.

Next time you plan a complete backup of your laptop, my bet is you'll think twice before using the wireless network. Plug both source and backup machines into the wired Ethernet or it'll take longer than you would believe possible.

CONTACTS

Guy Kewney welcomes your comments on the Mobile computing column. Email him at: mobilecomputing@pcw.co.uk. Please do not send unsolicited file attachments.

THE PCW TECHNICAL ADVICELINE

Personal Computer World aims to give you as much technical information as we can, but there may be occasions when you need a little more assistance.

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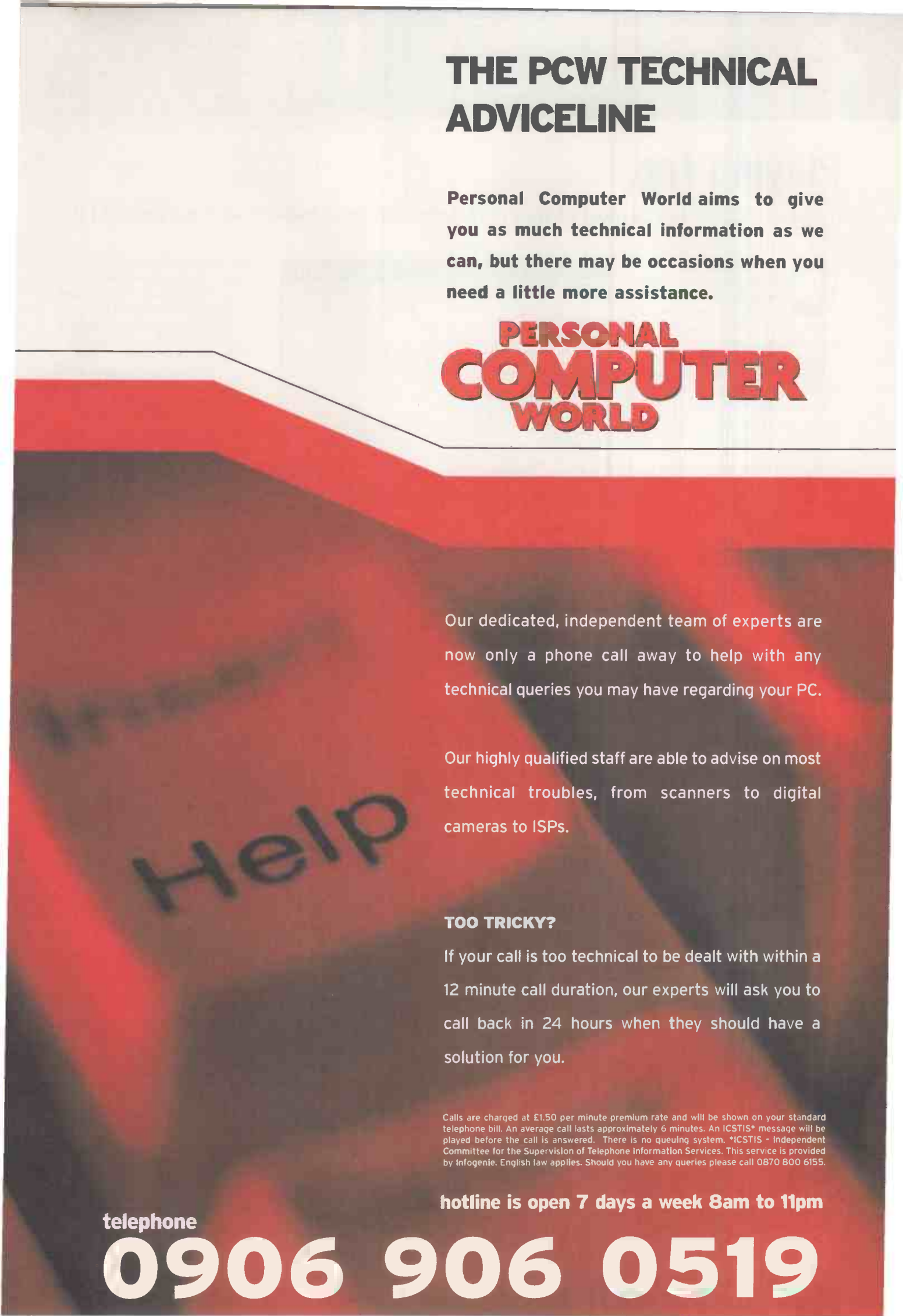

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hotline is open 7 days a week 8am to 11pm

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0906 906 0519

Niall Magennis
has been dabbling in Midi and digital audio since the days of the Atari ST. He writes on a freelance basis for a number of music magazines and lives in London in a flat overrun with music equipment

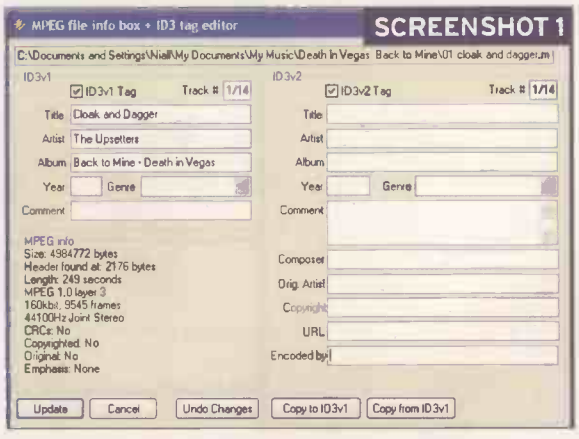
Playing tag

If you want to make the most of your mp3 collection you'll need to sort out the ID3 tags

Converting all your music to mp3 has a number of benefits, not least of which is the way you can quickly create a playlist that includes everything from Johnny Cash to Slipknot, without having to shuffle CDs in and out of your player. But another major plus point is the way mp3s allow you to more easily organise and catalogue your music collection. Load up an mp3 in your music player and the chances are that it will display the song title, artist name and album title in the info bar. All this information is stored within the mp3 file itself, in a special digital tag.

These tags can store lots of information, including the year the song was released and its genre. Hardware and software players are getting smarter about making use of this tagging information. For example, many now allow you to automatically create a playlist of tracks based on a particular decade. So, if you are having an Eighties party you can filter all the tracks in your collection so you're just left with those released during that decade.

Naturally if your mp3 tags are in a bit of a state you won't be able to take advantage of features like these, so we're going to investigate the world of mp3 tagging and check out some software that will reduce the amount of elbow grease needed to get your tags in order.



Winamp displays ID3v1.1 and ID3v2 tags side by side and you can easily copy data between the two

The original mp3 spec didn't include any facility for tagging files. However, there were some bits left over within the mp3 file structure for including copyright information and other small amounts of text. Once the format really started to take off as the standard of choice for distributing digital music on the net, it quickly became apparent that being able to store text information describing the content of the sound file would be a rather good idea.

Eventually a simple system was developed that used a fixed-sized 128byte tag at the end of the audio file to store title, artist, album, year and genre information as well as a comment field (see figure 1). This tagging format became known as ID3, but it was soon extended to include a code to identify which track on the CD the music came from (so the track sequence could be preserved in mp3 playlists). The last two bytes in the comment field were used for this purpose and the update was dubbed ID3v1.1 (see figure 2).

However ID3v1.1 was far from perfect. Not only did it merely have a few fields for entering information, but the biggest limitation was that these fields were restricted to 30 characters. While this was fine for most music tracks it wasn't good for properly titling some classical music pieces, radio plays or audio books.

The other problem was that the ID3v1.1 tag was at the end of the file, so when mp3s were being streamed the titling information would be the last thing to arrive at the streaming media player.

It was decided that a new, more flexible system should be developed to get around these problems and this was dubbed ID3v2. This system is worlds ahead of the previous format. It doesn't just solve the limitations that were inherent in ID3v1.1 tags – it annihilates them. The standard is so comprehensive and futureproof that it's hard to imagine it will ever need serious updating. If you take a peak at figure 3 you'll get an idea of how an ID3v2 tag is put together.

What's in a tag?

Each ID3v2 tag consists of a number of smaller pieces of information known as frames. These frames can contain pretty much any kind of data you can bring to mind. You can add artist and song title information, and stuff in extras such as lyrics, pictures, equaliser presets and even the address for the artist's website.

New types of frames can be added in the future. This is because players that don't understand the new frames will simply skip over them in much the same way as the parser in your browser skips over HTML commands it doesn't understand.

The full ID3v2 tag can be up to 256MB in size, with each frame having a maximum bulk of 16MB. You'll probably never see a tag with the maximum amount of data, but at least it futureproofs the standard. Also, for run-of-the-mill song titling the format remains remarkably byte light. The developers say if you convert an ID3v1 tag to ID3v2 it is likely the new tag will be smaller than the original.

The original ID3 tagging system was quite simple

Version 1.1 simply added track numbering

The current version of ID3 is very flexible

The ease with which new functionality can be added to ID3v2 tags means we'll probably see some innovative uses of the format in the future. Already some of its more advanced functions are being used within players to create automated playlists. For example, ID3v2 has a built-in system where you can rate tracks or have compatible players count how often you listen to a particular song. Players can then use this feature to build playlists of your favourite tunes without you even having to select a track. The standard also includes a field for tempo information which could be used by Automatic DJing software to create mixes that seem to flow from one track to another because they share the same tempo.

ID3v2 tags aren't exactly new, so it's not surprising that most of the well-established media players support them. Programs such as Winamp, Musicmatch and Itunes for Windows all have built-in support for the standard.

If you've been pretty careless about tagging your mp3s in the past, or if you've downloaded lots of music from the net, you may find that your files have pretty raw tags or that the tags only contain basic information. You may also want to convert older ID3v1 tags to the newer format.

Writing tags

It's easy to update one or two tags using an mp3 player such as Winamp. If you want to see the tag information for a file in Winamp, all you have to do is load in the track and then click on the main menu button on the left-hand side of the player. In the pop-up list that appears just select View File Info. This opens a window showing the file's mp3 tag data. You can edit any of the fields that are missing and then click on the Update button to have the data written to back to the file.

Winamp can deal with both version 1 and version 2 tags and you'll see both displayed side by side (see screenshot 1). If your file only has an older style version 1 tag you can copy this information across to the ID3v2 field by just clicking on the Copy from ID3v1 button.

Winamp is fine and dandy for adding data to a couple of tracks, but what if you need to edit tag data for tens or hundreds of songs? Life's too short to edit each one by hand, so you need some system that's going to automate much of the job.

The free Musicmatch player (www.musicmatch.com) has much more sophisticated tools to deal with tagging and retagging MP3 files. It's quite a large download at around 20MB, so it will take a bit of time to grab from the Internet, or you will find it on this month's cover disc. However, Musicmatch's tagging abilities are very impressive. As with Winamp, you can quickly edit the existing tags by right-clicking on the track name in the library window and then selecting Edit Track Tags from the pop-up list. The Tagging window that appears not only allows you to edit the current tag, but also to add extras such as lyrics, notes, tempo and a rating. In fact you can select multiple tracks at the same time in the library window and open them all in the tagging window so you can quickly hop between them.

Being able to select multiple tracks at the same time is very useful when you need to enter tags for an entire album of tracks. You can simply input the artist and album name and then tick the check boxes next to them to have these fields update for all the tracks in the album. This saves you having to type in the same information 10 or 12 times (see screenshot 2).

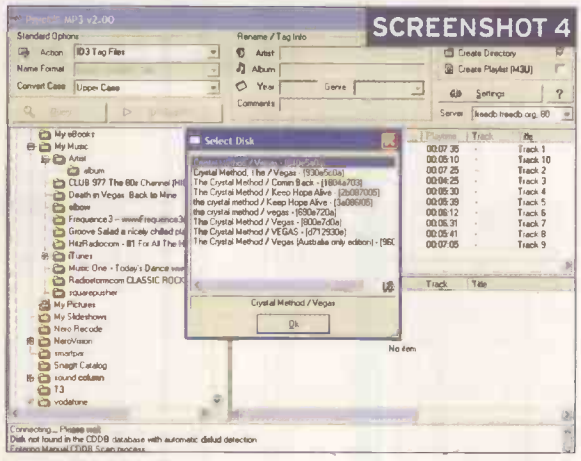
Musicmatch also features a set of tools grouped together under the Super tagging name. These can be found on the bottom left-hand side of the main tagging window (see screenshot 3).

You'll often come across tracks that include the artist and song title information in the filename, but not in the mp3 tag. This can be annoying because your mp3 player will display something basic such as Track 3 in the display. If you pay $19.99 for the full version of Musicmatch you can quickly fix this by clicking the Tag from Filename button under the Super tagging heading.

Another option in the paid-for version is the ability to repair tags that have most, but not all, of the information present. To do this you can just click on the Lookup Tags button. This will open a window showing the matching songs that the software has found in the Musicmatch online database. It will also show album art that it has found and add this to the tag.

There is also a host of dedicated file tagging programs on the net that you can use to clean up libraries of badly tagged mp3s. Programs such as mp3/Tag Studio, Abander Tag Control and Tagandrename allow you to delete underscores or add capitals to clean up your tags.

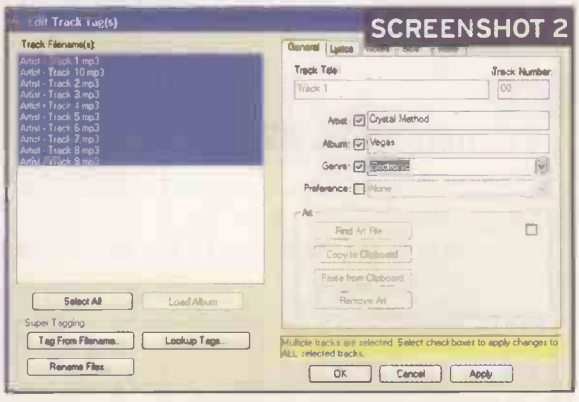
One of the weirdest – but most useful – tag editors is the intriguingly named PsychicMP3 (see screenshot 4). www.medlc.dk. If you've got an album of mp3 files that haven't been tagged yet, or that consists of tracks downloaded from different sources, then PsychicMP3 can retag all the tracks with the correct info virtually automatically. It uses the FreeDB online database to find matching albums. All you have to do is to select the folder containing all the tracks and click the Query button. The software then offers a list of possible matches. All you have to do is select one and click the Rename button to have all the tags and filenames updated. The software is surprisingly accurate and is a great time saver.

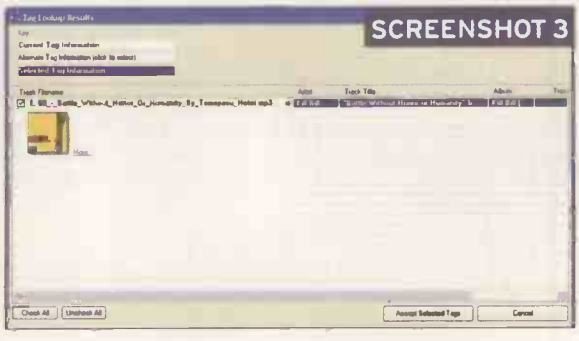


Above: You can quickly tag whole albums of songs using PsychicMP3

Below top: Musicmatch allows you to quickly change the artist and album details for multiple tracks at the same time

Bottom: If you paid the upgrade price to the Plus version of Musicmatch you can access the Super tagging tools





CONTACTS

Niall Magennis welcomes your comments on the Sound column. Email him at: sound@pcw.co.uk. Please do not send unsolicited file attachments.

Nigel Whitfield
edited computer magazines before going freelance in 1995. A specialist in Internet and consumer issues, he has a degree in Computing Science from Imperial College

Smile – you're on the Internet

How to synchronise audio and slides to download presentations from the web

Besides writing *PCW*'s Web development column, I'm often asked to come up with solutions for how some organisations can make the most of their website when it comes to getting information across to people. One such organisation I work for hosts conferences around the world, at which experts give talks on topics relevant to the membership.

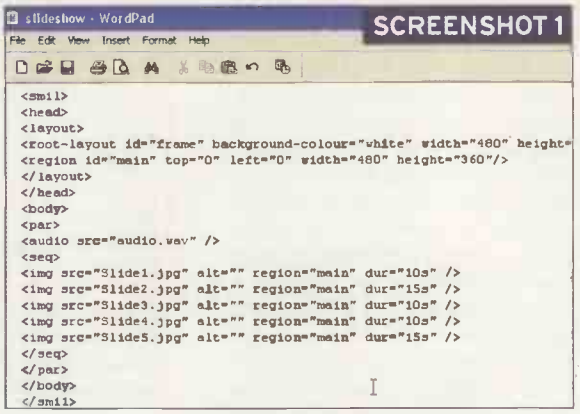
In the past, we've taken audio recordings of these and put them on the website in two forms – downloadable mp3 audio files and streaming files for those who want to listen without downloading. For the streaming, I picked the Darwin Streaming Server, which is the open source version of Apple's Quicktime Server. It's downloadable, compiled without any trouble on the Linux servers I use and doesn't have any inbuilt limitations on the number of clients that can be served. And, of course, the player itself is available for Windows and Mac, covering most of the users of the site and is arguably less intrusive than Real's player.

However, while that's worked fine, the latest change to the website was to find a way of presenting the talks at the meetings in a different form – with the slides and the audio synchronised, so people who weren't able to attend would be able to see what they'd missed. But how to do it?

The first thought was that, since we already had a streaming server, why not just make a movie with the slides and the audio track? It's pretty simple to do using tools like Imovie, adding sound to imported pictures. And you can easily export all the slides from Powerpoint. In fact, if you use Apple's Keynote instead, there's a built-in option to export a presentation to a Quicktime movie.

There was one big problem, though. Add the audio track, optimise the file with 'hints' for streaming and the result, while it would work, took up over 400MB. No problem with disk space, but that's a lot of data to push out of the server – you run the risk of hitting your own bandwidth limits, depending on the contract you have for your hosting. At 10GB a month, that's just 25 people viewing one presentation, for example. And with some of the cheaper ADSL services now on offer having monthly caps too, some users may have difficulties at their end, even if you don't. So, another solution was called for, which was literally staring me in the face. Over dinner, as it happens, with a friend who works for the W3C and helped write a program called Grins. The solution is called SMIL – Synchronised Multimedia Integration Language.

SCREENSHOT 1



Like RSS and other new types of net content, SMIL is XML-based, and quite similar to HTML

SMIL basics

SMIL – like RSS, which we looked at a couple of months ago – is based on XML, so it's fairly easy to get to grips with for people who have an understanding of HTML. There is a range of programs that will help you create SMIL, including Grins and Presenterone Basic, designed to create SMIL for Real One Player. But let's not get ahead of ourselves. It's always good to know how these things work, and understand the basics yourself.

Just as with HTML, a SMIL file is a text file, which contains head and body sections, both enclosed in <SMIL> and </SMIL> tags. Unlike HTML though, a typical SMIL file won't contain any of the actual data that is to be displayed. Instead, it references external items, such as video clips, sound files and images (see screenshot 1).

The head of a SMIL file defines the layout, which is the window where the multimedia content will be displayed; this is typically the size of the display in Real One Player or Quicktime Player, both of which can play back SMIL.

The root layout, as it's known, is then divided into regions. Think of these as a little like the frames on some websites – they have names, and you can control which media elements appear in each region. However, unlike frames, regions can overlap. You might, perhaps, have a top window to display a movie clip and a bottom one that will display subtitles.

The body of the SMIL file controls the temporal aspect of things. That's a fancy way of saying that it's there where you control what appears, when. The key to this is two tags, <par> and <seq> which respectively group together elements that are played at the same time, and those

FIG 1

A simple SMIL slideshow

```
<smil>
<head>
  <layout>
    <root-layout id="frame" background-colour="white" width="480" ↙
height="360"/>
    <region id="main" top="0" left="0" width="480" height="360"/>
  </layout>
</head>
<body>
  <par>
    <audio src="audiofile.wav" />
    <seq>
      <img src="slide1.jpg" alt="" region="main" dur="10s" />
      <img src="slide2.jpg" alt="" region="main" dur="15s" />
      <img src="slide3.jpg" alt="" region="main" dur="10s" />
      <img src="slide4.jpg" alt="" region="main" dur="10s" />
      <img src="slide5.jpg" alt="" region="main" dur="15s" />
    </seq>
  </par>
</body>
</smil>
```

(Key: ↙ code string continues)

which are played one after the other. You can nest these within each other. That means, for example, that in the case of our slideshow, we can have a parallel collection of a single audio file (the speaker's voice) and a sequence, which contains all the individual slides. The SMIL player starts the audio file and the sequence together. It's then up to the details in the sequence itself to say how long each slide is displayed for.

Each media type has its own tag, indicating what sort of file it is, where it's coming from – which could include a streaming server, for example – and other important information, including the region to display the content in and the length of time for which it can be displayed.

There are, of course, lots of other neat tricks, which we'll come to later. But for now we almost know enough to create a simple presentation – provided we know how long each slide was displayed for originally, which may require someone to time the talk in the first place.

Figure 1 shows a simple SMIL script, which will work with both Quicktime Player and Real One – so you don't need to insist that visitors to your site download a specific piece of software.

As you can see, in Figure 1 we've just created a simple window with one region – that's all we need for this example. The root layout ID isn't needed by Real One Player, but Quicktime is pickier and it only takes a few extra bytes. You can specify times as minutes:seconds, hours:minutes:seconds or fractions of seconds too, if it's important to maintain absolute timings.

It's also useful to note that the URLs don't have to be – as they are here – relative to the location of the SMIL file. You could specify, for example, that the audio file is on a streaming server, with a notation like rtsp://streambox.mycompany.com/audiofile.mov. If you go down that route, though, think carefully. Streaming the audio has some advantages certainly – but it is likely to restrict the range of players that can be used to watch the slideshow.

As it is at the moment, this script would work with either, and it will also work locally on your hard drive – so you could offer a Zip file, for example, containing the script with a .smil extension, and all the media elements.

Extra tricks with SMIL

The fairly straightforward code above will be enough for anyone who simply wants to show a sequence of slides with a soundtrack, but there's a lot more possible. SMIL2, which is less than a year old, adds a few extra things like transitions, opening up the possibility of something XML-based that can do almost everything you'd expect of Powerpoint.

One of the questions that you might ask is 'what happens if not everything downloads properly?'

If you have a lot of media elements that need to be pulled over the net and timing is crucial – we don't want slides to slip out of sync with the speech, for example, just because one didn't download – then you need to be a little more careful.

Apple has some extensions to SMIL defined, which you have to reference in the opening SMIL tag before you can use them, like this:

```
<smil xmlns:qt="http://✓
www.apple.com/quicktime/✓
resources/smilextensions">
```

(Key: ✓ code string continues)

That, if you're unfamiliar with XML, means the definitions for the extensions, which are prefixed with qt:, will be found at the URL mentioned. The extension we're interested in is called immediate-instantiation. It can appear in either the SMIL tag or an invididual element. When set to true, it ensures all the elements to which it applies are downloaded immediately. By doing this you can be sure that they'll be ready and there won't be any glitches. But this comes at the cost of a delay while it happens and considerable memory usage on the viewer's computer. For a single image, you'd use it like this:

```
<img src="image79.jpg" ✓
region="main" ✓
qt:immediate-✓
instantiation="true" />
```

And what of other players? Well, using player-specific extensions or formats isn't something we approve of here at Hands on Web development, so here's an alternative way of approaching the problem.

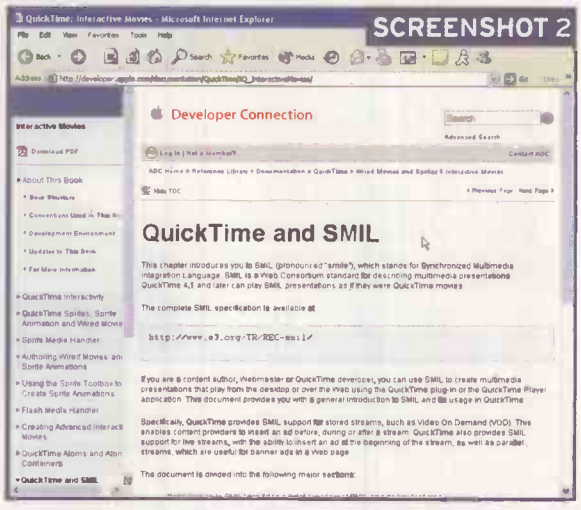
You don't have to specify a sequence for things to happen at different times. You can instead use the begin and end attributes. You can also use this to program in delays. For example, if you say:

```
<image src="TheEnd.jpg" ✓
region="main" begin="3s" ✓
/>
```

then the image will display three seconds after either the start of the parallel items it's grouped with or the finish of the preceding element of its sequence. You can similarly specify an end time.

Here, though, we're interested in a cunning trick. First, start your audio file and assign it an ID, like this:

```
<audio src="talk.wav" ✓
id="talk" />
```



Apple's SMIL documentation is a good starting point for beginners

Now, you can use the ID to synchronise elements with the progress of the talk. Instead of grouping the slides into a sequence, as we did in figure 1, we can put them in a <par> section, with the audio, and write a script like this:

```
<img src="slide1.jpg" ✓
region="main" dur="10s" />
<img src="slide2.jpg" ✓
region="main" ✓
begin="id(talk)(10s)" />
<img src="slide3.jpg" ✓
region="main" ✓
begin="id(talk)(25s)" />
```

This form of the begin command uses as its reference the playing time of the audio element, ensuring that each new slide will appear at the appropriate time relative to that – so there should be fewer problems caused by one slide in the sequence not downloading in time.

You can also synchronise with the end of another element, so you could use end="id(talk)(end)" to specify that you wanted, for example, a copyright message to disappear at the end of the talk.

There is, of course, a lot more to SMIL than this whirlwind tour, and it can be used for much more than a simple slideshow. If you want to learn more about it, go to the W3C website at **www.w3.org/audiovideo**. Newcomers will probably find the Apple documentation makes easier reading – you can find that at **http://developer.apple.com/documentation/QuickTime/IQ_InteractiveMovies** – click on Quicktime and SMIL at the left of the page (see screenshot 2).

CONTACTS

Nigel Whitfield welcomes your comments on the Web development column. Email him at: webdev@pcw.co.uk. Please do not send unsolicited file attachments.

Alan Stevens
has been implementing and supporting networks for over 25 years, working for IT vendors, systems integrators and customers. He now mostly researches and writes about networking matters

Network troubleshooting

If you're having problems setting up a network, here are some tips to make it easier

A number of readers have experienced difficulties setting up a home or small business network for the first time. Most are easy enough to resolve, but only if you know how, so this month I'll discuss some basic troubleshooting steps, as well as some of the tools available to help find out what's going on behind the scenes.

Connectivity first

It may sound obvious, but the first thing to check is that all the PCs, servers, printers and other devices on the network are able to 'see' each other. On a wired network that means making sure there's a cable from each device to the central hub or switch. These need to be firmly connected and correctly wired, and the latter can cause trouble as there are two types of network cable.

Most modern UTP (Unshielded Twisted Pair) leads will come with connectors fitted at each end. These contain several separate wires which can either be attached to the same connector pins at each end or crossed over. Straight-through cables connect a PC, server or other network device to a hub or switch. Crossover cables allow two PCs to be connected to each other peer-to-peer, and are used to daisy-chain one hub/switch to another. Use the wrong cable (they're often not marked!) and the signals simply won't get through.

If you're not sure how a cable is wired, the simplest way of finding out is to plug it in and check the connection LED at either the adapter or switch end. Most have a small green LED that lights up when a connection is made, often before the host device is powered up. On some this changes to yellow/orange to show a 100Mbits/sec or Gigabit connection (others have separate 100Mbit indicators), but if you get no light at all you could well have the wrong type of cable. The answer then is to change it, although some switches have buttons next to specific ports (typically marked 'uplink') to allow a straight-through cable to be used to connect to another hub/switch. Some of the latest switch products are able to auto-sense the cables being used and change port wiring internally to suit (see picture above).

This small Netgear switch can sense whether you're using straight-through or crossover cables. Older hubs and switches can't, so check for a green link light

Flashing LED?

In some instances you might find that the connection LED flashes rather than being lit continuously. This can mean there's activity on the line but it sometimes happens when there's an incompatibility in the port setup. For example, where an adapter in a PC is set to work at 100Mbits/sec and the port on the switch is set to 10Mbits/sec. Fortunately, virtually all devices now support auto-sensing of both port speed and duplex setup, specifically to avoid such issues. However, I still come across compatibility issues when mixing devices from different manufacturers, which can only be resolved by setting these parameters manually.

Wireless connections

Wireless is a little harder to deal with as it's not so obvious that you have a connection. However, most wireless adapters ship with software to tell you when a link has been established, with similar facilities in Windows XP regardless of the vendor involved.

To troubleshoot wireless connections start by making sure any security/encryption options are turned off. Next check the adapter is set for the correct mode. Most have an 'ad-hoc' mode, for use when communicating peer-to-peer, plus a separate configuration for use with an access point. Then make sure that the same channel and SSID (the Server Set ID identifying the wireless Lan) are being used throughout. Finally I put the PC being investigated as close as possible to other communicating devices, to eliminate any distance/interference effects.

IP configuration

Having established that your devices are physically connected, the next step is to make sure they can communicate with each other. On most networks that involves TCP/IP, in turn requiring that a unique IP address be assigned to every device.

Addresses can be configured manually but it's better to use the Dynamic Host Configuration Protocol (DHCP), where IP addresses are dished out automatically from a predetermined pool by a DHCP server. This way two or more systems should never have the same address.

Most routers and gateways have a DHCP server built in. You can also configure a Windows server to perform this function and, once configured, neither requires much attention. Despite that, things can go wrong and whenever problems occur, start troubleshooting by checking that the correct addresses are being used. That's something you can do on a PC or server from a command window using the ipconfig utility included in Windows.

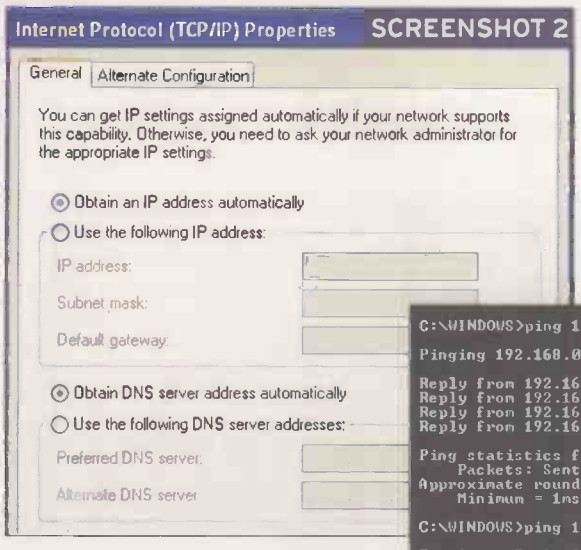
Type ipconfig at any command window and you'll see the current IP address assigned to each network interface, as shown in screenshot 1. Add "/all" to the end of the command, and it will display other networking information such as the MAC address, the address of the DHCP server used and the default gateway and DNS addresses, all of which can help when trying to fix problems. If you've changed the DHCP settings but a client PC hasn't been updated, you can also force it to give up the lease on its address, by adding "/release" to the ipconfig command. To get a new address, re-run ipconfig adding "renew" at the end.

On older Windows 95

Use the Ipconfig command (Ifconfig for Linux) to quickly find out whether an IP address has been assigned correctly and check other addressing details

SCREENSHOT 1

```
C:\Windows>ipconfig /all

Windows IP Configuration

        Host Name . . . . . . . . . . . . : EU0500
        Primary Dns Suffix  . . . . . . . :
        Node Type . . . . . . . . . . . . : Hybrid
        IP Routing Enabled. . . . . . . . : No
        WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Local Area Connection 2:

        Connection-specific DNS Suffix  . :
        Description . . . . . . . . . . . : Intel(R) PRO/100 VM Network Connection
        Physical Address. . . . . . . . . : 00-08-02-15-7E-5E
        Dhcp Enabled. . . . . . . . . . . : Yes
        Autoconfiguration Enabled . . . . : Yes
        IP Address. . . . . . . . . . . . : 192.168.0.15
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . . . . : 192.168.0.222
        DHCP Server . . . . . . . . . . . : 192.168.0.222
        DNS Servers . . . . . . . . . . . : 192.168.0.222
        Lease Obtained. . . . . . . . . . : 29 March 2004 12:53:59
        Lease Expires . . . . . . . . . . : 30 March 2004 12:53:59

C:\Windows>
```



Left: When using a DHCP server to assign network addresses, you need to make sure Windows clients are configured to get their addresses automatically

Below: The ping command is used to establish whether or not a PC is able to communicate with other devices on the Lan or Internet and how long it takes to reach them

```
C:\WINDOWS>ping 192.168.0.222                          SCREENSHOT 3

Pinging 192.168.0.222 with 32 bytes of data:

Reply from 192.168.0.222: bytes=32 time=1ms TTL=255
Reply from 192.168.0.222: bytes=32 time=1ms TTL=255
Reply from 192.168.0.222: bytes=32 time=1ms TTL=255
Reply from 192.168.0.222: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.0.222:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\WINDOWS>ping 195.92.195.222

Pinging 195.92.195.222 with 32 bytes of data:

Reply from 195.92.195.222: bytes=32 time=67ms TTL=243
Reply from 195.92.195.222: bytes=32 time=52ms TTL=243
Reply from 195.92.195.222: bytes=32 time=52ms TTL=243
Reply from 195.92.195.222: bytes=32 time=76ms TTL=243

Ping statistics for 195.92.195.222:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 52ms, Maximum = 76ms, Average = 61ms

C:\WINDOWS>
```

systems the command line ipconfig program is replaced by a graphical utility winipcfg. If you're running Linux, use the command ifconfig.

If ipconfig shows no address at all it could be that the DHCP server is down or inaccessible. Equally it could indicate that the PC or server isn't configured to get its addressing automatically using DHCP, in which case you simply change the PC setup (see screenshot 2).

On some Windows systems, you might also see an address starting with 169 (ie 169.xxx.xxx.xxx) when automatic assignment is configured but no DHCP server is found. This address is automatically generated by the operating system and, although it will work with other similarly generated addresses, should be treated as an error for troubleshooting purposes.

Ping's the thing

Another essential tool for resolving problems is the ping utility. You type this into a command window, this time followed by the IP address or DNS name of another system you want to communicate with.

Some routers and other network devices also let you issue ping commands. Either way, a series of special Internet Control Message Protocol (ICMP) packets are sent to the address specified. If the target system responds you'll then be told how long it took for the round trip to complete, as shown in screenshot 3. Here the first target (192.168.0.222) is on the Lan and responds very quickly (1ms). The second (195.92.195.222) is a public DNS server (in this case maintained by Freeserve) and takes longer.

If there's no response, you'll be advised that the host is either unreachable or the timeout value was passed before a response could be detected. That doesn't tell you what's wrong, but the use of ping can yield important clues. I would check to see if I can ping the default gateway as a first step in troubleshooting Internet connectivity problems. If the gateway doesn't respond the problem may lie there – the router might have crashed or the line failed.

If I can ping the gateway, however, I'll then try and ping an address on the Internet (I keep a list of public DNS servers in my head for just such a purpose). If I can reach the Internet that way but can't browse the web or retrieve email I would suspect a DNS problem. The DNS server might be down, which I can check using nslookup (covered shortly) or the wrong address could have been configured on the client, which I could find out using ipconfig.

Firewalls can be configured to block ICMP traffic, so the inability to ping a remote device doesn't necessarily imply a communication problem. Most home and small business routers will be configured not to respond to a ping request received via the Internet, although local pings should still be answered.

The tracert command shows the route taken by a packet as it passes from one router to another (a hop) between the source and target systems

```
C:\WINDOWS>tracert 195.92.195.222

Tracing route to 195.92.195.222 over a maximum of 30 hops

  1     2 ms     1 ms     1 ms  192.168.0.222
  2    49 ms   106 ms    73 ms  62.55.96.19
  3    57 ms    47 ms    97 ms  62.55.96.24
  4    48 ms    48 ms    51 ms  195.71.254.5
  5    47 ms    47 ms    88 ms  195.66.224.177
  6    59 ms    57 ms    56 ms  195.92.55.155
  7   173 ms   246 ms   204 ms  195.92.55.105
  8    74 ms    73 ms    72 ms  195.92.55.106
  9    81 ms    71 ms   103 ms  195.92.55.101
 10     *        *        *     Request timed out.
 11    57 ms    57 ms    65 ms  195.80.72.242
 12    57 ms    56 ms    66 ms  195.92.55.149
 13    60 ms    74 ms    74 ms  195.92.200.136
 14    69 ms    65 ms    62 ms  195.92.195.222

Trace complete.

C:\WINDOWS>                                            SCREENSHOT 4
```

Tracing the route

The pings to an Internet host in screenshot 3 took a lot longer than the local pings because there could be a number of routers between the source and target systems. How many of these 'hops' are involved and the addresses of intervening router can be determined using another built-in Windows utility called tracert (traceroute for Linux users).

Type in tracert followed by a target IP address (or DNS name) and you'll get a display like that shown in screenshot 4.

As you can see, to get to the public IP address specified (195.92.195.222) packets are first sent out via the local router at 192.168.0.222 then traverse several more points on the Internet before reaching the final destination. For local troubleshooting you're usually only interested in the first hop, although the other information can be of help where performance issues are involved.

Resolving names

Finally, you might need to check out the DNS side of your network and its connection to the Internet, using a utility called nslookup. You would do this if, as previously mentioned, you can ping an address on the Internet but can't browse to a URL or ping DNS names. Yet another command line utility, nslookup lets you directly resolve DNS names into IP addresses and vice versa.

There are quite a few options that can be set within the nslookup utility – just type nslookup then "?" to see all the options. However, the easiest way of using it is to type nslookup followed by either the DNS name or IP address to be resolved. The lookup will then be performed using the default DNS server settings on the host system. Assuming the name or address entered is valid, a failure in resolution indicates a problem with that particular component, usually an invalid DNS server entry.

Some care is needed interpreting the results from nslookup and the other tools covered here, but you can't do any real damage with them, so it's worth experimenting.

CONTACTS

Alan Stevens welcomes your comments on the Networks column. Email him at: networks@pcw.co.uk. Please do not send unsolicited file attachments.

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

Cardinality rules

How to tackle inconsistencies and improve the data quality of an existing database

Data quality is always a problem; no matter how consistent people try to be, they will always enter the same data in different ways – Mr Mr. Mr, MR, Mister, mister and so on.

Sometimes the answer is simple: as the designer of the database, you control the data entry in some way – perhaps you provide an interface that has a combo box. This contains the allowable entries and the users pick the one they need. This is fine for data with a low cardinality.

Cardinality is a very useful word to add to your database dictionary if it isn't already there. It describes the relationship between the number of entries and the variation you find between those entries. For example, suppose you have a table containing data for 1,000 customers. If there is a Date of Birth field, the table could contain 1,000 different dates. Or perhaps several customers share the same birthday, so there might be 992 different dates in 1,000 entries. Either way, the DOB field has a high cardinality. The Gender field, however, will only have two different entries in those 1,000 rows ('Male' and 'Female') each appearing about 500 times, so it has a low cardinality.

If the data for a field has a very high cardinality, there is very little you can do to manage the data input, except choose the correct data type (such as date), which will at least ensure that meaningless dates (such as 31/2/2004) are excluded.

However, what happens if you are presented with a database that contains data with a reasonably low cardinality where the data input could have been controlled in some way... but wasn't? This is the situation in which Simon Grey has found himself. He inherited a sales database in which the name of each customer has been entered into the Sales table (see screenshot 1). Now, you know, I know and Simon knows that there should be a separate Customer table and we should be using a primary key, foreign key relationship to tie one customer to each order (see screenshot 2). But that isn't how the database was designed and Simon is stuck with it. Far worse, he is being asked to analyse the existing data and come up with, for example, totals for each customer, which is exactly what he cannot do, because of the quality of the data. For example, when he runs a Group By query against the table, such as:

```
SELECT Sales.[Customer Name], Sum(Sales.[Order Value]) AS [SumOfOrder Value]
FROM Sales
GROUP BY Sales.[Customer Name];
```

(Key: ↙ code string continues)

he gets the answer shown in figure 1.

We don't get a total for James Kerr at all; instead we get five separate values which are sub-totals based on the different spellings/spacings of his name. The challenge is to turn all the above variants of customer Kerr's name into a consistent format, such as:Mr James Kerr.

A brute force approach is to hand edit all the records. Given a table of 20 records (such as I have provided in this month's sample file) that is exactly what I would do. Given a table of 200,000 records, it's going to be very tedious, so we need to find an easier way. So, we'll look at one way to solve this problem.

First, create a Group By query that groups all the customers' names.

```
SELECT Sales.[Customer Name]
FROM Sales
GROUP BY Sales.[Customer Name]
ORDER BY Sales.[Customer Name];
```

For Access users, this is in the sample Access database (DBCJUL04) as a query called AlphaCustomers.

This gives an output like this:

AlphaCustomers
Customer Name
James Kerr
Mr James Kerr
Mr G Ward
Mr G. Ward
Mr George Ward
Mr J Pool
Mr J. Pool
Mr James Kerr
Mr James Ker
Mr James Kerr
Mr John Devine
Mr John Devine
Mr John Pool

Now turn this into a make-table query which writes the table shown to disk as a base table called, say, Customer. (In Access you do this using the 'Query' menu option and select 'Make-Table Query' option.) For non-Access readers, the SQL for this query is:

```
SELECT Sales.[Customer Name] INTO Customer
FROM Sales
GROUP BY Sales.[Customer Name]
ORDER BY Sales.[Customer Name];
```

Run the query and you get a base table called Customer. Now edit the structure of the table to make the [Customer Name] field the primary key. Then use the relationship editor to make a primary key, foreign key relationship between the tables (see screenshot 3). Make sure you select the Cascade Update option. Non-Access users will need to use the tools provided with their engine to set up this kind of join between the tables.

Sales : Table

Sale No	Customer Name	Order Date	Dispatch Date	Order Value
4	Mr James Kerr	30 March 2004	02 April 2004	£23,123.00
5	Mr G. Ward	30 March 2004	15 April 2004	£4,345.00
12	Mr John Pool	30 March 2004	12 April 2004	£343,232.00
13	Mr James Ker	30 March 2004	05 April 2004	£43,544.00
14	Mr James Kerr	30 March 2004	05 April 2004	£7,667.00
15	Mr George Ward	30 March 2004	31 March 2004	£98,766.00
16	Mr James Kerr	30 March 2004	12 April 2004	£45,654.00
20	Mr J Pool	30 March 2004	07 April 2004	£43,443.00
22	Mr James Kerr	30 March 2004	14 April 2004	£56,789.00
25	Mr James Kerr	30 March 2004	12 April 2004	£987.00
40	Mr John Pool	30 March 2004	12 April 2004	£54.00
48	Mr G Ward	30 March 2004	12 April 2004	£23.00
52	Mr John Devine	30 March 2004	12 April 2004	£45.00
56	Mr J. Pool	30 March 2004	07 April 2004	£34,554.00
64	Mr John Devine	30 March 2004	05 April 2004	£465.00
66	James Kerr	30 March 2004	19 April 2004	£7.00
68	Mr John Pool	30 March 2004	30 March 2004	£8.00
74	Mr George Ward	30 March 2004	07 April 2004	£75.00
91	Mr J Pool	30 March 2004	12 April 2004	£4.00
94	Mr John Devine	30 March 2004	13 April 2004	£43.00
				£0.00

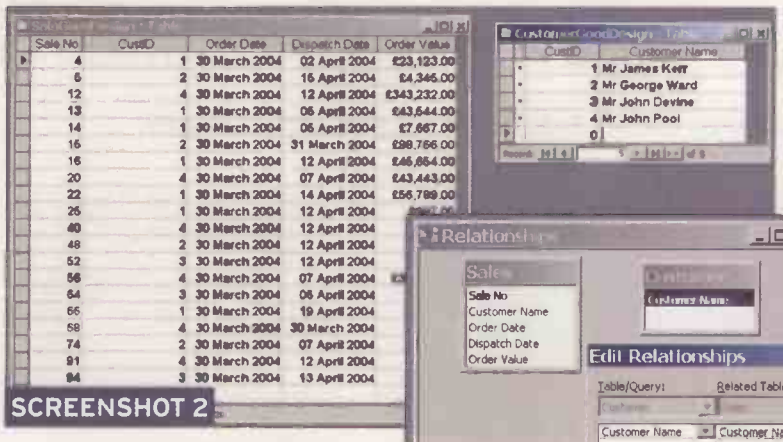
SCREENSHOT 1

A tiny amount of sample data that illustrates Simon Grey's problem

FIG 1

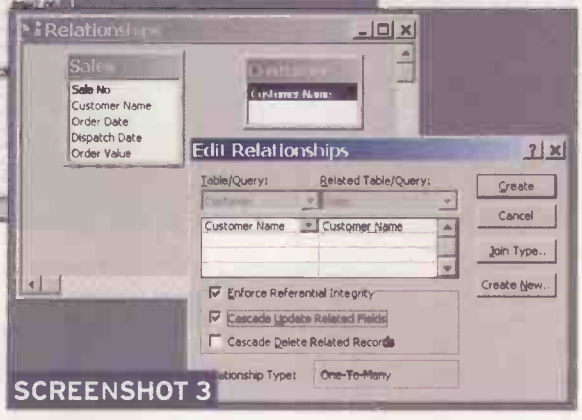
Query 1

Customer Name	SumOfOrder Value
James Kerr	£7.00
Mr James Kerr	£23,123.00
Mr G Ward	£23.00
Mr G. Ward	£4,345.00
Mr George Ward	£98,841.00
Mr J Pool	£43,447.00
Mr J. Pool	£34,554.00
Mr James Kerr	£56,789.00
Mr James Ker	£43,544.00
Mr James Kerr	£54,308.00
Mr John Devine	£43.00
Mr John Devine	£510.00
Mr John Pool	£343,294.00



Left: How the database should have been set up

Below: Set up the join with Cascade Update option set



At this point, let's recap what we have. There is a Customer table that lists one example of all of the possible variations of names found in the Sales table. Each name in this table is unique and it is now tied, via a primary key/foreign key relationship, to the names in the Sales table.

The clean-up

We have purposely set up this join as Cascade Update so, if we change one of the names in the Customer table, it will automatically update every identical name in the Sales table. Instead of having to hand edit thousands of names in the Sales table, we can simply edit those in the Customer table, which has far fewer entries. We can also sort the entries in this table, so similar entries tend to be grouped together. It really is much, much easier to deal with. The only problem is that it doesn't work.

Well, it does, but only up to a point. For example, if you change 'Mr G Ward' to 'Mrs Ethel Warrington' it works a treat. All references to 'Mr G Ward' in the Sales table are updated to the new name. However, as it stands, this arrangement is not going to allow us to change the different variations of James Kerr to one unified version. If you fancy a challenge, try to work out why it isn't going to work before reading on.

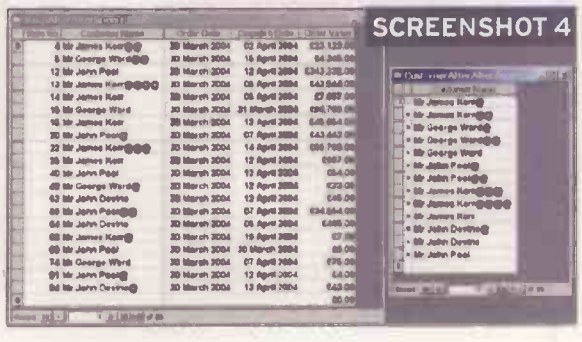
The problem is that, in order to set up the join, it was essential that we declared the Customer Name field in the Customer table to be a primary key. And the primary key values in any table have to be unique.

So, as soon as we try to edit 'James Kerr' to be 'Mr James Kerr' we get an error message telling us that we can't have duplicate values in a primary key field. This is because the Customer table already has an entry that reads 'Mr James Kerr'. OK, so it's a problem, but we are equal to the challenge, even if the solution appears a bit weird at first.

The solution

Open up the Customer table and start editing the names. The first one happens to be 'James Kerr' and we want to change it to 'Mr James Kerr' but, if we do, we will violate the integrity of the primary key because we already have an entry exactly like that. OK, so let's edit it to what we want and then stick an unusual character on the end so it is not quite the same as the other entry. Something like the @ character, turning it into 'Mr James Kerr@'. The next entry is 'Mr James Kerr' (with two spaces between 'Mr' and 'James'). Edit that to be 'Mr James Kerr@@'. Keep going until you have edited all the names in the Customer table. The 'cascade update' option we set will have ensured that all the corresponding entries in the Sales table have been updated in the same way (see screenshot 4). It is very important that you do have one entry in this table that is in exactly the format you want to end up with, in this case 'Mr James Kerr'.

Now I know that this looks like a horrible mess, but we are nearly there. I chose the @ symbol because, as far as I know, not many people have an @ symbol in their name; although, undoubtedly, someone, somewhere does.



As you edit the Customer table, the names in the Sales table are automatically updated by the Cascade Update setting

Now we have to remove all the @ symbols from Sales.[Customer Name]. This can be done using Update queries, however in Access we can do it even more easily using the 'Find and Replace' facility. Search for the @ symbol and replace it with nothing, making sure you search in the correct column and that you are searching in any part of the field. Click on the Replace All button and all the @ Symbols should disappear. Any that refuse to go are probably because you have forgotten to ensure that there is a clean, @-less, version of the name in Customer. If you use this method on very large tables, you may find that Access pops up a dialogue box that tells you it cannot complete the operation. The good news is that it will have done a proportion of the replacements, so keep repeating the operation until they are all done.

The names in the Sales table are now consistent and the Group By query Simon wants to run should yield the right answer. Incidentally, now that the data is consistent, it is relatively easy to alter the structure of the database to have that separate Customer table we described earlier.

Dates

I recently wrote about dates in Access and moving them to other packages, including Excel. Alistair C Logie has some more information about the compatibility of dates between Access and Excel.

'I have found one more fly in the ointment with regard to Excel dates. Excel has two base date systems, 1 January 1900 and 1 January 1904, which you set using Tools, Options, Calculation, 1904 date system. If you set to the 1904 system then serial date 1 is displayed as the 1st January 1904 instead of 1 January 1900, and if you enter the date 1/1/1904 this is stored as the serial date 1.

Using your example table, and an Excel 1904 date setting, 1 January 1900, 28 February 1900, 29 February 1900 and 1 March 1900 are not valid dates and will be stored as text, and 1 January 2004 will be stored as 36525. This value is 1462 less than the 37987 used by Access – four years and one day out. This obviously adds to the complexity of Access and Excel compatibility.' So, watch out for that!

CONTACTS

Mark Whitehorn welcomes your comments on the Databases column. Email him at: database@pcw.co.uk. Please do not send unsolicited file attachments.

Tim Anderson
is both 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

Develop with Media Player and Filemaker

How to extend WMP9 with a plug-in and use the developer features in Filemaker 7

Microsoft's Windows Media Player 9.0 (WMP9) supports plug-ins, so you can extend its features with custom programming. It is also an ActiveX control, and you can embed it into your own Visual Basic applications. PCs are increasingly being used as multimedia centres, so there is plenty of scope for developers to enhance applications such as WMP to fit with the new requirements of multimedia usage. Here is a simple example. You can now purchase PC cases that look like hi-fi units, complete with LCDs. If you are playing a CD or a music file in the media player, you want information about the current track to show up on the LCD panel (see picture above). To do this, you need a driver for the LCD panel, an application to handle output to the panel, and finally some means of getting information out of Windows Media Player and into the LCD controller.

The following example uses the Windows Media SDK to write Now Playing information to a text file. You can use this as input for an LCD application such as LCD Smartie. Another fun idea is to automatically insert the Now Playing information into an email signature, which works well if your mail client supports loading a signature from a file.

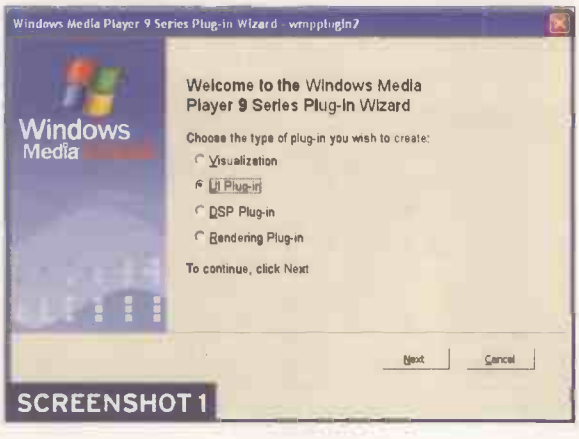
The first step in creating a Windows Media plug-in is to download and install the SDK. While you may be able to use other compilers, the documents assume you are using either Visual Studio 6.0 or Visual Studio .Net. The easiest option for creating a plug-in is to use Visual C++, since a plug-in wizard gets installed along with the SDK. In order to create the Now Playing plugin, go to File – New Project, choose Visual C++ projects, and then select Windows Media Plug-in Wizard (see screenshot 1). I called the project HandsOnWMP. The wizard offers a choice of four plug-in types: Visualization, UI, DSP or Rendering. Choose UI plug-in. The next screen lets you select from five sub-types, Display, Settings, Metadata, Window or Background. This plug-in has no user interface apart from a settings dialogue, so choose Background. Finally, you can specify features for the new plug-in, and here you should check Property Page, Show Property Page on first launch, and Listen to events. Enter a name and description of your choice, and click Next to generate the new project.

If you have a home theatre PC with an LCD display, you can use the plug-in to show the title that's currently playing

The wizard project uses ATL (Active Template Library), designed to create small, fast COM components. In this case, only a little work is needed to write the Now Playing information to a file. Go to the source file view in the project manager, and open HandsOnWMPevents.cpp, or the equivalent if you gave the project some other name. Here, the wizard has already created do-nothing event handlers for Windows Media events. Find the PlayStateChange method, and within its switch statement the wmppsPlaying case. This is where you can insert a block of code to write out the file.

The first task is to get a pointer to the IWMPMedia interface for the current item, from which you can read back all the information you need. The wizard has already done most of the work, since the HandsOnWMP class already has a private member called m_spCore which points to the IWMPCore interface. From this interface you can get pointers to the other interfaces supported by Windows Media Player. These two lines of code get a reference to IWMPMedia:

The Windows Media plug-in Wizard does a lot of the work involved in creating a plug-in. In this step, choose the type of plug-in required



SCREENSHOT 1

```
HRESULT hr = E_POINTER;
CComPtr<IWMPMedia>  ↙
spMedia;
hr = this->m_spCore↙
->get_currentMedia↙
(&spMedia);
```

(Key: ↙ code string continues)

You can read back the properties of the current item. For example, the following code gets the title:

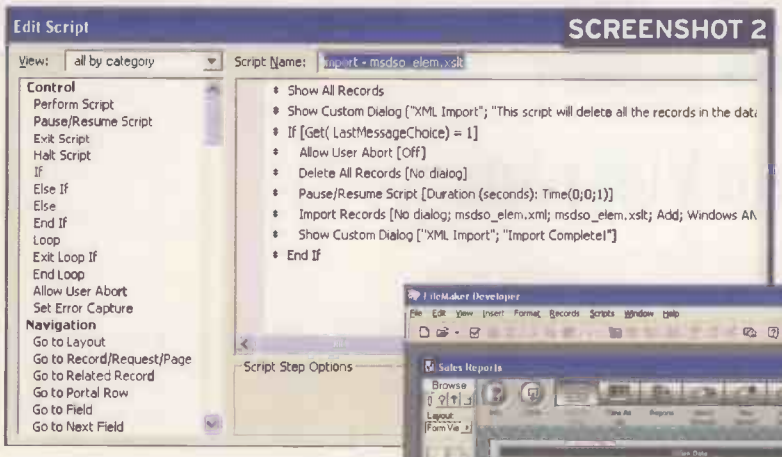
```
CComBSTR bstrMediaName;
if (! SUCCEEDED↙
(spMedia->get_name↙
(&bstrMediaName))) throw ↙
"Error getting title";
```

Another important IWMPMedia method is getItemInfo. This takes a string argument, specifying what information to retrieve. The possible arguments are listed under Available Attributes in the SDK documentation, and they include author, copyright, description, media type, album artist, album title and so on.

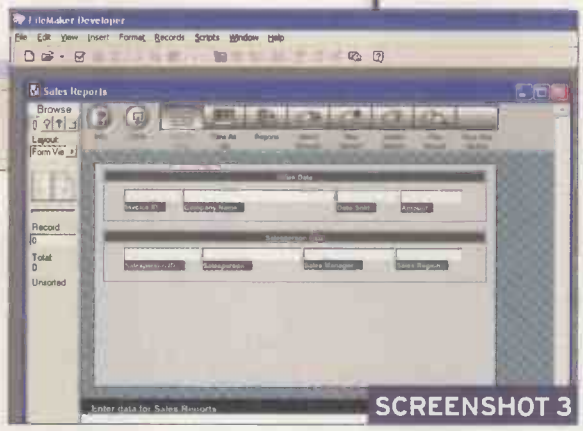
When you have the data you want, simply write out the file, for example using a filestream object. Rather than hard-code the file name, it makes sense to make this user-selectable. The wizard generates a simple dialogue which is almost all you need. It displays a text box, and stores the user's input in the m_szPluginText member of HandsOnWMP. All you need to do is open the resource script in HandsOnWMP.rc and edit the dialogue and strings as needed, so the user can enter a filename. One word of warning: if you double-click a control in the dialogue editor, Visual C++ will generate a new event handler that breaks the project. There's no need to do this, since there is already an event handler in CPropertyDialog.h.

The user will not want to enter a filename for the plug-in for every session, so it is also worth adding some code to read and save the selected filename in the Registry. One way to do this is by adding code to HandsOnWMP.cpp. You can save the current filename in the FinalRelease method, and read it back in the FinalConstruct method.

To test the plug-in, simply run it in Debug mode. Visual C++ will ask you to specify an application to host the library. Here you should select the Windows Media executable, which by default is in Program Files\Windows Media Player\wmplayer.exe. Visual C++ will warn



The Filemaker script editor is user-friendly but too basic



Filemaker Developer is easy for users, but less so for developers

you that there is no debugging information in this executable. It's not a problem, so you can continue. Now you can set breakpoints and step through the code.

This is a simple example, but shows how quickly you can create a plug-in that does something useful. You may want to enhance it, for example by letting the user select the filename with a File Open dialogue, and by exposing more of the properties available through getItemInfo. There are similar plug-ins already available for Windows Media Player, but the advantage of programming your own is that you can customise it as you like, track down any bugs and, by learning the API, use it as a starting point for more ambitious projects. All the code for this one is available for download at www.itwriting.com/pcw.

Developing in Filemaker

Filemaker is one of the few examples of a database manager that seriously aims for ease of use. As a result, it is more approachable for non-technical users than rivals such as Microsoft Access. In fact, Access has been steadily going down the path already taken by Visual Foxpro and others, becoming more of a development tool than a user-friendly desktop application. The reason is that databases have an inherent complexity. Single tables are easy to manage, but they are inadequate as a model of real-world data, while relational databases force you to deal with numerous problems such as preserving referential integrity. In the past, Filemaker has solved this by pushing the single-table model as far as it will go, using tricks such as repeating fields that let you store more than one value in a single field, and lookups which copy the data from one table into a field in another. Filemaker also has some relational capabilities, and in the new version this extends to having more than one table in a single file. There is a visual relationship builder, similar to the one in Access but less powerful.

Alongside its high usability, Filemaker benefits from an excellent database engine. Database files can be up to 8TB, compared to just 2GB in Access. A server version of Filemaker is also available, although version 7.0 is still in preparation. Another important feature of Filemaker is that, unlike Microsoft's effort, it runs on both the Mac and Windows. It also has a built-in web server that renders Filemaker forms as data-driven web pages, and good support for XML thanks to integration with the popular Xerces XML parser for C++.

'Filemaker benefits from an excellent database engine. Files can be up to 8TB, compared to 2GB in Access'

Even with Filemaker, it is hard to create a serious database client without a measure of scripting or programming. All versions of Filemaker have a Scriptmaker, which lets you define scripts by double-clicking script steps from a pick list. For developers familiar with other database languages such as Visual Basic or Dbase, Filemaker's Scriptmaker is primitive (see screenshot 2). Remarkably, it is still not possible to declare a variable in a script. Filemaker is also resolutely ignorant of SQL, the industry-standard database query and update language. The only partial concession to SQL is in the form of JDBC and ODBC drivers, apparently developed by the third-party ODBC specialist Intersolv, but this is for SQL access from external applications, not from scripts with Filemaker itself. Another headache is that there is no way of including ActiveX controls or any other sort of component on a Filemaker layout.

Despite the snags, Filemaker has attracted a substantial community of developers. Filemaker's Developer edition is specifically designed for custom applications (see screenshot 3). Best of all, it comes with a utility for bundling your database and scripts into a royalty-free redistributable application that does not require Filemaker to be installed. Whether or not you need the runtime, the Developer edition comes with several key features. One is the ability to define custom functions. Unlike scripts, these can now include variables, using the new Let statement. Next, there is a script debugger, a simple affair but better than nothing. Finally, you get the Plug-in SDK, which lets you create external functions in C or C++. Serious developers need this badly, since it is the only way to do grown-up programming in Filemaker. Unfortunately, Filemaker leaves you almost on your own when it comes to developing a plug-in, with just a few pages of documentation and a couple of simple examples. You have to study the header files to work out the API. It's still not possible to create custom controls, but you can create charts or other elements that display in their own window.

Filemaker is a mixed bag. On the plus side you get a powerful engine that works on Mac and Windows, an elegant user interface, and great value for money if you can make use of the royalty-free runtime. You have to balance that against the limited scripting capabilities, the lack of SQL support, and the frustrating, under-documented C++ API. The base product seems excellent, so it is puzzling that Filemaker does not do more to support developers.

CONTACTS

Tim Anderson welcomes your comments on the Visual programming column. Email him at: visual@pcw.co.uk. Please do not send unsolicited file attachments.

For Windows Media development, go to http://msdn.microsoft.com and search for the Windows Media SDK. LCD Smartie is at http://backupteam.gamepoint.net/smartie/
Filemaker information is at www.filemaker.com

Leisure

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LOADING...

Playing bad

Where's the fun in playing the big bold hero all the time? With Thief: Deadly Shadows, you take the role of the world's best tea leaf. The sequel to the popular original sees you taking up your lock picks as master thief Garrett. The plot has you fighting to stop an impending dark age. In reality, this is just an excuse to do the fun stuff including stealing, breaking and entering, sabotage and assassination.

With a range of tools and weapons to choose from, it's a game that requires cunning and skill to remain undetected and complete the game. The graphics are shaping up to be sufficiently slick and moody, with plenty of shadows to sneak around in. The release date is set for June and we'll do our best to lay our hands on a review copy as soon as possible.

Battlefield Vietnam

Do a tour of duty in 'Nam

Battlefield Vietnam is the sequel to the hugely popular multi-player first-person shooter Battlefield 1942. As its title suggests, the game is set in the jungles of Vietnam and allows players to re-enact the fodder of many a Hollywood film.

The similarities between this edition of the game and its predecessor are numerous. At first glance, the only major difference between the two is the improved graphics engine. Whereas 1942 was a somewhat unattractive game, this outing has been given a very welcome visual makeover.

Its character models and vehicles are now far more realistic and the authentic-looking environments add to the tension and realism. Things can become a little frustrating due to the high likelihood of being shot by an unseen assailant but, there are a variety of level types available.

The quality of the level design in Battlefield Vietnam is impressive, but its environments are less focused. In the original, there always seemed to be an easily definable front line. In Vietnam, unless you are playing with a large number of opponents, you will often find yourself wandering aimlessly in search of combat.

Other problems that affected 1942 haven't been ironed out. A team that is firmly on the upper hand can easily find itself losing a flag when players on the opposing team creep around the main battle undetected. This problem is made worse in Vietnam thanks to the addition of thick undergrowth.

As with the first game, the single-player mode is something of a disappointment. The artificial intelligence of computer-controlled enemy bots has been beefed up slightly, but the enemy characters are still none too clever.

There are both land and airborne vehicles available in Battlefield Vietnam, including jeeps, planes and tanks, but the most significant addition to this area are the helicopters. Unfortunately, you'll be spending a huge amount of your time crashing and burning before you become a skilful pilot.

On the whole, Battlefield Vietnam seems like little more than an overblown expansion pack for the original game. This is no bad thing, since Battlefield 1942 was an enjoyable multi-player experience. However, despite its positive points, those expecting a significant improvement in the series may walk away feeling slightly disappointed.

Rory Reid

DETAILS

PRICE £29.99 inc VAT
CONTACT Electronic Arts
www.eagames.com
SYSTEM REQUIREMENTS
Windows 98 or above • 1GHz CPU • 256MB of Ram • 64MB OpenGL graphics card • 1.5GB hard disk space • DirectX9
VERDICT
Not a huge improvement over the original, but still an enjoyable multi-player experience
OVERALL ★★★★★

WIN!

Competitions
214 Win 6 Sapphire graphics cards, a £1,200 PC World voucher and a copy of Far Cry
Turn to page 214 for your chance to win

Counter Strike

A stopgap that offers nothing new

With the odds of Elvis being found alive, well and working in a fish 'n' chip shop in Worthing greater than those of Half Life 2 being released, Valve has released Counter Strike: Condition Zero as a stopgap.

For fans of the series, it's basically more of the same team-based multi-player action as the previous incarnation. It's best played online and there are literally thousands of servers to pick from. With games varying from seek and destroy to hostage rescue, it is one multi-player game that requires a high level of team work. If you're struggling with human players however, maps can be played using computer-controlled bots, which vary in skill level.

The box also contains Deleted Scenes, which is a single-player version of the game complete with a range of objective-based missions. These vary from a *Black Hawk Down*-style escape, to rescuing hostages held in a prison camp.

In fairness, there's nothing particularly wrong with either the multi-player or single-player games. However, there's nothing particularly right either. The game uses the old Half Life engine and looks a few years out of date. With games like Call Of Duty showing what PCs can really do, it's a shame to have something so dated.

There's nothing new or innovative about the game and it's just some new maps. The single-player game is simply a way of justifying the £25 price tag. It feels as though Condition Zero is very much a stopgap for people waiting for Half Life 2. Even the box has a large sticker advertising that there's a CD with Half Life 2 videos on it.

Unless you're a diehard fan of Counter Strike there's little here to entice new players. All it really does is make us frustrated that there's still no sign of Half Life 2.

David Ludlow

DETAILS

PRICE £24.99 inc VAT
CONTACT Vivendi
www.vugames.com
SYSTEM REQUIREMENTS
Window 98 or higher • Pentium III 500MHz • 96MB of Ram • 500MB hard disk space
VERDICT
A space filler before the main event, this is fun, but there's really nothing new on offer
OVERALL ★★★★☆

Splinter Cell 2

Stealthy action in multi-player mode

Tom Clancy's name may have been expunged from the title for Splinter Cell's second outing, Pandora Tomorrow, but his presence can still be detected, lurking in the shadows. The scarily plausible terrorist threats and cutting-edge spy gadgets – staples of Clancy's books – are all present.

Splinter Cell 2 revisits all the elements that made the original so good, from the polished graphics to the faultless controls. In addition, some of the original's minor niggles have been ironed out and there are a handful of new moves and weapons.

Once again, stealth and the darkness are your greatest allies, as super spy Sam Fisher globetrots from hostage situation to airport confrontation, the highly effective pawn of a shadowy US government agency on the trail of terrorists and a deadly virus.

This set of eight single-player missions retreads the successful formula of the original while a scattering of standout moments and a diversity of scenarios keep the gameplay interesting.

But, despite being tooled up for every eventuality, you'll never feel completely free of the game designers' hand directing you from one set piece to another.

The innovative multi-player mode cleverly integrates stealthy action within a standard shooter death match format. Put simply: multi-player pitches spies against mercenaries in a cat and mouse hunt through gloomy labyrinths. The twist is that, while the spies are equipped with a third-person view, gadgets and light weaponry, the mercenaries are limited to a first-person perspective and are more heavily armed.

It's the multi-player mode that will ensure Splinter Cell 2 a life beyond the single-player missions. Without it, this wouldn't be much more than a glorified expansion pack.

Andy Stewart

DETAILS

PRICE £29.99 inc VAT
CONTACT
Ubisoft
www.ubi.com/UK
SYSTEM REQUIREMENTS
Pentium III 1GHz • 128MB of Ram • 64MB 3D card • Windows 98, 2000, ME, XP
VERDICT
Familiar stealth action overshadowed by an innovative multi-player mode
OVERALL ★★★★☆

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The Commodore Amiga 500 was released to compete with Atari's cheaper ST

The Amiga 1000 was technically superior to Atari's 16bit computer

Amiga

The concept began at Atari, but the Amiga was launched by the company's biggest rival

Back in 1979, Atari's Jay Miner had an idea for a competitor to the Apple II. It would feature Motorola's 68000 processor and a custom chipset to take the load off the main CPU – a strategy that had proved successful on the earlier Atari 400 and 800 computers. His idea became one of the most powerful machines of the 1980s, yet one that wouldn't arrive until six years later, and under the brand of Atari's fiercest rival. This is the story of the Commodore Amiga.

Miner joined Atari in the mid-1970s to work on the Video Computer System (VCS) games console. After its 1977 launch, the VCS engineering team began work on a successor based on three custom chips: one for video, one for DMA addressing and one for handling I/O and audio.

A change of heart by Atari management saw these chips become the heart of a home computer – or two computers, in fact, the lower-end Atari 400, and the Atari 800. But Atari's management wasn't interested in Miner's proposal for a higher-end follow-up, so he resigned in 1979 and joined Zimast to design chips for pacemakers.

Programmers Larry Kaplan and David Crane were part of a group that also left Atari in 1979 to form rival software house Activision. By 1982, though, Kaplan had grown tired of Activision and wanted to start a new games company. He called Miner at Zimast and asked if he knew anyone who might be interested in investing. Miner put him onto his boss who knew several wealthy customers. They funded Kaplan's new company, Hi-Toro.

Kaplan took the role of vice-president and hired David Morse from Tonka Toys to become its CEO. The plan was for Jay to stay at Zimast, where he would design the chips that Zimast would manufacture, and Kaplan would program the games.

However, by mid-1982, Kaplan grew frustrated with the slow progress and resigned. Morse persuaded Miner to give up his job at Zimast and take Kaplan's role as vice-president. At this time they abandoned the Hi-Toro name due to potential confusion with Toro, a Japanese lawnmower firm. Wanting a friendly sounding alternative, they opted for Amiga, Spanish for female friend.

In autumn 1982, Miner started recruiting a team to design the high-end custom chipset, code-named Lorraine after Morse's wife. Miner first approached former Atari colleague Joe Decuir, pitching his idea during a boating trip up the Sacramento River. Engineer Dave Needle was one of several key players to join later.

Like the Atari 400 and 800 that preceded it, project Lorraine would employ three custom chips to take the load off the main CPU. One would handle video output, a second would take care of DMA (with a high-end bit blitter for shifting graphics data), and the third would handle I/O and audio; the chips were named Denise, Agnus and Paula respectively.

After two years, the chips were finished, but the market for home computers was crashing. Amiga was short on funds, and after failing to secure investment from several companies, Atari came to the rescue with a $500,000 loan in early 1984.

At around the same time, Jack Tramiel had been voted out of Commodore by his board of directors, disgruntled with profits hit by an earlier price war with Texas Instruments. Tramiel started a new company that began work on a new 16bit computer. Tramiel bought Atari that summer and discovered the Amiga loan.

Commodore bought Amiga and paid its Atari debts, leaving Atari to continue development of its own machine. Commodore implemented improvements to project Lorraine, which, 11 months later, was announced as the Amiga 1000.

Atari may have beaten Commodore to launching a 16bit computer by six months, but the Amiga was technically far superior. Indeed, with a colour multi-tasking graphical interface, stereo sound, custom graphics hardware and support for video, the Amiga was arguably ahead of the Apple Mac.

However, Atari's ST was cheaper, so Commodore later released the cut-down A500 and a higher-end A2000 model. The Amiga and ST remained rivals into the early 1990s, and were two of the last successful proprietary systems before IBM's architecture became unstoppable.

Miner later described how he enjoyed working at Amiga as, like Atari, he was allowed to bring his cockapoo dog Mitchy into the office. Mitchy's paw print can be found inside the Amiga 1000 case, with the signatures of Miner and the other main designers.

Gordon Laing

Six Sapphire graphics cards

This month, we're giving six readers the chance to upgrade their graphics card with some of the latest offerings from Sapphire Technology. If you've ever experienced choppy frame rates in games or have avoided buying the latest game releases because your current graphics card isn't up to the job, then this is the perfect opportunity to bring your PC up to date.

One winner will receive a top-of-the-range Sapphire 9800 XT Atlantis. This excellent graphics card was reviewed in *PCW*'s May 2004 issue and was given our coveted Highly Commended award. It topped the performance graphs in the default 3Dmark tests and comes with software utilities, a copy of Tomb Raider – Angel of Darkness and a voucher for the forthcoming Half Life 2.

We're also giving two runners-up the chance to win the impressive Sapphire 9600 XT Atlantis, a slightly cut-down version of the 9800 XT. On top of this, we've got two highly versatile Sapphire 9800SE cards to give away, and a 9800 Pro Ultimate 128MB – each of which has enough horsepower to drive the most demanding of games.

For more information, go to **www.sapphiretech.com**, or for a chance to win one of these excellent graphics cards, simply answer the following question.

How much memory does the Sapphire 9800 Pro Ultimate 128MB have?

a) 128MB
b) 64MB
c) 256MB

SAPPHIRE

PCW JULY 2004 SAPPHIRE COMPETITION ENTRY FORM

How much memory does the Sapphire 9800 Pro Ultimate 128MB have?

.....

Name: .....

Address: .....

.....

Email address: .....

Daytime telephone number: .....

Mobile telephone number: .....

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PERSONAL COMPUTER WORLD

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May winners

The three winners of a copy of Dantz Retrospect Multiserver 6.5 are: Tim Little, D Tanswell and Kasia Brekka.

And three Iiyama Prolite E431S monitors go to: R Cook, Julia Shaw and A Mart.

Win Far Cry and a £1,200 PC World voucher

One reader has the chance to win a £1,200 voucher to spend in PC World, plus a copy of the excellent Far Cry game, courtesy of Ubi Soft.

For those of you who missed our review of the game in *PCW* June, go to **www.pcw.co.uk/Products/1153744**. Far Cry allows players to step into the shoes of Jack Carver; a charter boat owner whose life takes a turn for the worst after escorting a journalist to the tropical island of Cabatu.

En route, his boat is attacked and his passenger kidnapped by a group of trained mercenaries, so Jack is left with little choice but to rescue his companion while trying to escape unharmed.

Far Cry makes use of a brand new game engine allowing incredibly realistic graphics and artificial intelligence. As a result, your current PC may not be able to make the most of it – which is where the £1,200 PC World voucher comes in handy.

With this, you'll be able to walk into any PC World store and buy yourself a new computer with all the necessary bells and whistles. For more information, visit **www.farcry.ubi.com** and, for a chance to win this prize, or be one of five runners-up to receive a copy of the game, simply answer the following question:

What is the name of the tropical island Jack Carver must escape from?

a) Jamaica
b) Iraq
c) Cabatu

How to enter

Fill in the coupon and send to the following address by 25 June 2004:
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Competition open to UK residents only.

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What is the name of the tropical island that Jack Carver must escape from?

.....

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Address: .....

.....

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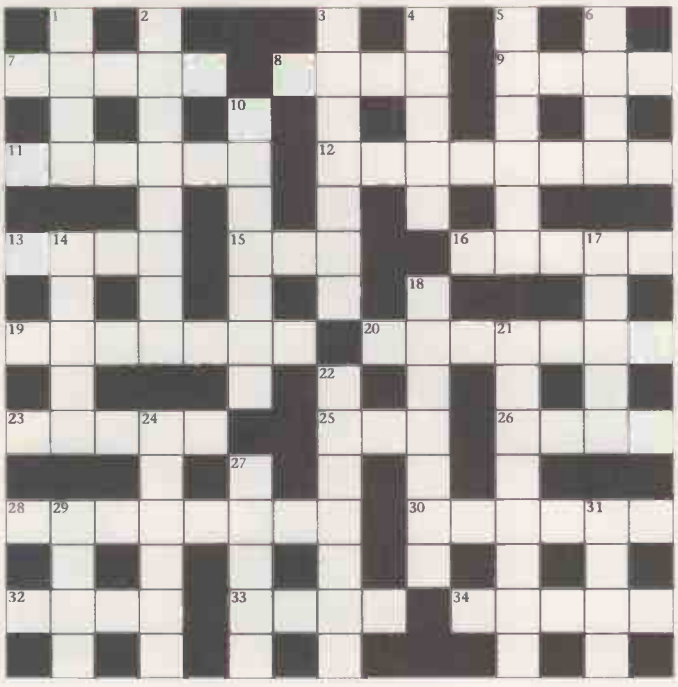
PERSONAL COMPUTER WORLD

Mindbenders

These puzzles will keep you amused for hours, and if you solve them you could win a Concise Oxford English Dictionary or a UK and Ireland Route Finder

Prize crossword



ACROSS

7 Electronic module including chips (5)
8 ___ mode, display for letters etc (4)
9 Legal agreement between software maker and user (acr) (4)
11 Electric discharge on insulated body (6)
12 ___ art, electronically created pictures (8)
13 ISDN second channel control standard (acr) (4)
15 Unit of electrical resistance (3)
16 ___ significant bit, right-most (5)
19 Aborting a program's process (7)
20 Go back to a website (7)
23 Spare ___, bits you can't get hold of (5)
25 Group of national standard setters (inits) (3)
26 Embed a table in a table (4)
28 Global computer web (8)
30 Spreadsheet column sums (6)
32 Hackers' word for deep understanding (4)
33 Holy image on screen? (4)
34 Printed page number (5)

DOWN

11 Stockade (4)
2 Of vital importance (8)
3 Gladly received (7)
4 Totally fox (5)
5 High quality (2, 4)
6 Ice-sheet (4)
10 Reverberating (7)
14 ___ Roddick, Body Shop founder (5)
17 Seagoing vessels (5)
18 Mutinies (7)
21 Car's firing system (8)
22 Small bars (7)
24 Nips (6)
27 ___ Dickinson, actress (5)
29 George Wendt's character in Cheers (4)
31 Superman's Ms Lane (4)

Cross Wise

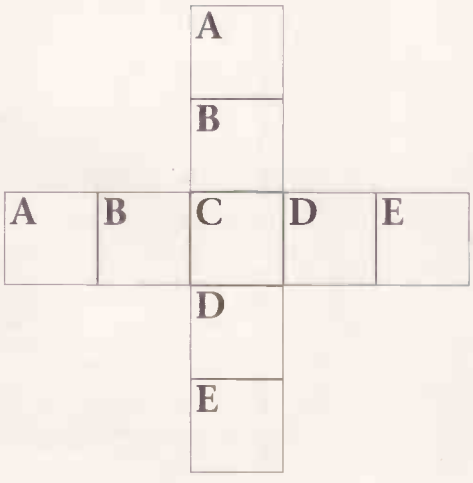
Using any of the numbers from 1 to 16 not more than once and, bearing in mind that only one end number is odd, can you complete the empty cross?

DOWN

A plus B equals D
Twice B equals E
D equals twice (A plus C)

ACROSS

C plus E equals A
(Three times A) minus C equals D
B equals three times E
B plus E equals C plus D



WIN!

Each month, one *PCW* crossword entrant will win a copy of *The Concise Oxford English Dictionary*, and the brainteaser winner gets a CD version of *Route Finder United Kingdom and Ireland*.

Send your completed crossword to: '*PCW* July – Prize Crossword', VNU, 32-34 Broadwick Street, London, W1A 2HG, to arrive no later than 25 June 2004. Send the answers to the brainteaser to: '*PCW* July – Prize Puzzle', VNU, 32-34 Broadwick Street, London, W1A 2HG, to arrive by 25 June 2004.

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May winners

George E Moy from Chichester won the crossword puzzle and Andrew Gibbons from Basingstoke won the brainteaser.

May solutions

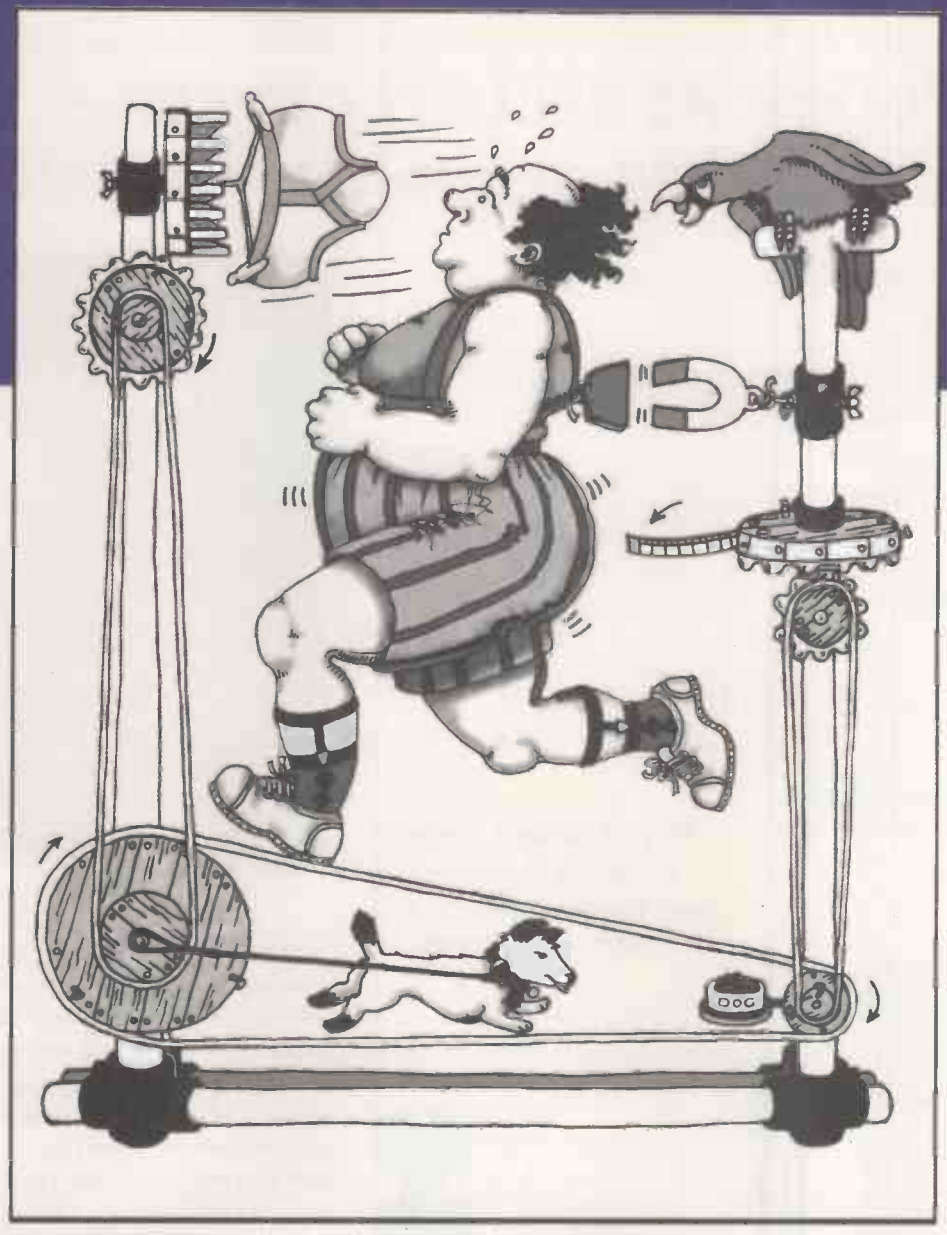
Brainteaser

2	7	4	1	3	5	6
7	5	6	2	4	3	1
6	3	1	7	2	4	5
4	1	3	5	6	7	2
5	6	7	3	1	2	4
3	4	2	6	5	1	7
1	2	5	4	7	6	3

Crossword

ACROSS: 7 DFSMS 8 Watt 9 AAUI 11 Syntax 12 Binomial 13 Deci 15 CFG 16 E-Cash 19 Not gate 20 Huffman 23 Depth 25 PNP 26 Else 28 Transfer 30 Nibble 32 CTRL 33 ISDN 34 Actor
DOWN: 1 Iffy 2 Omitting 3 Cabbage 4 Sting 5 Tarmac 6 Tuba 10 Execute 14 Evoke 17 Slams 18 Suspend 21 Feedback 22 Upgrade 24 Tingle 27 Affix 29 Rita 31 LaosSolutions

Not all technology makes it into the Personal Computer World newsletter



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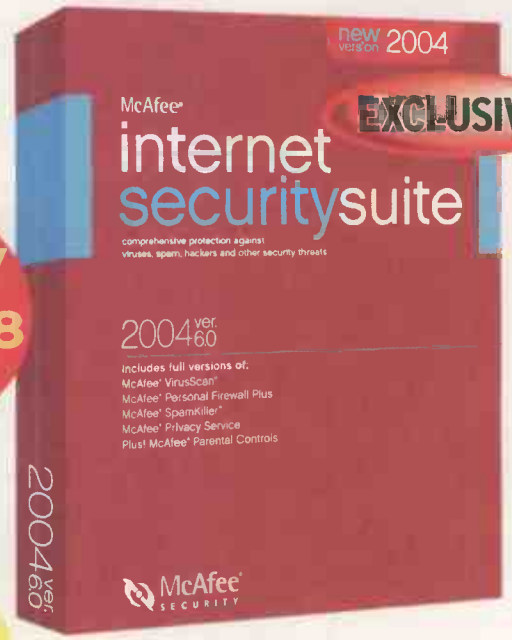

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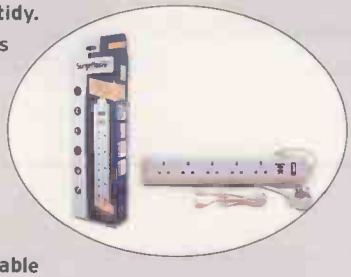

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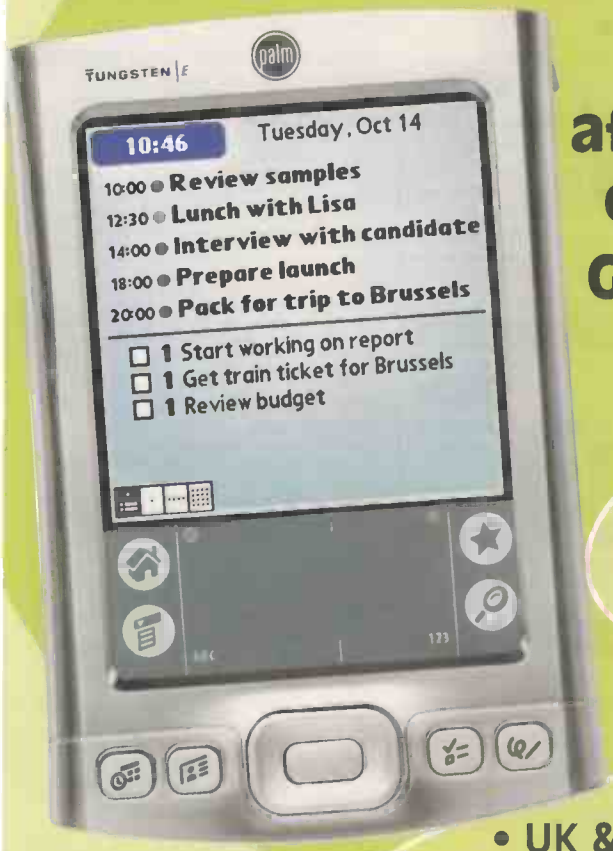

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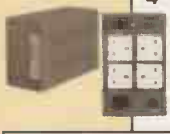

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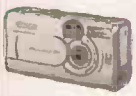

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- 3 x Optical Zoom
- 4.1 x Digital Zoom
- Pictbridge compatible
- VGA movie mode with sound

£339.57 (£289.00 ex VAT)
quicklinx > 31MDPW

Digital Cameras

quicklinx		Inc VAT	ex VAT
	CANON		
31M8PW	Powershot A75	210.32	179.00
20DZPW	Powershot A80	270.00	229.79
31M9PW	Ixus IIs	229.12	195.00
31MDPW	Ixus 500	339.57	289.00
	FUJIFILM		
345PPW	Finepix A120	94.99	80.85
345QPW	Finepix A330	134.99	114.89
345SPW	Finepix A710	324.99	276.59
345TPW	Finepix S20 Pro	524.99	446.80
	HP		
2PTHPW	Photosmart 435	86.95	74.00
2N5DPW	PhotoSmart 635	112.99	96.17
2C9BPW	Photosmart 735 Camera 3.2 MP	127.00	108.09
2R77PW	Photosmart 735 And Docking Kit	198.50	168.94
2C99PW	Photosmart 935	234.00	199.15
2PTJPW	Photosmart 945	258.50	220.00
2C9CPW	Photosmart 935 Camera & Dock	304.32	259.00
	KODAK		
2FGZPW	Easyshare DX6340	169.99	144.68
2Q73PW	Easyshare CX6200	75.00	63.83
2Q72PW	Easyshare CX6230	104.99	89.36
	OLYMPUS		
2FC9PW	C-350	144.99	123.40
2VPCPW	C-5060WZ	484.99	412.76
	SONY		
2FG4PW	DSC-P32 Cyber-shot	139.82	119.00
2CWNPW	DSC-P52 Cyber-shot	163.32	139.00
3454PW	DSC-P73 Cyber-shot	214.98	182.97
3455PW	DSC-P93 Cybershot	257.99	219.57
16MZPW	MVC-FD200 Digital Camera	269.07	229.00
3456PW	DSC-P100 Cyber-shot	299.98	255.31
2Z1QPW	DSC-T1 Cyber-shot	399.00	339.58
2FGFPW	MVC-CD500 Mavica	433.57	369.00
2QL2PW	DSC-F828 Cyber-shot	665.99	566.80

Digital Camcorders

quicklinx		Inc VAT	ex VAT
	CANON		
3163PW	MV700	327.82	279.00
3164PW	MV700i	374.82	319.00
3165PW	MV750i	457.07	389.00
20DLPW	MVX3i	999.99	851.06
20DNPW	MVX10i	889.99	757.44
	SONY		
317YPW	DCR-TRV255 Handycam D8	279.99	238.29
2CP7PW	DCR-TRV265 handycam D8	299.98	255.31
31WYPW	DCR-HC14E Compact MiniDV	363.07	309.00
348TPW	DCR-DVD91E DVD Handycam	489.99	417.02
348XPW	DCR-DVD201E DVD Handycam	609.98	519.14
31WXPW	DCR-HC18E Super-Compact MiniDV	405.37	345.00
31X3PW	DCR-PC106E PC Style MiniDV	445.32	379.00
31X0PW	DCR-HC30E Super Compact MiniDV	465.99	396.59
31X1PW	DCR-HC40E Super compact MiniDV	569.87	485.00
31X2PW	DCR-HC85E 2Megapixel MiniDV	734.37	625.00
12CVFPW	DCR-IP1 Handycam MicroMV	868.32	739.00

DCR-HC30E Mini DV Handycam

£465.99 (£396.59 ex VAT)
quicklinx > 31X0PW Go

- 800k Pixel CCD
- Carl Zeiss Lens
- 10 x Optical Zoom (120 x digital)
- Memory Stick Duo slot
- 2.5" Hybrid LCD Monitor
- New GUI Menu

SONY

DCR-TRV460 D8 Handycam

£399.99 (£340.42 ex VAT)
quicklinx > [illegible] Go

- 20 x Optical Zoom
- 990 x Digital Zoom
- 2.5" LCD Screen
- Super Steadyshot
- Nightshot plus Infrared System

MEMORY STICK PRO

SONY

MV700i Digital Camcorder

£374.82 (£319.00 ex VAT)
quicklinx > [illegible] Go

Highest zoom ranges of any camcorder in its class.
- Lightweight design
- 18 x Optical Zoom
- 360 x Digital Zoom
- 2.5" LCD
- Night mode

you can Canon

Fujifilm FinePix F420 Zoom

£259.99 (£221.27 ex VAT)
quicklinx > [illegible] Go

A real show-stopper, the FinePix F420 Zoom is the smallest camera to include Fujifilm's 4th Generation Super CCD HR (High Resolution) technology and can realise 3 million effective pixels, producing 6 million recorded pixels. Its diminutive frame also successfully incorporates a 3x optical zoom lens and a voice memo recorder capable of storing up to 30 seconds of sound.

What's more, the FinePix F420 Zoom's high quality movie capture capabilities give an encore-deserving performance. It records at 30 frames per second, a frame-rate that will ensure silky-smooth movie clips.

FUJIFILM

CX7300 Digital Camera

£111.62 (£95.00 ex VAT)
quicklinx > [illegible] Go

Capture a smile and so much more with the CX7300
- 3.2 Megapixels
- 3 x Digital Zoom
- Video Clip Capture
- Point & Shoot simplicity

Kodak

HP Photosmart 945 Digital Camera

As seen on dabs TV

£258.50 (£220.00 ex VAT)
quicklinx > [illegible] Go

The HP Photosmart 945 is a precision 8x optical zoom digital camera delivering superior image quality. With 56x total zoom and 5 MP resolution, it also has "Digital Flash".
- 5.3 Megapixels
- 56 x Total Zoom (8 x Optical, 7 x Digital)
- 5 cm (2") Colour LCD Display
- 32 MB SD Memory Card Supplied
- Optional Docking Station
- HP Photo & Imaging software with HP Memories Disc Creator

Pentax Optio S4

£245.57 (£209.00 ex VAT)
quicklinx > [illegible] Go

The Optio S4 comes in a small package. The 4 million pixel quality and diamond tooled case finish this gem off a treat.
- 4.0 Megapixels
- 3 x Optical Zoom
- 4 x Digital Zoom

PENTAX

OLYMPUS

C-360 Zoom Digital Camera
3.2 Megapixels
3 x Optical Zoom
Super Macro mode
5 scene programmes
Movie recording function

£163.32 (£139.00 ex VAT)
Collect 163 Dabspoints
www.dabs.com/olympus | quicklinx : 31VJPW

Memory

quicklinx		Inc VAT	ex VAT
	LEXAR		
292MPW	128MB Compact Flash Card	20.00	17.03
292PPW	256MB Compact Flash Card	40.00	34.05
292QPW	512MB Compact Flash Card	80.00	68.09
2CGPPW	1GB Compact Flash Card Type II	155.00	131.92
2LRGPW	128MB Compact Flash Card 21X	26.00	22.13
2LRHPW	256MB Compact Flash Card 21X	52.00	44.26
2LRJPW	512MB Compact Flash Card 21X	105.00	89.37
292TPW	128MB Smart Media Card	20.00	17.03
292XPW	128MB Multi Media Card	32.00	27.24
2931PW	128MB Secured Digital Card	35.00	29.79
2DFNPW	256MB Secured Digital Card	55.00	46.81
2LRLPW	512MB Secured Digital Card	179.00	152.34
	SONY		
YZVPW	128MB Memory Stick	44.99	38.29
2DMKPW	128MBx2 memory Stick	69.99	59.57
2DMLPW	64MB Memory Stick Duo	31.72	27.00
2TB2PW	128MB Memory Stick Duo	49.35	42.00
2HDPPW	256MB Memory Stick Pro	85.98	73.18

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HP DeskJets from only £47.80 (£56.16)

Inkjet Printers

quicklinx		inc VAT	ex VAT
2PPMPW	i350	48.99	41.70
2SP7PW	i455	69.99	59.57
2TF4PW	i965	233.82	199.00
	EPSON		
2LZXPW	C44UX	43.47	37.00
2Q9CPW	C64	61.10	52.00
2Q90PW	C84	92.82	79.00
2TDXPW	Photo R300 with Monitor	116.32	99.00
	HP		
2PT6PW	Photosmart 145	90.47	77.00
2PT5PW	Photosmart 245	129.99	110.63
2PT7PW	Photosmart 7260	79.99	68.08
2PT8PW	Photosmart 7660	137.47	117.00
2PT9PW	Photosmart 7960	229.94	195.70
	LEXMARK		
2H9JPW	Z705	52.87	45.00
2TDBPW	P707 Photo Printer	57.57	49.00

Laser Printers

quicklinx		inc VAT	ex VAT
308TPW	**BROTHER** HL-5130	158.62	135.00
308XPW	HL-5170DN	339.57	289.00
30S0PW	HL-2700CN	598.07	509.00
	EPSON		
2SRVPW	EPL-6200	245.57	209.00
2SRZPW	EPL-6200L	158.62	135.00
	KYOCERA		
20NNPW	FS-1010	205.62	175.00
2VL3PW	FS-1020D	243.22	207.00
	OKI		
2CTHPW	B4200	210.32	179.00
2CTJPW	B4300	233.82	199.00
	OMS		
2WX8PW	Pagepro 1300W	89.95	76.56
	SAMSUNG		
2F9FPW	ML1510	99.87	85.00
2F9GPW	ML1710	158.62	135.00

Scanners

quicklinx		inc VAT	ex VAT
2483PW	**CANON** Lide 20	39.99	34.04
24N2PW	Lide 30	49.99	42.55
2889PW	Lide 50	64.00	54.47
2TF5PW	3200F	63.45	54.00
24N3PW	5000F	119.99	102.12
24N4PW	8000F	174.99	148.93
2CXJPW	9900F	269.00	228.94
	EPSON		
2Q9FPW	Perfection 1670 Photo	70.50	60.00
2Q9GPW	Perfection 3170 Photo	175.07	149.00
2444PW	Perfection 2400 Photo	116.32	99.00
	HP		
2PTGPW	Scanjet 4670	154.99	131.91
2R84PW	Scanjet 5530C	184.47	157.00

Multi-function Devices

quicklinx		inc VAT	ex VAT
2HVFPW	**CANON** MPC 700 Photo	198.57	169.00
2C0SPW	MPC 730 Photo	276.12	235.00
	EPSON		
2572PW	CX3200	86.95	74.00
2TF2PW	CX5400	116.33	99.00
2S7CPW	CX6400	143.35	122.00
	HP		
2B03PW	OfficeJet 5110	158.62	135.00
2C6MPW	OfficeJet 6110	225.60	192.00
2ZVZPW	OfficeJet 5510	188.00	160.00
2CCHPW	PSC 1205	92.82	79.00
2HY2PW	PSC 2175	139.98	119.14
2R80PW	PSC 2410	219.99	187.23
	LEXMARK		
2H9ZPW	X1150	64.62	55.00
347TPW	X4250	116.32	99.00

SMARTDISK

2700 Slide Scanner

2700 x 2700 dpi
Slides
Film Manual Load
USB

£154.99 (£131.91 ex VAT)
Collect 154 Dabspoints

www.dabs.com/smartdisk | quicklinx : 2LPLPW

to see the full range go to www.dabs.com/hp

HP DeskJets provide quality and performance at an affordable price.

Deskjet 3650 Photo Printer
- Fast 17ppm B/W, 12ppm Colour
- up to 4800dpi photo quality
- Print borderless 10x15 photos
- Optional 6 ink colour printing available

£56.16 (£47.80 ex VAT) | quicklinx 2PJ1PW

Deskjet 5150c Photo Printer
- Fast 19ppm B/W, 14ppm colour
- up to 4800dpi photo quality
- Print borderless 10x15 or A4 photos
- Optional 6 ink colour printing available

£79.99 (£68.08 ex VAT) | quicklinx 2PC4PW

Deskjet 5850 WIFI Photo Printer
- Fast 21ppm B/W, 15ppm colour
- up to 4800dpi Photo quality
- Print borderless 10x15 or A4 photos
- Optional 6 ink colour printing
- 802.11b WiFi

£183.30 (£156.00 ex VAT) | quicklinx 2R82PW

to see the full range go to www.dabs.com/hp

HP Photosmart printers give you lab quality printers that last for generations.

Photosmart 245
- Small, Compact and Portable (1.4kg)
- Print Borderless 10x15 upto 4800dpi
- PC and MAC compatible
- Built in memory card readers (11)
- 4.6cm Colour LCD

£129.99 (£110.63 ex VAT) | quicklinx 2PT5PW

Photosmart 7660
- HP Photoret IV 6 ink printing
- Fast 19ppm B/W, 11ppm colour
- Built in memory card readers (11)
- Print from 10x15 up to A4 borderless

£137.47 (£117.00 ex VAT) | quicklinx 2PT8PW

Photosmart 7960
- Photolab quality 8 ink printing
- Fast 21ppm B/W, 15ppm colour
- Edit photo's on the 6.4cm colour LCD
- Built in memory card readers (11)
- Prints from 10x15-A4 borderless

£229.94 (£195.70 ex VAT) | quicklinx 2PT9PW

to see the full range go to www.dabs.com/epson

The award-winning Epson Stylus Photo range offers outstanding performance.

Stylus Photo R200
The EPSON Stylus Photo R200 is the perfect solution to photo printing at home. Providing enormously realistic 6-colour photos and a wealth of features like direct CD/DVD printing, it makes printing your own photos quick, easy and affordable too.

£89.30 (£76.00 ex VAT) | quicklinx 300MPW

Stylus Photo R800
Bringing photography out of the darkroom - revolutionary A4 Photo Inkjet Printer featuring groundbreaking photographic quality, durability and flexibility. The Stylus Photo R800 sets a new benchmark for A4 photo printers. Its new ultrachrome hi-gloss pigment ink.

£269.07 (£229.00 ex VAT) | quicklinx 300KPW

to see the full range go to www.dabs.com/epson

The EPSON perfection range of scanners are ideal for the home/office and photo enthusiasts.

Perfection 1670 Photo
The Perfection 1670 and 1670 Photo are Epson's new generation of flatbed scanners specifically designed for the home user. Enhanced quality, performance and ease of use, perfect for the beginner.

£81.07 (£69.00 ex VAT) | quicklinx 2Q9RPW

Perfection 4870 Photo
If you're serious about film and photo scanning, you'll appreciate the quality, flexibility and sheer scanning power of the EPSON Perfection 4870 Photo. It recognises detail so fine you can even see the grain of the film.

£313.72 (£267.00 ex VAT) | quicklinx 300LPW

to see the full range go to www.dabs.com/epson

EPSON's latest printing and scanning technologies plus quick & easy standalone copying facility.

RX500 All in One
The first all-in-one home photo centre to scan, copy and print premium quality photos from digital or analogue collections. The Rx-500 offers premium photo printing and high performance scanning in one space and cost saving solution.

£206.80 (£176.00 ex VAT) | quicklinx 2SQRPW

RX600 All in One
Allowing users to reproduce images from both digital and traditional film sources. The RX600 also features a number of standalone printing features to facilitate quick and intuitive operation by both photo enthusiasts and non-PC literate users.

£251.45 (£214.00 ex VAT) | quicklinx 31KHPW

to see the full range go to www.dabs.com/canon

Canon's inkjet and all-in-one range providing excellent quality and performance.

i990 Inkjet Printer
The i990 delivers the highest photo quality with unmatched print speeds and photo functionality. Canon's exclusive 7-ink ChromaPLUS photo system ensures spectacular colour quality.

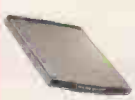
£280.82 (£239.00 ex VAT) | quicklinx 31N6PW

MP390 All In One
The stylish SmartBase MP390 delivers photo quality printing, fast flatbed Super G3 faxing and superb colour scanning and copying. It provides camera and card direct photo printing - no PC required.

£186.82 (£159.00 ex VAT) | quicklinx 31N8PW

to see the full range go to www.dabs.com/canon

The Canon scanners offer excellent quality and performance.



Lide 80
CanoScan LIDE 80 brings together stunning design and outstanding quality in the world's most compact film-capable flatbed scanner. Outstanding 2400 x 4800dpi resolution, a super compact hand-held film adapter unit.

£129.99 (£110.63 ex VAT) | quicklinx 2Q97PW

3200F Film Scanner
The CanoScan 3200F is an ultra-fast film capable flat-bed scanner. Transparencies & documents scan at 1200x2400 dpi resolution with record speed via a USB 2.0 HI-Speed connection, then CanoScan 3200F will appeal to home users with film scanning requirements.

£63.45 (£54.00 ex VAT) | quicklinx 2TF5PW

to see the full range go to www.dabs.com/brother

All-in-one range providing excellent quality and performance for your home or office...

MFC-890 All-in-One
This versatile All-In-One functions as a colour printer, colour fax, colour copier and colour scanner. features an integral Photo Capture Centre facility enables the user to print images directly from SmartMedia, Compact Flash or Memory Stick.

£222.07 (£189.00 ex VAT) | quicklinx 2BJJPW

MFC-4820C All-in-One
The new MFC-4820C is a combined colour printer, copier, scanner & fax. It also incorporates additional features such as a handsfree speakerphone, answering machine and photo capture centre.

£198.57 (£169.00 ex VAT) | quicklinx 2MSQPW

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Video, stills and audio – ready to go!
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HP All-in-One products help you conserve space, money and time.

PSC 1350 Printer, Copier, Scanner
- Up to 17ppm B/W, 12ppm colour
- Photo quality up to 4800dpi
- 36 bit scanning up to 2400dpi (opt)
- Direct print from SD, CF & MemoryStick

£117.50 (£100.00 ex VAT) quicklinx > 2R7YPW

PSC 2175 Printer, Copier, Scanner
- up to 18ppm B/W, 13ppm colour
- Photo quality up to 4800dpi
- 48 bit scanning up to 4800dpi (opt)
- Direct Print SD, CF & MemoryStick

£139.99 (£119.14 ex VAT) quicklinx > 2HY2PW

PSC 2410 Print, Copy, Scan, Fax
- up to 21ppm B/W, 14ppm colour
- 48 bit scanning up to 4800dpi (opt)
- Edit and direct print from 9 formats of memory card
- Built in 33.6kbps

£219.99 (£187.23 ex VAT) quicklinx > 2R80PW

to see the full range go to www.dabs.com/hp

HP ScanJet series - value for money combined with ease of use.

ScanJet 2400c
- One touch scanning
- 48 bit scanning up to 1200dpi (opt)
- Scan 3D objects with CCD tech.
- PC & Mac compatible (USB 2.0)

£45.82 (£39.00 ex VAT) quicklinx > 2HY3PW

ScanJet 4670
- Sleek space saving design
- Scans 35mm slides and negatives
- 48 bit scanning up to 2400dpi (opt)
- Capture up to A4+ images with inc. stitch software

£154.99 (£131.91 ex VAT) quicklinx > 2PTGPW

ScanJet 5530c
- Unique photo feeder (scan 24 images in under 5 minutes)
- 48 bit scanning up to 4800dpi (opt)
- Scans 35mm slides and negatives
- PC & Mac compatible

£184.47 (£157.00 ex VAT) quicklinx > 2R84PW

Belkin Wireless Router

quicklinx > 2CS7PW Go

£52.87 (£45.00 ex VAT)

New 802.11g technology provides you with networking speeds nearly five times faster than the current Wi-Fi (802.11b) standard 54Mbps. 802.11g is the easiest wireless network to implement and is interoperable with existing 802.11b Wi-Fi networks.

quicklinx	BELKIN	inc VAT	ex VAT
2CS7PW	54g Wireless Access Point	52.87	45.00
2CS5PW	54g Wireless PCI Adapter	34.07	29.00
2CS4PW	54g Wireless Notebook Card	34.07	29.00

Linksys Wireless-G 54mbps PCI Card

quicklinx > 2CM9PW Go

£38.77 (£33.00 ex VAT)

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Wireless-G connectivity at 54Mbps lets you network at high-speed from anywhere in the building. Also interoperates with Wireless-B (802.11b) networks at 11Mbps.

quicklinx	LINKSYS	inc VAT	ex VAT
2CM7PW	Wireless-G Broadband Router	63.80	56.00
2CM9PW	Wireless-G PCMCIA Card	47.00	40.00
2D12PW	Wireless-G Access Point	63.45	54.00
2Z9MPW	Wireless modem/router	92.83	79.00

ADSL Modem & Router

quicklinx > 33WDPW Go

£92.83 (£79.00 ex VAT)

The PSL-G6047 Remote Router is a versatile all-in-one networking device that provides high speed broadband internet connection, wireless user access and dedicated LAN bandwidth server connection.

DG834G Wireless Modem

quicklinx > 2VCDPW Go

£104.58 (£89.00 ex VAT)

NEW LOWER PRICE

- Modem & Router
- Wireless ADSL modem and firewall router
- Built-in 4-port 10/100Mbps switch
- Share internet connection for upto 253 users, inc. up to 32 users

OfficeConnect Wireless Modem/Router & PC Card

quicklinx > 3CWPW Go

£111.62 (£95.00 ex VAT)

The 3Com® ADSL Wireless 11g Firewall Router combines an ADSL modem, router, 802.11g wireless access point, four-port switch with a Wireless PC Card.

Wacom Graphire 3 Classic

quicklinx > 2SOLPW Go

£69.99 (£59.57 ex VAT)

Designed to allow you to get so much more from your images. The ultimate tool for the digital imaging enthusiast, lets you work with the accuracy of the pen, draw, select, sketch and navigate your images or video with precision and ease. Pressure sensitivity, the darker the colour of your line or the larger the brush, depending on the application and your choice, the possibilities are near endless.

quicklinx	WACOM	inc VAT	ex VAT
2SOMPW	Graphire 3 Studio	99.99	85.10
2SONPW	Graphire 3 Studio XL	179.99	153.19

Bluetooth™ PDA & PC Adapter Combo Card

quicklinx > 31NZPW Go

£48.17 (£41.00 ex VAT)

The fast & simple way to wirelessly connect your computing devices together, eliminating the need for cables and physical connections between electronic devices.

4-Socket SurgeMaster®

quicklinx > 2C9XPW Go

£19.97 (£17.00 ex VAT)

This 4-Socket Home series model also offers Telephone/ Modem/DSL protection and 2-metre power cable. This model includes £50,000 connected equipment warranty.

Wireless Optical DeskSet

quicklinx > 2SBPW Go

£29.37 (£25.00 ex VAT)

- Wireless keyboard and wireless optical mouse
- Rechargeable mouse with 5 buttons and 1 scroll wheel
- 19 extra direct access multimedia keys

Wireless Tablet 400

quicklinx > 2FKCPW Go

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Ergonomically designed large tablet for drawing, handwriting, sketching, colouring and picture editing.

- 3 Button Mouse
- 3 Button Pen
- Software included

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Tilt Wheel Technology and state-of-the-art optical tracking and true wireless freedom

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www.dabs.com/microsoft quicklinx : 2QNDPW

Microsoft Black Multimedia Keyboard

A keyboard that maximises your digital experience! with one-touch buttons

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www.dabs.com/microsoft quicklinx : 2PKWPW

Microsoft Wireless Optical Desktop Elite

Top Performance Total Style in a Wireless Desktop

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www.dabs.com/microsoft quicklinx : 2PKDPW

Logitech Cordless Click! Optical Mouse

USB or PS/2 connection for PC and Mac Fits either hand 5-year guarantee

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www.dabs.com/logitech quicklinx : 2041PW

Logitech Cordless Click! Plus Opt Mouse

A stylish, cordless optical mouse for more comfort & control 5-year guarantee

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Featuring 29 Additional keys, inc. 10 patented side mounted Xpress Keys for instant access

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www.dabs.com/cherry quicklinx : 2WCCPW

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GeForce FX 5200 cards from £40.00 (£34.05)

AGP Video Cards

quicklinx	ABIT	inc VAT	ex VAT
30RCPW	FX 5700 Ultra 128MB	94.00	80.00
3397PW	Radeon 9200SE DVI VO 128MB	34.00	28.94
3399PW	Radeon 9200SE DVI VO 128MB	40.00	34.05
339CPW	Radeon 9600SE DVI VO 128MB	65.50	55.75
339DPW	Radeon 9600 DVI VO 256MB	96.50	82.13
339CPW	Radeon 9600XT DVI VO 256MB	130.00	110.64
3365PW	Radeon 9800XT DVI VO 256MB	315.00	268.09
	AOPEN GeForce FX		
2W68PW	FX5200 PCI 128MB	57.50	48.94
2S09PW	FX5200 DVI VO AGP 128MB	45.50	38.73
2H24PW	FX5200 DVI AGP 128MB	47.50	40.43
2S0BPW	FX5200 DVI VO AGP 256MB	68.00	57.88
2W69PW	FX5600XT AGP 128MB	81.00	68.94
2S08PW	FX5200 DVI VO AGP 128MB	93.50	79.58
2W6TPW	FX5700 AGP 128MB	105.00	89.37
339HPW	FX5700 AGP 256MB	111.00	94.47
30MMPW	FX5900XT DVI VO AGP 128MB	145.00	123.41
2W6WPW	FX5950 Ultra AGP 128MB	315.00	268.09
	CONNECT 3D		
2RXFPW	Radeon 9200SE VO AGP 64MB	36.50	31.07
2RXCPW	Radeon 9200SE VO AGP 128MB	40.50	34.47
2RXHPW	Radeon 9200SE DVI VO AGP 64MB	37.50	31.92
2RXJPW	Radeon 9200SE DVI VO AGP 128MB	42.00	35.75
2C9YPW	Radeon 9200 DVI VO AGP 128MB	54.50	46.39
2RXSPW	Radeon 9200 DVI VO AGP 256MB	64.00	54.47
2VDPPW	Radeon 9600SE DVI VO AGP 128MB	66.50	56.60
2LJMPW	Radeon 9600 DVI VO AGP 128MB	81.00	68.94
2RXRPW	Radeon 9600 DVI VO AGP 256MB	89.49	76.17
2VDRPW	Radeon 9600 XT DVI VO AGP 128MB	121.00	102.98
31G5PW	Radeon 9600 XT DVI VO AGP 256MB	130.00	110.64
2C9ZPW	Radeon 9800 Pro DVI VO AGP 128MB	180.00	153.20
2VDSPW	Radeon 9800 XT DVI VO AGP 256MB	365.00	310.64
2W4KPW	All-in-Wonder 9200SE AGP 64MB	125.00	106.39
2RXWPW	All-in-Wonder 9800 Pro AGP 128MB	304.00	258.73
	MSI GeForce		
2M4PPW	GeForce 4 MX440SE VO PCI 64MB	45.50	38.73
2MTCPW	GeForce 4 MX440-8X VO AGP 64MB	33.49	28.51
2M5JPW	FX5200 VO AGP 128MB	43.50	37.03
2M5KPW	FX5200 DVI VO AGP 128MB	56.99	48.51
2Q8VPW	FX5200 VIVO Pcin AGP 128MB	100.00	85.11
30FRPW	FX5600XT DVI VO AGP 128MB	78.00	66.39
30FTPW	FX5700 DVI VO AGP 128MB	106.92	91.00
30FVPW	FX5700 DVI VIVO AGP 256MB	119.00	101.28
2W01PW	FX5700 Ultra DVI VO AGP 128MB	136.00	115.75
30FWPW	FX5900XT DVI VIVO AGP 128MB	150.88	128.41
2W02PW	FX5950 Ultra DVI VIVO AGP 256MB	295.00	251.07
	XFX GeForce		
2VKKPW	FX5600XT 128MB AGP DVI 128MB	75.00	63.83
2VKMPW	FX5600XT 128MB AGP DVI inc gamepad	82.50	70.22
2VKTPW	FX5700 128MB DVI VO 128MB	104.00	88.51
30LDPW	FX5700 256MB DVI VO 256MB	113.00	96.17
2VKVPW	FX5700 Ultra 128MB DVI VO 128MB	146.00	124.26
33HFPW	FX5900XT 128MB DVI VO 128MB	156.00	132.77

Sound Cards

quicklinx	CREATIVE	inc VAT	ex VAT
2S1DPW	SoundBlaster Live 5.1 Digital	26.00	22.13
18C2PW	SB Extigy	126.00	107.24
2LJTPW	SB MP3+ USB	34.50	29.37
2S2QPW	Audigy LS	51.50	43.83
2S2RPW	Audigy 2 ZS	85.50	72.77
2S2SPW	Audigy 2 ZS Platinum Pro	167.00	142.13
2S2TPW	Audigy 2 NX	83.50	71.07

Networking

quicklinx	DABSVALUE	inc VAT	ex VAT
2J7TPW	5 Port 10/100Mbps	11.50	9.79
2J7VPW	8 Port 10/100Mbps	13.00	11.07
1Y30PW	16 Port 10/100Mbps	35.00	29.79
1Y31PW	10/100 RJ45 PCI	5.75	4.90
28V1PW	10/100 CardBus	11.50	9.79
28V3PW	10/100 USB2	12.00	10.22
2MBCPW	802.11b 11Mbps PCMCIA	15.50	13.20
2Q2ZPW	802.11b 11Mbps USB Stick	17.50	14.90
2SPFPW	802.11b 11Mbps PCI	17.50	14.90
2W03PW	Bluetooth Class 2 USB	14.75	12.56
2Q8MPW	Bluetooth Class 1 USB	19.50	16.60

Modems/ADSL

quicklinx	DABSVALUE	inc VAT	ex VAT
14X9PW	56k PCI Soft Conexant	9.25	7.88
14XBPW	56k PCI Controllerless Voice Intel	9.99	8.51
14XFPW	56k Serial Voice Intel	17.50	14.90
25BWPW	External USB	16.00	13.62
86LPW	PCMCIA	21.50	18.30
14XKPW	ADSL PCI Conexant	19.50	16.60
17P6PW	ADSL USB	17.50	14.90
17P8PW	ADSL Conexant Router 4Port	37.50	31.92
2LPZPW	802.11b ADSL 4 Port Router	59.00	50.22

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- Output connections to analog monitor (up to 2048x1536), TV (up to 1024x768) & digital LCD panel
- Dual integrated 10-bit per channel 400 MHz DACs
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- HYDRAVISION™ multi-monitor management software Support AGP 8X/4X/2X

quicklinx	CREATIVE Radeon	inc VAT	ex VAT
2Z20PW	9200SE 128MB DDR AGP VO 128MB	45.00	38.30
2Z21PW	9600 256MB DDR AGP VO 256MB	100.00	85.11

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- 256MB DDR AGP Video Out

quicklinx	DABSVALUE GeForce/Radeon	inc VAT	ex VAT
10MNPW	GeForce 2 MX 400 64MB AGP	22.00	18.73
33FPPW	MX4000 64MB DDR AGP VO	28.00	23.83
2GM9PW	FX5200 DVI VO 128MB AGP	40.00	34.05
2SSTPW	FX5200 VO 128MB PCI	55.00	46.81
2HZLPW	FX5600 Ultra DVI VO 128MB AGP	99.00	84.26
2Q7FPW	FX5600 Personal Cinema 128MB AGP	110.00	93.62
33FTPW	FX5900XT DVI VO 128MB DDR AGP	140.00	119.15
30RFPW	7000 DVI VO 64MB DDR AGP	23.50	20.00
30RJPW	9200SE DVI VO PCI 128MB DDR PCI	42.50	36.17
30RQPW	9600XT DVI VO 128MB DDR AGP	98.00	83.41
30RWPW	9800 Pro AIW 128MB DDR AGP	235.00	200.00
30RVPW	9800XT DVI VO 256MB DDR AGP	299.00	254.47

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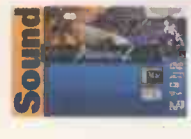

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3343PW	32890 USB2 DVD+-R/RW/RAM 4x	131.92	155.00

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30FBPW	4.7GB DVD+/-RW 8x4x24x FW & USB	133.00	113.20
30FDPW	4.7GB DVD+/-RW 8x4x24x internal	84.00	71.49
2SDGPW	P5 CD-RW, 52x32x52x USB2	62.00	52.77
2SDBPW	Mobile CD-RW/DVD 24x24x24x & 8x	89.00	75.75

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2VQGPW	DRU-530A DVD+/-RW/DVD+RW	128.07	109.00
2VQHPW	DRX-530UL DVD+/-RW External	199.75	170.00

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- Dabs value Silver 80min 700MB CD-Rs
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- DVD+-R/RW 8x

NEC

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- Just Link and Just Speed Technology
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- Best Combination as using a DVD+R/RW,DVD-R/RW,CD-RW,DVD,CD
- Calculating the optimum laser power and adjusting it in real-time
- Dust-proof design

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16xDVD 52r52w32rw

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£38.00 (£32.34 ex VAT)

- CD-RW & DVD-ROM in one mechanism
- Adopting Superlink (Buffer Under Run Proof Technology)
- Supporting DVD-R, DVD-RW, DVD-RAM Discs Read: Multi Read

SAMSUNG

DVD+-R/RW/RAM 8x

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- Writes to DVD+R (8x), DVD-R (8x), DVD+RW (4x), DVD-RW (2x), DVD-RAM (3x), DVD-ROM (12x), CD-R (24x) & CD-RW (16x)
- Interface E-IDE/ATAPI
- 2MB buffer mem.

LG

Optical Drives

quicklinx	AOPEN	inc VAT	ex VAT
12NTPW	CD-956E PRO Retail IDE 56xCD	14.00	11.92
30S3PW	DVD-1648 Multicol IDE 16xDVD 48xCD	23.00	19.58
2PSDPW	DRW-4410 Pro IDE DVD+R/RW 4x	63.00	53.62
	ASUS		
2J6NPW	CRW-5224U USB2 52r 52w 24rw	42.50	36.17
	FREECOM		
2CLJPW	Traveller II+ U2/CB 8xDVD24r24w10rw	195.00	165.96
30STPW	Classic 8x DVD+-R/RW IDE 8x	93.99	80.00
30SVPW	Classic 8x DVD+-R/RW Black IDE 8x	93.99	80.00
30SXPW	FC-1 Cardreader IDE 52r 52w 32rw	45.50	38.73
30T0PW	Cardreader Black IDE 52r 52w 32rw	45.50	38.73
2HMGPW	FX-1 USB 2 52r 52w 24rw	89.49	76.17
221MPW	FS-1 USB 2 24r 24w 10rw	99.00	84.26
2P8NPW	FS-1 USB 2 8xDVD 24r 24w 10rw	129.00	109.79
2RV7PW	FS-1 CardBus 8xDVD 24r 24w 10rw	140.00	119.15
2RV6PW	FX-5 USB 2 16xDVD 48r 48r 24rw	105.00	89.37
30T1PW	Classic DVD+-R/RW USB2 8x	130.00	110.64
30T2PW	FX-50 DVD+-R/RW U2&F 8x	177.99	151.49
	LITEON		
30M6PW	XJ-HD-166 Retail IDE 16xDVD 48xCD	21.00	17.88
30M7PW	Retail IDE 16xDVD 52r 52w 32rw	45.50	38.73
30M9PW	LDW-S4115X Retail USB2 DVD+-R/RW 4x	119.00	101.28
2Z3PPW	LDW-851S Retail IDE DVD+-R/RW 8x	75.00	63.83
	LG		
30V8PW	GRD-B161 Black IDE 16xDVD 48xCD	22.00	18.73
2T21PW	GCE-8525B IDE 52r 52w 32rw	27.50	23.41
300YPW	GSA-4081B OEM IDE DVD+-R/RW/RAM 8x	90.00	76.60
30P8PW	GSA-4081B IDE DVD+-R/RW/RAM 8x	78.00	66.39
33XHPW	GSA-4082BA OEM	74.99	63.83
	MSI		
2M3PPW	C52 IDE 52xCD	14.00	11.92
2M3QPW	C52-Black IDE 52xCD	14.00	11.92
2M3MPW	D16 IDE 16xDVD 48xCD	21.50	18.30
2M3NPW	D16-Black IDE 16xDVD 48xCD	21.50	18.30
2Q7PPW	CR52-M IDE 52r 52w 32rw	25.50	21.71
2YYBPW	CR52 Active Panel IDE 52r 52w 32rw	26.50	22.56
2R86PW	X48-A IDE 16xDVD 48r 48w 24rw	37.99	32.34
2T31PW	DR4-A IDE DVD+-R/RW 4x	50.00	42.56
229TPW	DR8-A IDE DVD+-R/RW 8x	89.00	75.75
2ZBVPW	DR8-A Black IDE DVD+-R/RW 8x	89.00	75.75
	NEC		
2HVGPW	ND-1300A OEM IDE DVD+-R/RW 4x	65.00	55.32
30SKPW	ND-1300A Black IDE DVD+-R/RW 4X	65.00	55.32
2ZD6PW	ND-2500A IDE DVD+-R/RW 8x	74.00	62.98
	OPTORITE		
30M2PW	CD-5205 IDE 52r 52w 24rw	22.99	19.57
30M4PW	DD-0201 IDE DVD+R/RW 4x	54.00	45.96
30M5PW	DD-0401 IDE DVD+R/RW 8x	88.50	75.32
	PLEXTOR		
2WKFPW	PX-W5224TA/T3C IDE 52r 52w 32rw	45.00	38.30
2LSRPW	Premium/T3 IDE 52r52w32rw	65.00	55.32
2LSSPW	Premium/T3B IDE 52r52w32rw	65.00	55.32
2WKGPW	PX-W4012SE External SCSI 40r40w12rw	219.00	186.39
2FQYPW	PX-504A IDE DVD+R/RW	70.00	59.58
2THWPW	PX-708A/T3B Black IDE DVD+-R/RW 8x	120.00	102.13
2S17PW	PX-708A/T3 IDE DVD+-R/RW 8x	120.00	102.13
2THXPW	PX-708UF USB2 DVD+-R/RW 4x	249.00	211.92
	SAMSUNG		
2GZFPW	SC-152LRBS Retail IDE 52xCD	13.49	11.49
2DDJPW	SC-152AEBB Black IDE 52xCD	13.49	11.49
2X5FPW	SD-616EEB OEM IDE 16xDVD 48xCD	21.00	17.88
2ZZHPW	SD616EEBB BLACK IDE 16xDVD 48xCD	21.50	18.30
2ZZGPW	SD-616ERP IDE 16xDVD 48xCD	23.00	19.58
2VHCPW	SW252FEN OEM IDE 52r 52w 32rw	21.50	18.30
2VHDPW	SW252FRNS RP IDE 52r 52w 32rw	23.00	19.58
2HTMPW	SM352BRNS IDE 16xDVD 52r52r24rw	39.00	33.20
2M9ZPW	SM352BEN OEM IDE 16xDVD 52r 52r 24rw	37.99	32.34
	SONY		
2T3DPW	CD-RW 52x32x52x Int IDE OEM	23.50	20.00
2W4RPW	CD-RW 52x32x52x Int Black	24.70	21.00
2VCJPW	CRX-300E-B2 Combo Black OEM	37.60	32.00
2T3FPW	CRX-300E Combo Int IDE OEM	38.80	33.00
3094PW	DWU-14A DVD+/-RW IDE OEM	72.85	62.00
3355PW	DVD+/-RW 8x Internal OEM Black	88.12	75.00
3356PW	DVD+/-RW 8x Internal OEM Silver	90.47	77.00
3357PW	DWU-50A Slim DVD+/-RW Internal	222.07	189.00

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2SQQPW	40GB UDMA100 2MB 7200rpm	36.50	31.07
2BDNPW	60GB UDMA100 2MB 7200rpm	41.50	35.32
2QD8PW	80GB UDMA100 2MB 7200rpm	45.50	38.73
	HITACHI/IBM Deskstar		
2PH7PW	7K250 40GB UDMA100 2MB 7200rpm	40.50	34.47
30QPPW	7K250 60GB UDMA100 2MB 7200rpm	43.00	36.60
2PH8PW	7K250 80GB UDMA100 2MB 7200rpm	46.00	39.15
2PH9PW	7K250 80GB SATA150 8MB 7200rpm	53.50	45.54
2PHDPW	7K250 120GB UDMA100 2MB 7200rpm	60.50	51.49
2PHFPW	7K250 120GB UDMA100 8MB 7200rpm	69.00	58.73
2PHLPW	7K250 120GB SATA150 8MB 7200rpm	75.50	64.26
2PHMPW	7K250 160GB UDMA100 2MB 7200rpm	73.50	62.56
2PHNPW	7K250 160GB UDMA100 8MB 7200rpm	80.00	68.09
2PHPPW	7K250 160GB SATA150 8MB 7200rpm	84.50	71.92
2VN3PW	7K250 200GB UDMA100 8MB 7200rpm	117.50	100.00
2PHQPW	7K250 250GB UDMA100 8MB 7200rpm	144.00	122.56
2PHRPW	7K250 250GB SATA150 8MB 7200rpm	184.00	156.60
	SAMSUNG Spinpoint P80		
20D2PW	80GB UDMA133 2MB 7200rpm	48.00	40.86
2ZDNPW	80GB SATA150 8MB 7200rpm	55.50	47.24
2S0TPW	120GB UDMA133 2MB 7200rpm	63.00	53.62
2ZDPPW	120GB UDMA133 8MB 7200rpm	65.50	55.75
2ZDQPW	120GB SATA150 8MB 7200rpm	70.50	60.00
2S6SPW	160GB UDMA133 2MB 7200rpm	79.00	67.24
2ZDRPW	160GB UDMA133 8MB 7200rpm	80.50	68.51
2ZDTPW	160GB SATA150 8MB 7200rpm	84.00	71.49
	WESTERN DIGITAL		
18HFPW	Caviar 120GB UDMA100 8MB 7200rpm	70.00	59.58
2N5BPW	Caviar 120GB SATA150 8MB 7200rpm	76.50	65.11
12NMPW	Caviar 160GB UDMA100 2MB 7200rpm	75.00	63.83
2J7ZPW	Caviar 160GB UDMA100 8MB 7200rpm	81.00	68.94
25T3PW	Caviar 200GB UDMA100 2MB 7200rpm	104.00	88.51
2WQ9PW	Caviar 200GB UDMA100 2MB 7200rpm	91.50	77.88
25T5PW	Caviar 200GB UDMA100 8MB 7200rpm	100.00	85.11
2N7DPW	Caviar 250GB SATA150 8MB 7200rpm	168.00	142.98
2GKZPW	Raptor 36GB SATA150 8MB 10000rpm	92.50	78.73

External Hard Disks

quicklinx	MAXTOR	inc VAT	ex VAT
2LYTPW	5000DV 160GB U2/FW 8MB 7200rpm	147.00	125.11
2VDGPW	One Touch 120GB USB2 2MB 7200rpm	115.00	97.88
2VDHPW	One Touch 200GB U2/FW 8MB7200rpm	178.00	151.49
2VDKPW	One Touch 250GB U2/FW 8MB7200rpm	205.00	174.47
2VDLPW	MAC 250GB Fire 8MB 7200rpm	182.00	154.90
2VDMPW	One Touch 300GB U2/FW 2MB5400rpm	228.00	194.05
	LACIE		
30FNPW	Data Bank 20GB USB2	135.00	114.90
30FPPW	Data Bank 40GB USB2	170.00	144.69
30FJPW	Data Bank 20GB Firewire & USB2	150.00	127.66
30FMPW	Data Bank 40GB Firewire & USB2	209.00	177.88
255PPW	d2 80GB 7200rpm Firewire	114.00	97.03
255QPW	d2 120GB 7200rpm Firewire	119.00	101.28
2G6PPW	d2 160GB 7200rpm Firewire	130.00	110.64
2ZD7PW	d2 160GB 7200rpm Firewire800&USB2	135.00	114.90
2G6LPW	d2 200GB 7200rpm Firewire	165.00	140.43
2ZD8PW	d2 200GB 7200rpm Firewire800&USB2	165.00	140.43
2C66PW	d2 250GB 7200rpm Firewire	180.00	153.20
2ZD9PW	d2 250GB 7200rpm Firewire800&USB2	175.00	148.94
2ZDKPW	d2 320GB 7200rpm Firewire800&USB2	220.00	187.24
2N9FPW	d2 320GB 7200rpm Firewire	249.00	211.92
2ZDLPW	d2 400GB 7200rpm Firewire800&USB2	315.00	268.09
2C6MPW	d2 400GB 7200rpm Firewire	340.00	289.37
2ZDMPW	d2 500GB 7200rpm Firewire800&USB2	395.00	336.17
2SDHPW	P3 40GB USB2	76.00	64.69
2SDJPW	P3 80GB USB2	75.00	63.83
2SDLPW	P3 80GB Firewire	85.00	72.34
2SDKPW	P3 80GB 7200rpm USB2	105.00	89.37
2SDMPW	P3 80GB 7200rpm Firewire	115.00	97.88
2SDNPW	P3 250GB 7200rpm Firewire	160.00	136.17

Media

quicklinx	MAXTOR	inc VAT	ex VAT
32SQPW	Bulkpaq CD-R 48x 80min 25pk	7.00	5.96
32SRPW	Datasafe CD-R 52x 80min Silver 25pk	7.50	6.39
32SSPW	Datasafe CD-R 52x 80min Printable 25pk	8.00	6.81
32SVPW	Datasafe CD-R 52x 80min Silver 100pk	18.00	15.32
32SXPW	Datasafe CD-R 52x 80min Printable 100pk	18.00	15.32
32T1PW	Datawrite CD-RW 12x 80min 10pk	8.00	6.81
32T3PW	Bulkpaq DVD-R 4x Printable 25pk	12.50	10.64
32T5PW	Datasafe DVD-R 4x Ritek (G04) 25pk	16.50	14.05
32T6PW	Datawrite DVD-R 4x Yellow 25pk	14.00	11.92
32T7PW	Datawrite DVD-R 4x Red 25pk	10.00	8.51
32TBPW	Datawrite DVD-R 4x Printable 25pk	15.00	12.77
32TCPW	Bulkpaq DVD+R 1x in 25pk	18.50	15.75
32TCPW	Datasafe DVD+R 8x Ritek 25pk	26.50	22.56
32TFPW	Datawrite DVD+R 2.4x Yellow 25pk	19.99	17.02
32THPW	Bulkpaq DVD+RW 1x in 25pk	20.00	17.03
32TJPW	Bulkpaq DVD+RW 2.4x Yellow 10pk	13.00	11.07
32TKPW	Datawrite DVD-RW 4.7Gb 10pk	11.75	10.00

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quicklinx	CRUCIAL MEMORY			
WWLPW	256MB 184Pin	DIMM PC2100	DDR RAM Non-Parity	CL2.5
SHWPW	256MB 168Pin	DIMM PC133	SDRAM Non-Parity	CL2
	128MB 168Pin	DIMM PC133	SDRAM Non-Parity	CL2
	512MB 184Pin	DIMM PC2100	DDR RAM Non-Parity	CL2.5
SGTPW	128MB 168Pin	DIMM PC100	SDRAM Non-Parity	CL2
SHVPW	256MB 168Pin	DIMM PC133	SDRAM Non-Parity	CL3

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Iomega Desktop 120MB External Hard Drive

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quicklinx 30PFPW Go

- 48x Writing CD/DVD Write Speed, 48x CD/DVD Read, 24x CD/DVD Re-Write
- PC/Mac compatible

quicklinx	IOMEGA	inc VAT	ex VAT
30PBPW	Host Powered 40 U2	114.00	97.03
3364PW	Host Powered 60 U2	140.00	119.15
30PCPW	Desktop 80 U2	112.00	95.32
30PFPW	Desktop 120 U2/Fire	138.00	117.45
30PGPW	Desktop 250 U2/Fire	227.00	193.20

iomega

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The quick way to save, share and manage your information.

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- Hot-swapable
- Media not included

iomega

DiamondMax Plus9 80.0 SATA150 8MB 7200rpm

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Expand your computer's storage capacity with the high performance DiamondMax Plus 9 hard drive.

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2LYNPW	MaXLine II 250GB UDMA133 2MB 5400	152.00	129.37
2P3JPW	MaXLine II 300GB UDMA133 2MB 5400	188.00	160.00
24YDPW	40GB UDMA133 2MB 7200rpm	40.00	34.05
24YFPW	60GB UDMA133 2MB 7200rpm	48.50	41.28
24YHPW	80GB UDMA133 2MB 7200rpm	51.00	43.41
259JPW	80GB UDMA133 8MB 7200rpm	54.50	46.39
259XPW	80GB SATA150 8MB 7200rpm	58.00	49.37
259YPW	120GB UDMA133 2MB 7200rpm	64.00	54.47
259ZPW	120GB UDMA133 8MB 7200rpm	69.50	59.15
25B0PW	120GB SATA150 8MB 7200rpm	75.00	63.83

Maxtor

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Maximum performance, storage capacity and reliability.

quicklinx	FREECOM U Series X/Barracuda	inc VAT	ex VAT
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2LK5PW	FHD-2 20GB 20155 USB 2	104.00	88.51
2LK9PW	FHD-2 40GB 20156 USB 2	140.00	119.15
2LK7PW	FHD-2 60GB 20690 USB 2	190.00	161.71
2N01PW	FHD-2 20GB 20686 U2/Fire	123.00	104.69
2N02PW	FHD-2 40GB 20688 U2/Fire	157.00	133.62
2N03PW	FHD-2 60GB 20403 U2/Fire	202.00	171.92
30X2PW	FHD-2 PRD 20GB 21841 USB 2	113.00	96.17
30X3PW	FHD-2 PRO 40GB 21842 USB 2	137.00	116.60
30X4PW	FHD-2 PRO 80GB 21844 USB 2	232.00	197.45
30X5PW	FHD XS 20GB 20404 USB 2	139.00	118.30

FREECOM TECHNOLOGIES

Barracuda 7200.7 120GB SATA150 7200rpm

£75.00 (£63.83 ex VAT)

quicklinx 2FZWPW Go

- 8MB Cache/Buffer Size
- 9.0ms Average Seek Time
- Interface Type Serial ATA-150

quicklinx	SEAGATE DiamondMax/MaXLine	inc VAT	ex VAT
25DDPW	Plus8 40 UDMA133 2 7200	37.50	31.92
2G24PW	Plus9 60 UDMA133 2 7200	41.00	34.90
2FZNPW	Plus9 80 UDMA133 2 7200	41.50	35.32
2FZQPW	Plus9 120 UDMA133 8 7200	51.50	43.83
2FZRPW	Plus9 120 SATA150 8 7200	55.00	46.81
2FZSPW	Plus9 160 UDMA133 8 7200	64.50	54.90
2FZVPW	Plus9 160 SATA150 8 7200	69.00	58.73
2FZWPW	Plus9 200 UDMA133 8 7200	75.00	63.83
2FZYPW	Plus9 200 SATA150 8 7200	79.00	67.24
2G0DPW	Plus II 250 UDMA133 8 7200	86.00	73.20
2G01PW	Plus II 250 SATA150 8 7200	93.50	79.58

Seagate

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2SD5PW	Mobile Hard Drive 20GB FireWire	90.00	76.60
2SCYPW	Mobile Hard Drive 40GB USB2	105.00	89.37
2SD6PW	Mobile Hard Drive 40GB FireWire	119.00	101.28
2SCZPW	Mobile Hard Drive 80GB USB2	185.00	157.45
2SD7PW	Mobile Hard Drive 80GB FireWire	205.00	174.47

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Intel® Pentium® 4 processor is designed to deliver performance across applications & usages where end users can truly appreciate it.

quicklinx	INTEL	inc VAT	ex VAT
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2HNLPW	Pentium 4 2.6 512KB	130.00	110.64
2HNMPW	Pentium 4 2.8 512KB	139.00	118.30
2HNNPW	Pentium 4 3.0 512KB	169.00	143.83
2PFGPW	Pentium 4 3.2 512KB	209.00	177.88
2W0YPW	Pentium 4 3.2 EE 2MB	649.00	552.34
313ZPW	Pentium 4 3.4 512KB	309.00	262.98
3141PW	Pentium 4 3.4 EE 2MB	699.00	594.90
3144PW	Pentium 4E 2.8 1MB	139.00	118.30

AMD Athlon™ 64 3400+ Processor²

£289.00 (£245.96 ex VAT)

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Only AMD64 technology runs today's 32-bit & tomorrow's 64-bit software.

quicklinx	AMD Athlon™ XP	inc VAT	ex VAT
2BP7PW	2000+ 1.67Ghz 256Kb SoA 266Mhz	40.00	34.05
2WPXPW	2200+ 1.8Ghz 256Kb SoA 266Mhz	43.00	36.60
2HSXPW	2200+ 1.8Ghz 256Kb SoA 266Mhz	43.00	36.60
2VD4PW	2400+ 2Ghz 256KB SoA 266Mhz	49.00	41.71
24T9PW	2400+ 2Ghz 256KB SoA 266Mhz	49.00	41.71
2CYGPW	2500+ 1.83Ghz 512Kb SoA 333Mhz	56.00	47.66
2CYHPW	2600+ 512Kb SoA 333Mhz	63.00	53.62
28Z6PW	2700+ 2.17Ghz 256Kb SoA 333Mhz	75.00	63.83
2CYKPW	2800+ 2.08Ghz 512Kb SoA 333Mhz	80.00	68.09
2CYLPW	3000+ 2.17Ghz 512Kb SoA 333Mhz	110.00	93.62
2N71PW	3000+ 2.1Ghz 512Kb SoA 400Mhz	119.00	101.28
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Gigabyte GA-K8N Motherboard

£67.50 (£57.45 ex VAT)

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2LLXPW	GA-8KNXP Intel 875P Socket 478 ATX	151.00	128.51
2W1CPW	GA-8I875 Intel 875P Socket 478 ATX	100.00	85.11
2W1DPW	GA-8I875 ULTRA Intel 875P So478 ATX	123.00	104.69
2LLYPW	GA-8IK1100 Intel 875P Socket 478 ATX	91.00	77.45
2LLZPW	GA-8PENXP Intel 865PE Socket 478 ATX	130.00	110.64
2LMOPW	GA-8IPE1000 PRO Intel 865PE So478 ATX	74.50	63.41
2W1FPW	GA-8IPE1000 PRO 2 Intel 865PE So478	81.00	68.94
2M2KPW	GA-8IPE1000L Intel 865PE So478 MATX	65.00	55.32
2LM5PW	GA-8IPE1000MK Intel 865PE So478 MATX	65.50	55.75
2LM6PW	GA-8IG1000 PRO Intel 865G So478 ATX	82.50	70.22
2LM9PW	GA-8IG1000 Intel 865G Socket 478 ATX	68.50	58.30
2LMPPW	GA-8IG1000MK Intel 865G So478 MATX	71.00	60.43
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- VIA K8T800
- Socket 754

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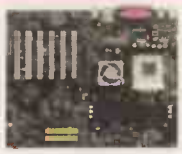
2PV9PW	KT6 Delta-FISR VIA KT600 SoA ATX	65.00	55.32
2Q7SPW	KT6 Delta-LSR VIA KT600 SoA ATX	54.00	45.96
2223PW	MS-6378-L VIA KLE133 SoA MATX	32.00	27.24
2HZRPW	KM2M Combo-L VIA KM266 SoA MATX	38.00	32.34
30JSPW	KM4M-L VIA KM400 Socket A MATX	41.50	35.32
2VXBPW	KT4AV-L VIA KT400A Socket A ATX	42.50	36.17
2BDKPW	K7N2G-L nForce 2 Socket A ATX	69.00	58.73
2HZVPW	K7N2 Delta-ILSR nForce 2 SoA ATX	75.50	64.26
2M3GPW	K7N2 Delta-L nForce 2 Socket A ATX	53.50	45.54
2R4MPW	K8T Neo-FIS2R VIA K8T800 So754 ATX	93.50	79.58

SoA VIA KT400A ATX A L

£38.50 (£32.77 ex VAT)

quicklinx > 2R62PW Go



- Memory Slots: DIMM x 3
- Chipsets: VIA Apollo KT400+VT8235
- CPU Bus Clock : 400Mhz (EV6)
- AGP 8X/ DDR400*/ 5.1 channel/ ATA133/ LAN on-board

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S478 Intel 875P ATX A L R

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- Memory Slots: DIMM x 3
- Chipsets: VIA Apollo KT400+VT8235
- CPU Bus Clock : 333Mhz (EV6)
- AGP 8X/ DDR400*/ 5.1 channel/ ATA133/ LAN on-board

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Sonata Quiet Midi Tower

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- 3.0 GHz Compatible
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Antec The Power of You

Minuet Slimline PC Case

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- SmartPower 220Watt ATX12V power supply
- Front mounted USB & IEEE 1394 (FireWire, i.Link) ports
- Front Audio ports
- 3 Drive Bays in easy to install Flip-UP Drive Cage

Antec The Power of You

Super LANBoy EU

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- Clear side window
- Front ports: 2x audio, 2x USB
- One low-speed 120mm fan (rear)
- One low-speed 120mm blue LED fan (front)

Antec The Power of You

Midi Tower KOB-24

£28.00 (£23.83 ex VAT)

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- 3x Ext 5.25"
- 2x Ext 3.5"
- 1x Int 3.5"
- AMD/P4 PSU

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£69.99 (£59.57 ex VAT)

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- Case Dimension: H440xW180xD460mm
- Ultra-light: only 4kg (8.8 lb)
- Drive Bays: 5.25"x3, 3.5"x2 (external), 3.5"x2 (internal)
- Thermaltake EL flash fire ball in front panel

Tt Thermaltake

A600B Super Tower

£69.00 (£58.73 ex VAT)

quicklinx > 2BK3PW Go

- Black
- 350W
- ATX/microATX/Full AT 5.25" x 4/0, 3.5" x2/1 (external/internal)
- 3.5" HDD cage x2 (option)

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Processors

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2X4ZPW	Duron 1.8Ghz	32.00	27.24
	INTEL Celeron Boxed		
24SCPW	Celeron 2.0Ghz	47.00	40.00
2HNHPW	Celeron 2.4Ghz	50.00	42.56
2PFDPW	Celeron 2.5Ghz	60.00	51.07
2PFFPW	Celeron 2.6Ghz	63.00	53.62
2VCKPW	Celeron 2.7Ghz	79.00	67.24
2VCLPW	Celeron 2.8Ghz	85.00	72.34

Motherboards

quicklinx	ABIT	inc VAT	ex VAT
2Q4ZPW	IC7-MAX3 Intel 875P Socket 478 ATX	142.00	120.86
2QRXPW	IS7-V Intel 865PL Socket 478 ATX	55.00	46.81
2TCYPW	AN7-Guru nForce 2 Socket A ATX	76.50	65.11
2QRZPW	KD7-A VIA KT400A Socket A ATX	40.50	34.47
2Q50PW	KV7 VIA KT600 Socket A ATX	49.00	41.71
28J9PW	NF7 nForce 2 18D Socket A ATX	52.00	44.26
293RPW	NF7-S nForce 2 18D Socket A ATX	70.00	59.58
2BRSPW	NF7-M nForce 2 18G Socket A ATX	64.50	54.90
2Q51PW	VA-10 VIA KM400 Socket A MATX	37.50	31.92
2TC2PW	KV8-MAX3 VIA K8T800 Socket754 ATX	117.00	99.58
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30XMPW	P4TCA-Pro Intel 875P S478 ATX	126.00	107.24
30XNPW	P4TSE-D2 Intel 865PE S478 ATX	51.00	43.41
30XPPW	P4TSV Intel 865G S478 uATX	56.00	47.66
30XVPW	U8798-Pro VIA P4X400 S478 ATX	31.00	26.39
30XWPW	U8668-D VIA P4M266A S478 MATX	32.50	27.66
30XYPW	M7VIT GRAND VIA KT600 SoA ATX	38.00	32.34
30XZPW	M7VIZ VIA KM400 SoA uATX	38.00	32.34
30Y0PW	M7VIQ VIA KM266 SoA uATX	32.00	27.24
30Y3PW	M7NCD nForce 2 SoA ATX	37.50	31.92
30Y5PW	M7NCD-Pro nForce 2 SoA ATX	43.50	37.03
30Y6PW	M7NCG-400 nForce 2 SoA uATX	46.00	39.15
30Y8PW	K8NHA-Pro nForce 3 S754 ATX	62.00	52.77
30YBPW	K8VHA-Pro VIA K8T800 S754 ATX	61.50	52.34
	GIGABYTE		
28SSPW	GA-7DXE AMD 761/VIA Socket A ATX	35.50	30.22
2QP6PW	GA-7N400EL nForce 2 Socket A ATX	48.00	40.86
2NLWPW	GA-7VT600L VIA KT600 Socket A ATX	46.50	39.58
2QPDPW	GA-K8N nForce 3 Socket 754 ATX	67.50	57.45
2W2ZPW	GA-8NNXP-940 nForce 3 Socket 940 ATX	148.00	125.96
2QPKPW	GA-K8VT800M VIA K8T800 So754 MATX	60.50	51.49
2QPNPW	GA-K8VT800 VIA K8T800 So754 ATX	67.50	57.45
	MICROSTAR		
31G6PW	875P Neo-FISR Intel 875P Socket 478 ATX	105.00	89.37
30JMPW	865PE Neo2-PFISR Intel 865PE So478 ATX	83.99	71.49
30JPPW	865PE Neo2-PFS Intel 865PE So478 ATX	70.49	60.00
31G7PW	865G Neo2-PLS Intel 865G Socket 478 ATX	68.00	57.88
2H42PW	865G Neo2-LS Intel 865G Socket 478 ATX	65.00	55.32

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2RVMPW	OVERTURE UK 380W	199.00	169.37
2QJFPW	MINUET-UK	56.00	47.66
2QJHPW	SLK1600UK	44.50	37.88
2QJJPW	SLK2600AMB UK	51.50	43.83
2QJKPW	SLK3700AMBUK	61.50	52.34
2WG7PW	SLK3700BQE-UK 350W	69.00	58.73
2PZKPW	LANBOY-UK	75.00	63.83
2WC8PW	Super LanBoy EU - No PSU	89.00	75.75
31Q2PW	P160EU	99.00	84.26
2RVDPW	PlusView 1000AMG EU	62.00	52.77
2QJNPW	SX635BII UK	72.00	61.28
2QJPPW	SX835 II UK	72.00	61.28
2QJQPW	SX1040B II UK	87.00	74.05
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29KQPW	H700A 350W ATX 12V	75.00	63.83
2LQ5PW	H700B 350W ATX 12V	75.00	63.83
2LQ9PW	H700C 400W	90.00	76.60
2LQBPW	A600A 350W ATX 12v	105.00	89.36
14P1PW	H600A Super Tower 300W ATX12V	59.00	50.22
2PYBPW	H600B Black Pearl 350W ATX 12v	79.00	67.24
21GDPW	H500A 300W ATX12V	49.00	41.71
2LQCPW	H500B 300W ATX12V	55.00	46.81
2LQDPW	H500C 300W ATX12V	48.00	40.86
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2N15PW	V1000+ Xaser III Black	74.00	62.98
2N16PW	V1000A Xaser III Black-Win	75.00	63.83
2N17PW	V1000C Xaser III Blue	72.50	61.71
2N19PW	V1000D Xaser III Blue-Win	75.00	63.83
2N1BPW	V2000+ Xaser III Silver	95.00	80.85
2N1CPW	V2000A Xaser III Silver-Win	95.00	80.85
2SJSPW	VM2000A LanFire Silver	69.99	59.57
3178PW	VM1000A LanFire Black	67.50	57.45
2SJTPW	VM3000A Skull Silver	85.00	72.34
3179PW	VM1000C Romeo Silver	55.00	46.81

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2CWVPW	Quicken XG	26.43	22.50
2NX2PW	MS Money 2004 Standard	22.32	19.00
2NX3PW	MS Money 2004 Financial Suite	34.07	29.00
2R4SPW	Sage Instant Accounts v10	116.32	99.00
2R4RPW	Sage Instant Payroll v10	81.07	69.00
	ANTIVIRUS/SECURITY		
2H9BPW	McAfee TVD Suite 5 user Pack	198.57	169.00
2H9KPW	McAfee TVD Suite 10 user Pack	410.07	349.00
2SSYPW	McAfee VirusScan Home v8	29.37	25.00
2SSZPW	McAfee VirusScan Pro v8	41.12	35.00
2NYRPW	Symantec Norton AV Small Business Su	175.07	149.00
2PSYPW	Symantec Norton Internet Security	38.77	33.00
	BACKUP		
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248BPW	Symantec Norton Ghost 2003	37.60	32.00
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335MPW	AutoCAD LT 2005	804.87	685.00
2M5FPW	AutoDesk Volo View v3	175.07	149.00
15B6PW	AutoSketch v8	146.87	125.00
33RMPW	IMSI TurboCAD v10 Standard	69.32	59.00
	COMMUNICATIONS		
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2RZ3PW	MS Outlook 2003	92.82	79.00
244TPW	Act v6	116.32	99.00
244VPW	Act v6 5 User	574.57	489.00
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2RYFPW	MS Access 2003	186.82	159.00
2H01PW	MS Visual FoxPro Pro v8	515.82	439.00
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2RZMPW	Visio Standard 2003	163.32	139.00
2RZKPW	Visio Professional 2003	393.62	335.00
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2Z5QPW	Adobe FrameMaker v7.1	see	699.00
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2RZFPW	MS Publisher 2003	135.12	115.00
2N13PW	Quark Xpress v6	1126.82	959.00
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2NPTPW	MS Visual Studio .NET Pro 2003	863.62	735.00
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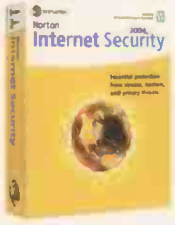

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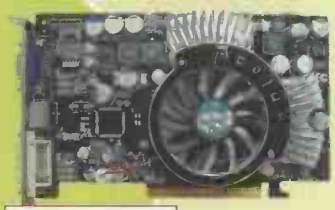

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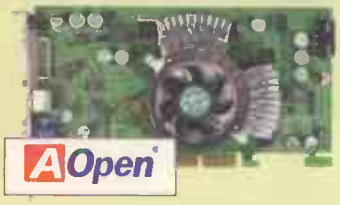

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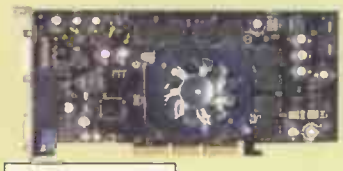

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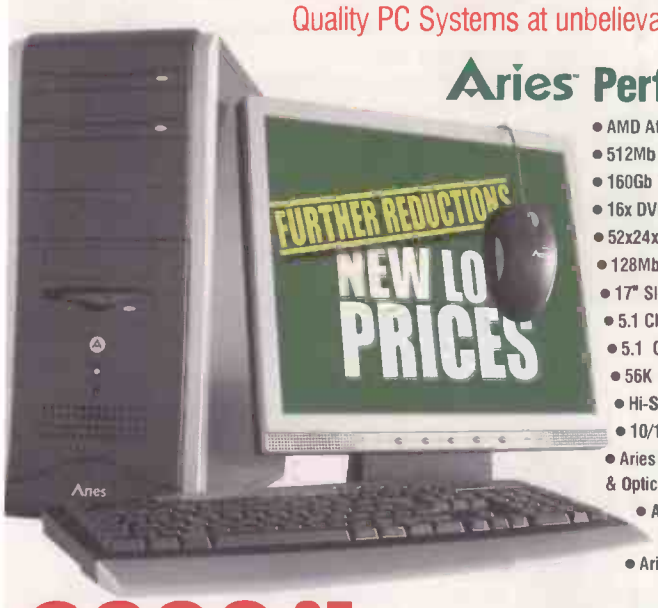

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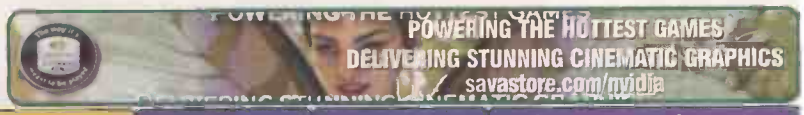

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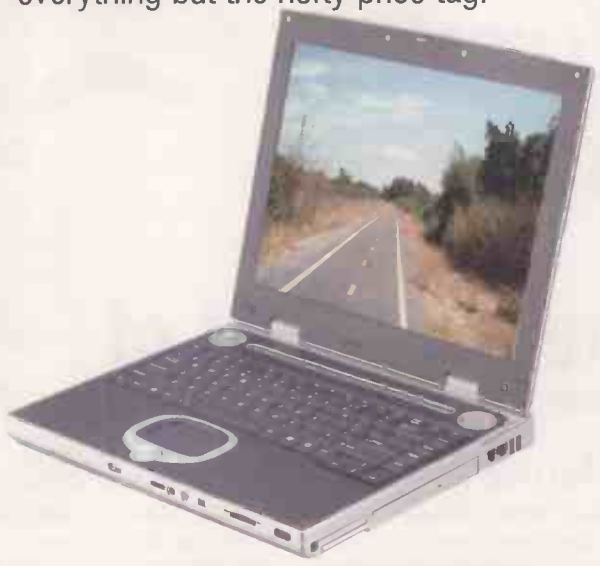

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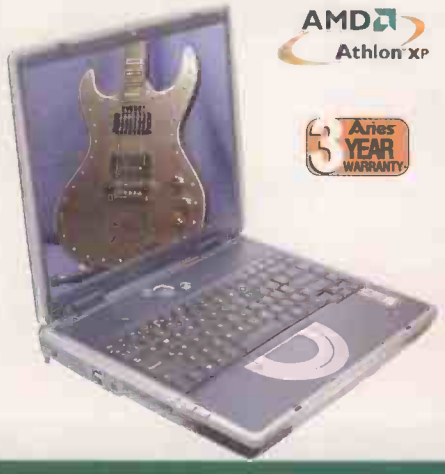

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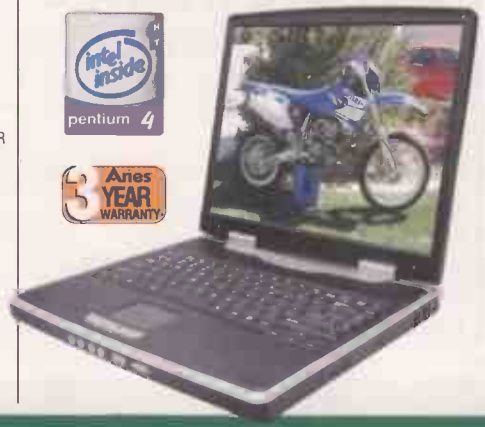

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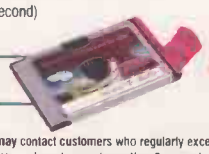

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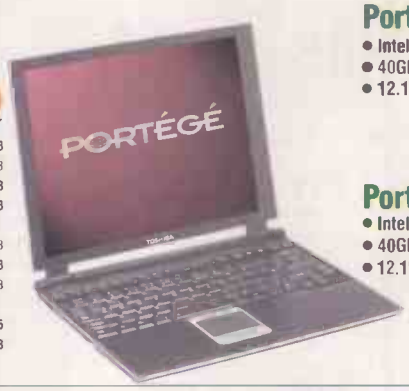

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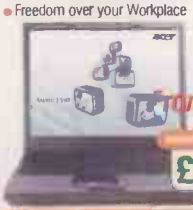

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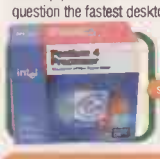

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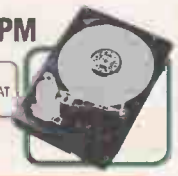

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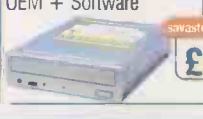

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Available with Hi-Speed USB interface, the LaCie Hard Drive offers fast data transfer rates (up to 480Mbits/s) that are required for substantial jobs like downloading digital photos or saving MP3s.

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CREATIVE MuVo™ TX 256MB

The Creative® MuVo™ TX 256MB downloads up to 4 hours (60 tracks*) of MP3 or 8 hours (120 tracks*) of WMA via its fast USB 2.0 interface. It delivers up to 15 hours of continuous playback from a single AAA battery and includes a blue backlit display and microphone. Creative MediaSource software makes file conversion on the PC fast and easy.

*Based on 4-minute songs at 64kbps in wma, 128kbps in mp3

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CREATIVE Jukebox Zen Xtra

The Creative® Jukebox Zen Xtra gives music lovers the power to enjoy up to 16,000 songs, anywhere. A massive 30Gb hard disk with USB 2.0 connectivity. Navigate using the icon-based interface and scroller control with the help of the extra-large blue backlit display. The rechargeable, removable lithium-ion battery offers up to 14 hours play-time per charge, and high-quality Neodymium stereo earphones complete this versatile system, which can also store photos, documents and other data files.

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CREATIVE MuVo™ Slim

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BenQ Joybee 120

Everyone needs a little joy in their lives, and at 57 x 38 x 12mm, the BenQ Joybee 120 is certainly little.

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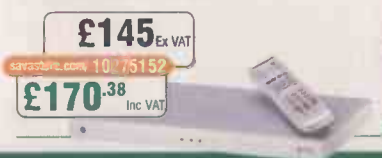

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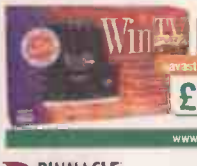

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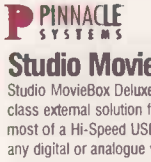

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10262607	MFC-9880	306.35	359.96
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10273130	SmartBase MP360	79.00	92.83
10268007	MP700 Photo	169.00	198.58
10268006	MP730 Photo	234.50	275.54
10245406	PC1210D	456.00	535.80
10245407	PC1230D	496.00	582.80
10275949	Smartbase PC1270D	639.00	750.83
10265474	MPC190	119.00	139.83
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10260126	Stylus DX3200	74.00	86.95
10272479	Stylus Photo CX5400	97.00	113.98
10272480	Stylus Photo CX6400	119.00	139.83
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10268347	PSC 2175	117.05	137.53
10271149	PSC2410	174.90	205.51
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10268184	OfficeJet 4110	118.95	139.77
10275952	OfficeJet 4215	111.00	130.43
10275953	OfficeJet 4255	129.00	151.58
10274510	OfficeJet 5510	156.00	183.30
10264025	OfficeJet 6110	188.00	220.90
10265327	OfficeJet 7110	261.00	306.68
10265328	OfficeJet 7130	298.00	350.15
10265329	OfficeJet 7140dn	378.00	444.15
10275954	OfficeJet 9110	518.00	608.65
10275955	OfficeJet 9120	645.00	757.88
10275956	OfficeJet 9130	751.00	882.43
10275957	LaserJet 3015	249.00	292.58
10275958	LaserJet 3020	281.00	330.18
10275959	LaserJet 3030	340.00	399.50
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10271427	X1150	49.30	57.93
10266108	X1150	49.95	58.69
10275961	X1180	55.00	64.63
10275072	P3150	75.00	88.13
10275073	P3150	75.80	89.07
10275962	X2250	79.00	92.83
10275963	X5250	110.00	129.25
10264064	X125	95.00	111.63
10275964	X125 Pro	114.00	133.95
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10268206	UF590 Business	415.00	487.63
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10274120	HL-5170DN	279.95	328.94
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10274115	HL-2700CN	486.48	571.61
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True-to-life photo quality and crisp black text.

- True-to-life photo quality at up to 4800-optimised dpi colour* • Optional 6-ink colour printing. Compact, reliable, and fast • Up to 17 ppm in black, 12ppm in colour Innovative tools and features to save time and money • On-screen ink-level indicator lets you know when it's time to replace ink cartridges.

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The HP Deskjet 5150 is a fast and versatile printer, offering true-to-life photo quality – with or without borders – at up to 4800-optimised dpi colour. Prints screenshots at the touch of a button. Print cancel button halts unwanted print jobs. On-screen ink-level indicator warns you when you run low on ink.

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- Borderless printing up to 10 x 15 cm – great for photos

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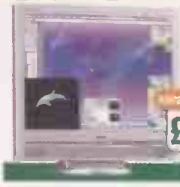

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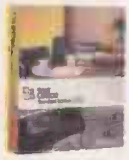

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10268531	FinePix S5000 10x Zoom 3MP	201.50	236.76
10272489	FinePix S7000 Zoom 6MP	359.00	421.83
10274608	FinePix F420 3.1MP 3x Zoom	202.00	237.35
10274609	FinePix F610 6.3MP 3x Zoom	313.00	367.78
	HEWLETT PACKARD		
10270370	PhotoSmart 635 3x Zoom 2MP	99.00	116.33
10268183	Photosmart 735 3x Zoom 3.2MP	109.00	128.08
10265330	Photosmart 935 3x Zoom 5.3MP	160.00	188.00
	KODAK		
10268598	EasyShare CX6200 2MP	59.00	69.33
10268599	EasyShare DX6440 4x Zoom 4MP	139.00	163.33
10273674	Easyshare DX6490 10x Zoom 4MP	209.00	245.58
10268600	EasyShare DX4530 3x Zoom 5MP	141.00	165.68
	MINOLTA		
10272490	Dimage A1 2x Zoom 5MP	459.00	539.33
10272491	Dimage Z1 10x Zoom 3.1MP	195.00	229.13
10272492	Dimage X20 3x Zoom 2MP	89.00	104.58
10267628	Dimage S414 4x Zoom 4.1MP	169.00	198.58
	NIKON		
10268189	CoolPix S0 3x Zoom 3.1MP	169.00	198.58
10275102	Coolpix 2200 3x Zoom 2MP	111.65	131.20
10275103	Coolpix 3200 3x Zoom 3.2MP	147.50	173.31
10275106	D70 Digital SLR Kit 1 inc AF-S DX 18-70mm Lens	824.00	968.20
10275744	MSV-01 CoolWalker Digital Photo Storage Viewer	306.00	359.55
	OLYMPUS		
10263861	Mju-300 3x Zoom 3MP Weatherproof	154.00	180.95
10267632	Mju-400 3x Zoom 4MP Weatherproof	174.00	204.45
10275108	C-770 10x Zoom 4.2MP	329.00	386.58
10275109	C-360 3x Zoom 3.3MP	127.98	150.38
	PENTAX		
10273842	Optio 33-LF 3x Zoom 3.2MP	135.00	158.63
10273843	Optio 33-WR 3.2MP Weather-Proof	208.50	244.99
10273845	Optio 550 5x Zoom 5MP	309.75	363.96
10273846	Optio 450 5x Zoom 4MP	278.00	326.65
	SAMSUNG		
10273702	Digimax V3 3x Zoom 3.2MP	159.00	186.83
10271112	Digimax V4 3x Zoom 4MP	175.00	205.63
	SONY		
10265393	DSC-P10 3x Zoom 5MP	249.00	292.58
10268233	DSC-P12 3x Zoom 5MP	262.00	307.85
10265392	DSC-P8 3.2 MP	191.00	224.43

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10270355	Creative Webcam NX	17.40	20.45
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10270972	Philips Toucam II PVC820K	22.00	25.85
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PRESS-IT CD Labelling Kit	£11.50
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SONY DG4/125M DDS3 (12/24Gb)	£5.50	£5
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SONY Super DLT (100-120 /160-320Gb)	£65	£62
SONY DLT Cleaning Cartridge	£25	
SONY AIT1 (35Gb - Long Length)	£36	£35
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HP Laserjet 5L/6L/3100/3150	(C3906A)	£28
HP Laserjet 5P/5MP/6P/6MP	(C3903A)	£32
HP Laserjet 1100/1100A	(C4092A)	£30
HP Laserjet 2100/2200	(C4096A)	£48
HP Laserjet 4000/4050	(C4127X)	£64

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Canon Inkjet Cartridges		Black	Colour
BJ10E/EX/20	(BC01)	£14	
BJ200/E/X/230	(BC02)	£14	
BJC210/240/250	(BC02/BC05)	£14 ..	£18
BJ30/BJC50/70/80/85	(BC10E)	£22	
BJ30/BJC50/70/80/85 Tanks 3's	(BCI10)	£12	
BJC50/70/80/85	(BC11E)	£25	
BJC50/70/80/85 Tanks 3's	(BCI11)	£10 ..	£13
S200/S300	(BCI24BK/BCI24C)	£6 ..	£11
S200/S300 TWIN Pk	(BCI24BK/BCI24C)	£11 ..	£20
BJC2000/4000/5000series	(BC20E/21E)	£21 ..	£28
BJC2000/4000/5000Series Tanks	(BCI21)	£5 ..	£12
BJC3000/S400	(BC33)		£38
BJC3/6000/S400 Tanks	(BCI3B/3C/3M/3Y)	£7	£6
BJC6000/6100/6200/6500 .	(BC30/31)	£26 ..	£29
BJC7000/7100	(BC60/61)	£26 ..	£28
BJC7000/7100 Colour Ink Tank	(BCI61)		£18
BJC7000/7100 Photo Cart	(BC62)		£39
BJC7000/7100 . Photo Ink Tank	(BCI62)		£24
S800/BJC8200 Photo Ink Cart	(BC50)		£75
S800/BJC8200 Tanks	(BCI6BK/6C/6M/6Y)	£8	£8
S800/BJC8200 Photo Ink	(BCI6PC/6PM)		£8

Canon Inkjet Paper Media		A4	A3
Coated Paper	(200) (LC101)	£22 ..	£42
High Resolution	(200/20) (HR101)	£22	£6
Glossy Paper..	(20) (GP301)	£9 ..	£15
Photo Paper Pro (8200) ..	(15) (PR101)	£11	
Photo Paper Pro 4"x6" ..	(20) (PC101)	£10	
Glossy Photo Card 4"x6"	(20) (FM101)	£6	

Compatible Cartridges

Compatible Inkjet Cartridges		Black	Colour
Epson 400/600	(JT093/JT089)	£5	£8
Epson 800/1520	(JT108/JT089)	£6	£8
Epson 440/640	(JT187/JT191)	£5	£8
Epson 740	(JT189/JT191)	£6	£8
Epson 480/580/C20/C40	(JT013/JT014)	£5	£8
Epson 680	(JT017/JT018)	£9 ..	£12
Epson 880	(JT019/JT020)	£6	£9
Epson 790/870/890/895	(JT007/JT008)	£9	£8
Epson P 810/830/925 ..	(JT026/JT027)	£9 ..	£11
Epson C42	(JT036/JT037)	£5	£8
Epson C60/C61	(JT028/JT029)	£9 ..	£11
Epson C62/CX3200	(JT040/JT041)	£9 ..	£11
Epson C64	(431/442/443/444)	£14CM	£7
Epson C70/80	(321/324/334/344)	£14CM	£7
Epson C82/CX5400	(321/422/423/424)	£14CM	£7
Epson C84	(441/442/443/444)	£14CM	£7
Epson CX6400	(441/452/453/454)	£14CM	£7
Epson R200/300/RX500	(481/2/3/4/5/6)	... £6CM	£6

Color Copy Paper (Laser)	A4	A3	A3x
Ultra Smooth (100gsm) 500's ..	£12	£24 ..	£26
Ultra Smooth (120gsm) 500's ..	£15	£29 ..	£32
Ultra Smooth (160gsm) 250's ..	£19	£22 ..	£24
Ultra Smooth (200gsm) 250's		£24	
Ultra Smooth (200gsm) 200's ..	£18	.....	£24

HP Inkjet Cartridges

		Black	Colour
Deskjet 500 Series	(51626A/25A)	£17 ..	£19
Deskjet 600/660/670/690/695	(29/49A)	£17 ..	£19
Deskjet 610/612/640	(6614D/49A)	£17 ..	£19
Deskjet 810/PSC500	(6615D/23D)	£17 ..	£19
Deskjet 816/825/840/845	(6615D/25A)	£17 ..	£19
Deskjet 920/940/V40/V45	(15D/6578D)	£17 ..	£19
Deskjet PSC750/PSC950	(15D/6578D)	£17 ..	£19
Deskjet 820/50/70/1100	(45A/41A)	£17 ..	£20
Deskjet 720/815/890/1120 .	(45A/23D)	£17 ..	£19
Officejet T45/T65/R45/R65 .	(45A/23D)	£17 ..	£19
Deskjet 930/950/970/1220 .	(45A/78D)	£17 ..	£19
Deskjet G55/85/95/K60/80 .	(45A/78D)	£17 ..	£19
PhotoSmart P1000/P1100	(45A/78D)	£17 ..	£19
Deskjet 2000/2500	(44A/41C/42Y/43M)	£22 ..	£23
Deskjet 2200/2250	(44A/36C/37M/38Y)	£22 ..	£23
Deskjet CP1700	(44A/36C/37M/38Y)	£22 ..	£23
Deskjet 3320/3420	(8727A/28A)	£12 ..	£14
Deskjet 5550/PS7000 Series	(56A/57A)	£12 ..	£18
Deskjet 5550/PS7000 .. Photo	(6658A)		£18
CP1160/OJ 7110/D Series	(5011D/10D)	£14 ..	£18
CP1160/OJ 7110/D . (Printhead No.14)		£28 ..	£28
Designjet 10/20/50PS	(36C/37M No.11)		£23
Designjet 10/20/50PS ..	(84K/C/M/82Y)	£29 ..	£29

HP A4 Paper Media		Pack	Price
Premium+ Glossy Photo ...	(C7040A)	... 50 ..	£19
Premium+ Photo Glossy ...	(C6832A)	... 20 ..	£13
Premium+ Photo Matte	(C6951A)	... 20 ..	£14
Premium Glossy Photo	(Q1992A)	... 10	£7
Premium Glossy Paper	(C3831A)	... 10	£9
Premium HeavyWeight 2-Side	(C1853A)	100 .	£12
Photo Quality Inkjet Paper ..	(C6984A)	... 20	£6
Premium Transparency	(C3832A)	... 20 ..	£14
Iron-On T-Shirt Media	(C6050A)	... 10 ..	£13

HP 10x15cm Paper Media		Pack	Price
Glossy Photo 10x15cm	(C7894A)	... 60 ..	£10
Glossy Photo 10x15cm	(C7891A)	... 20	£4
Premium+ 10x15cm Photo	(Q1991A)	... 20	£7

HP A3/A4 Paper Media	A4	A3
Professional Brochure/Flyer (50)	(C6818/21A)	£9 .. £18
Premium Inkjet (A4-200/A3-100)	(51634/1858A) ..	£14 .. £22
Premium Photo ... (A4-15/A3-20)	(C6040/59A)	£7 .. £29
Bright White .. (A4-500/A3-200)	(C1825/1858A)	£7 .. £10

HP A3+ Proofing Paper Media	Pack	Price
Proofing Semi Gloss (150gsm)	(7884A) ... 50 ..	£96
Proofing Gloss & Proofing Matte	.....	POA

Other Inkjet Supplies

Apple/Lexmark/Olivetti		Black	Colour
Apple S/Writer I/II/1200	(8041)	£16	
Apple S/Writer 1500	(8041/4609)	£16 ..	£20
Apple S/Writer 2200 & 2400/2500 ..		AS CANON	
Lexmark 150/1000/2000	(13400/13619)	£20 ..	£22
Lexmark 32/50/7000/Z11	(A1970/1980)	£19 ..	£22
Lexmark Z42/43/Z51/52	(A1970/M0120)	£19 ..	£24
Lexmark X73/X83/X85	(A1970/M0120)	£19 ..	£24
Lexmark Z12/Z22/Z32 ...	(17G0050/60)	£20 ..	£20
Lexmark Z13/23/33/X75	(10N0016/26)	£19 ..	£22
Lexmark Z55/Z65/Z65N	(18L0032/42)	£21 ..	£25
Olivetti JP170/190/360/450	Mono/Col	£24 ..	£32

Epson Inkjet Cartridges	Black	Colour
Stylus All Older Models	POA .	POA
Stylus 440/460/640/660/670	(187/191)	£15 .. £16
Stylus 740/760/860/1160 ...	(189/191)	£16 .. £16
Stylus 480/580/C20/C40 .	(T013/T014)	£11 .. £14
Stylus 680/680T	(T017/T018)	£20 .. £17
Stylus 880	(T019/T020)	£20 .. £17
Stylus 900/980	(T003/T005)	£20 .. £24
Stylus P 790/870/890/915	(T007/T008)	£15 .. £12
Stylus Photo 1270/1290 .	(T007/T009)	£15 .. £17
Stylus Photo 810/830/925	(T026/T027)	£19 .. £16
Stylus Photo 950	(T331/2/3/4/5/6)	£10CM £10
Stylus Photo 2100 ..	(T341/3/4/5/6/7/8)	£11CM £11
Stylus Photo 2000P	(T015/T016)	£22 .. £25
Stylus Photo R200/300	(T481/2/3/4/5/6)	... £9CM £9
Stylus Photo R800 ..	(T5?? ALL 8 COLS)	£10CM £10
Stylus Photo RX500/700	(T481/2/3/4/5/6)	... £9CM £9
Stylus C42/C44	(T036/T037)	£12 .. £15
Stylus C60/C61	(T028/T029)	£22 .. £18
Stylus C62/CX3200	(T040/T041)	£22 .. £18
Stylus C70/80 ..	(T321/C322/M323/324)	£23CM £10
Stylus C82/CX5400	(T321/422/423/424)	£23CM £10
Stylus C64	(T431/C442/M443/Y444)	£16CM £10
Stylus C84	(T441/C442/M443/Y444)	£23CM £10
Stylus CX6400	(T441/C452/M453/Y454)	£23CM £10
Stylus Pro5000	(118B/147C/143M/122Y)	£38CM £38
Stylus Pro5500	(T486/487Y/488M/489C)	£49CM £49
Stylus Pro7000 (All 6 Cols - Price Each)		£31CM £31
Stylus Pro7500 (All 6 Cols - Price Each)		£38CM £38
Stylus Pro7600/9600 Standard (All Cols)		£32CM £32
Stylus Pro7600/9600 HighCap (All Cols)		£49CM £49
Stylus Pro9000 (All 6 Cols - Price Each)		£47CM £47
Stylus Pro9500 (All 6 Cols - Price Each)		£60CM £60

Epson Stylus Paper Media		Pack	Price
Premium Glossy Photo Roll 100mm	(41303)	1x8m .	£12
Premium Semi-Gloss Roll 100mm .	(41330)	1x8m ..	£13
Premium Glossy PhotoRoll 210mm	(41377)	1x10m	£30
Premium Semi-Gloss Roll 210mm .	(41336)	1x10m	£32
Premium Glossy PhotoRoll 329mm	(41379)	1x10m	£42
Premium Semi-Gloss Roll 329mm .	(41338)	1x10m	£44
A4 Colorlife Photo	(41560)	... 20 ..	£15
A4 Premium Glossy	(41287)	... 20 ..	£11
A4 Premium Glossy	(41624)	... 50 ..	£24
A4 Premium Semi-Gloss	(41332)	... 20 ..	£11
A4 Glossy Photo Weight	(41349)	... 20 ..	£10
A4 Photo Glossy	(41126)	... 20	£8
A4 Photo Glossy	(41620)	... 50 ..	£18
A4 Photo Paper	(41140)	... 20 ..	£10
A4 Photo Paper	(41622)	... 50 ..	£22
A4 Archival Matte Paper	(41342)	... 50 ..	£11
A4 Matte HeavyWeight	(41256)	... 50 ..	£10
A4 Matte H/W Double Sided	(41569)	... 50 ..	£14
A4 720/1440 Dpi Photo Quality .	(41061)	100 ..	£10
A4 Transparency	(41063)	... 30 ..	£36
A3 Colorlife Photo	(41561)	... 20 ..	£40
A3 Premium Glossy	(41315)	... 20 ..	£24
A3 Premium Semi-Gloss	(41334)	... 20 ..	£25
A3 Glossy Photo Weight	(41350)	... 20 ..	£23
A3 Glossy Film	(41073)	... 10 ..	£40
A3 Photo Glossy	(41125)	... 20 ..	£18
A3 Photo Paper	(41142)	... 20 ..	£21
A3 Archival Matte Paper	(41344)	... 50 ..	£23
A3 Matte HeavyWeight	(41261)	... 50 ..	£22
A3 720/1440 Dpi Photo Quality .	(41068)	100 ..	£26
A3+ Professional (Pro-5500)	(41457)	... 20 ..	£49
A3+ Water Colour Radiant White	(41352)	... 20 ..	£20
A3+ Premium Glossy	(41316)	... 20 ..	£31
A3+ Premium Semi-Gloss	(41328)	... 20 ..	£32
A3+ Glossy Photo Weight ..	(41347)	... 20 ..	£29
A3+ Glossy Film	(41074)	... 10 ..	£48
A3+ Photo Glossy	(41133)	... 20 ..	£20
A3+ Photo Paper	(41143)	... 20 ..	£25
A3+ Archival Matte Paper	(41340)	... 50 ..	£30
A3+ Matte HeavyWeight	(41264)	... 50 ..	£28
A3+ 720/1440Dpi Photo Quality	(41069)	100 ..	£30
A2 Photo Glossy	(41123)	... 20 ..	£35
A2 720/1440 Dpi Photo Quality .	(41079)	... 30 ..	£24

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Apple Personal L/W 300/320/4-600 .	(2045)	£56
Apple LaserWriter 12/640PS	(4683)	£85
Apple LaserWriter Pro16/600/630/800	(2473)	£65
Apple LaserWriter 8500	(5893)	£175
Brother HL730/760/FAX-8/9000	(TN/DR200)	£18 ..... £89
Brother HL820/1051/1060	(TN/DR300)	£18 ..... £89
Brother HL1240/50/70 Hi-Yield	(TN6600/DR6000)	£49 ..... £89
Brother HL1650/5000 Hi-Yield	(TN7600/DR7000)	£52 ..... £99
Epson AcuLaser C900/1900	(50100/99C/98M/)	£34 CM £95
Epson AcuLaser C1/2000	(50033/ /35M/36C)	£46 CM £89
Epson AcuLaser C4000 ...	(50091/ /89M/90C)	£30 CM £132
Epson AcuLaser C4100 ...	(50149/46C/47M/)	£99 CM £179
Samsung CLP500	(D7K/ /D5M/D5C)	£66 CM £76
Samsung ML1650/1651	(ML1650)	£79
Samsung ML2150/2151N/2152W	(ML2150)	£79
Samsung ML4500/ML4600	(ML4500)	£49
Samsung ML6040/6060	(ML6060)	£69

PHOTOCONDUCTOR / FUSER / TONER / DRUM		
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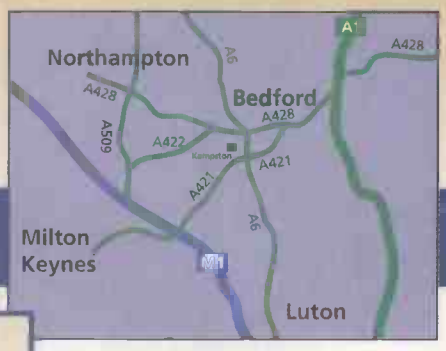

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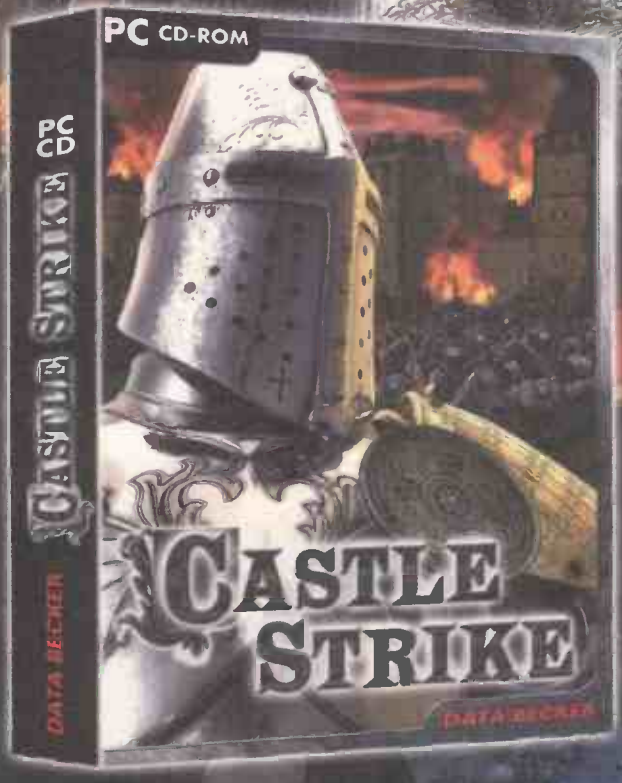

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On the CD

CD1

Internet Cleanup 3
Privacy Expert PE
Panda Anti-virus Platinum 7
Steganos Internet Anonym 5

CD2

Euro 2004 and forecaster
Championship Manager 03/04
Fifa 2004
Splinter Cell: Pandora Tomorrow

On the DVD

Serif Pageplus 6
Openoffice 1.1.1
Gimp 2
Castlestrike

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 July 2004 cover disc
ABT, 306 St Mary's Lane
Upminster, Essex RM14 3HL
quoting reference '*PCW* Vol 27 No 7'.
PROBLEMS INSTALLING/RUNNING THE SOFTWARE > Check the support page on the disc, or check the manufacturer's site.
GENERAL DIFFICULTIES > Call 08700 885 995 (9.30am to 5pm Mon, Tues, Thurs & Fri; open until 8pm on Wed and 10am to 2pm Sat). Or go to www.vnusupport.co.uk. Or email us at pcw@vnusupport.co.uk.

FULL SOFTWARE LISTING

CD1

Full programs
Aladdin Internet Cleanup 3
Panda Antivirus Platinum 7
Acronis Privacy Expert PE
Steganos Internet Anonym 5
Alcohol 52%

Hands on section
Belarc Advisor 6.1
Dialupass
Internet Explorer Backup 1.1
MFS
Musicmatch
Password Safe 2.01
PE Builder v3.0.32
Photorescue
Printfile 2.1.5
Protected Storage
Passview v1.60
XP Logger 2.01a

In this month's reviews
Canon and Nikon digital camera pictures

Cooling kit heat images

Motherboard and TV tuner buyer's guide

Trial software
Camtasia Studio 2
Cutepdf 3
Maxivista 1.0.14
Spring Cleaning 3
Stuffit Standard Edition 8.5

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CD2

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Official UEFA Euro 2004 game and forecaster
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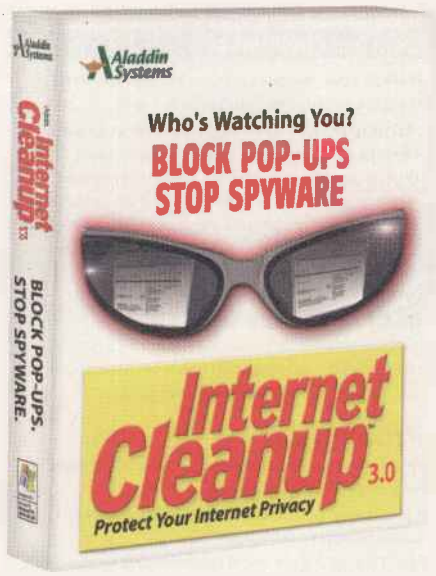
Internet Cleanup 3

FULL PROGRAM

Clear your Internet tracks, block ads and remove spyware with this suite of web privacy tools from Aladdin



Need to know

System requirements
Windows 98 or later, 30MB of disk space

Information
www.aladdinsys.com

Installation information
Visit www.aladdinsys.com/cgi-bin/freealaddin.cgi?cleanup-vnu using the magazine code **VNUCLW301**

Limitations
None

It's viruses and hackers that make all the headlines these days, but the Internet holds many other threats to your online privacy. There might be cookies tracking your movements, spyware reporting back to its authors or dodgy ActiveX controls that could compromise your browser security. And don't forget about your browser cache, history and other tracks. They can quickly reveal to any other user of your PC what you've been doing recently.

Many of these files can be cleared away manually, if you know where to look, but Internet Cleanup 3 is a much easier way of doing this. Click on 'Auto Clean' and it wipes away your Internet tracks in just a few seconds. If even that seems like too much trouble, then you can schedule the program to run automatically. Internet Cleanup can be set up to do its work when your system starts or closes, when specified applications close, at a specified time interval or any combination of these.

By default the Auto Clean function just erases your browser cache and history files, but Internet Cleanup can optionally remove lots of other data. This includes downloads and message histories left behind by many instant messenger programs, for instance. There's also support for deleting unwanted emails from within Outlook and Outlook Express.

The various 'Recent files' lists throughout Windows can reveal plenty to a snooper, so Internet Cleanup can also erase these. Supported applications include Internet Explorer (Autocomplete and Previous Search), Microsoft Paint, Paint Shop Pro and Real Player. The program can also get rid of many Windows lists (Run, Recently used documents, File files and more).

The location of temporary files and Registry entries varies between applications, of course, so Internet Cleanup also lets you create custom lists to suit your exact needs. Just specify a list of files and folders and they'll be deleted the next time the program runs. It's a very useful capability, but you need to be careful. Internet Cleanup will delete the contents of whatever folder you specify, no matter what it holds, so any accidents could be costly.

Is this all beginning to seem a little complicated? No problem, you don't have to do everything from within Auto Clean. Choose the Manual option instead and you've got absolute control over every part of the clean-up process.

From everything we've said so far, you might think this program was all about deleting junk (and being called Internet Cleanup seems to be a pointer in that direction, too). But you also get a tool that can help many Internet irritations reaching your hard drive in the first place.

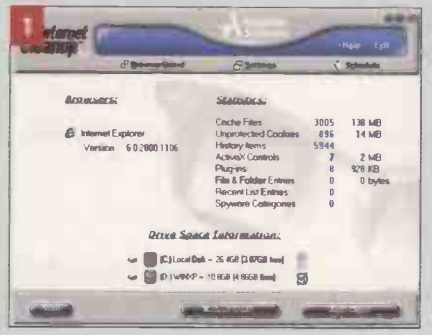
Click 'Browserguard' in the Internet Cleanup start page to begin setting this up. Useful options here include the Ad Blocker, which stops Internet Explorer downloading banner ads and web bugs. The Popup Blocker offers another way to speed up your browsing.

Both features may occasionally interfere with legitimate sites, but the authors of the software have that covered too. Tell Internet Cleanup which domains are trusted and it will leave them alone, so you can be sure only unwanted ads and pop-ups are blocked.

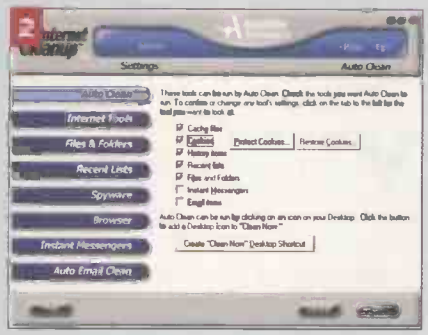
Key features

- Wipe browser cache, history and cookies
- Protect useful cookies from being erased
- View and delete unwanted ActiveX controls
- Bug-blockers speed up browsing
- Erase junk files linked to IM tools
- Detect and dispose of spyware
- Remove Recently Used lists
- Customise files and folders to delete
- Built-in scheduler cleans your system
- Files overwritten so can't be undeleted

Customise Internet Cleanup 3

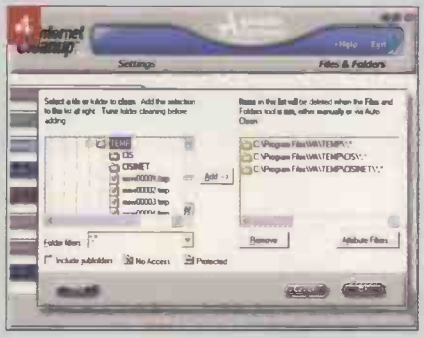


1 When you launch Internet Cleanup it scans through your current Internet Explorer history, cache and other files. This may take a while, so be patient. Once complete, you could just click on Auto Clean and let the program do its work, but it's better if you configure Internet Cleanup to suit your needs.

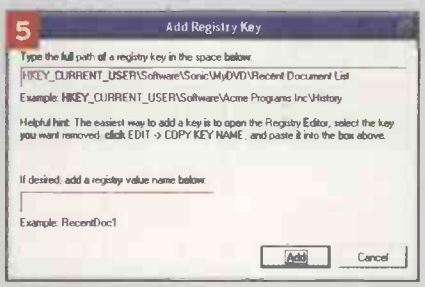


2 Click on Settings and you'll see the Auto Clean feature only erases your browser history and cache files. Is that really good enough? Not for us, so we checked Cookies, Recent lists and Files and folders as well. Next, we have to tell the program exactly which of these elements are to be erased.

3 You may not want to wipe all cookies, for instance. Sometimes it's useful if a site such as Amazon remembers who you are, while other cookies may hold site passwords or shopping cart information. Click Protect Cookies and choose (or enter) any cookie domains you'd like to keep, such as amazon.com.



4 Internet Cleanup only directly supports Internet Explorer, but you can still use it to clean up other browsers and applications. Click Files and folders, Setup files and folders, then specify the locations you'd like to be erased. Be careful that you only pick folders containing temporary files.



5 Click Recent lists, check Customisable Registry cleaner, then click Configure. Here you can specify Registry entries you'd like Internet Cleanup to delete. To get rid of the Recent document list in Sonic MyDVD, for instance, specify HKEY_CURRENT_USER\Software\Sonic\MyDVD\Recent Document List.

6 Once you've finished configuring Internet Cleanup, click OK. The program now knows what you want to clean, and how, but not when. To answer that question, choose Schedule. Now you may configure Internet Cleanup to run when the system starts, closes down, or at regular intervals – it's your call.

Upgrade offer >> Cleanup 4

SAVE 50% ON RRP

New features

- >> Support for multiple browsers
- >> Protection for personal ID
- >> Business users can have workstations on a network cleansed

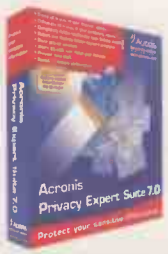
Not using Internet Explorer as your browser? The latest version of Internet Cleanup now supports multiple browsers, including Mozilla. New features include protection for your personal identification, and it can even cleanse workstations on your network if you're a business user.

Normally priced at $29.99, all this privacy functionality can be yours at the 50 per cent discount price of $14.99 (approx £8.50).

Head to the Aladdin Systems homepage at www.aladdinsys.com and simply choose the option to upgrade from Internet Cleanup 3 to v4.

Privacy Expert PE

FULL PROGRAM



Who can see which websites you're visiting?

Need to know

System requirements
Windows 98 or later, 6MB of disk space

Information
www.acronis.com

Installation instructions
Go to www.acronis.com/mag/vnu_privacy and follow the instructions

Limitations
Personal Edition

You're an honest person, who would never think about spying on someone else. But if they're spending a suspiciously long time on your PC, it's very tempting to try and find out why. Just a little peek at the browser cache files, a glance at its history, a moment to peruse the cookies, that's all it would take...

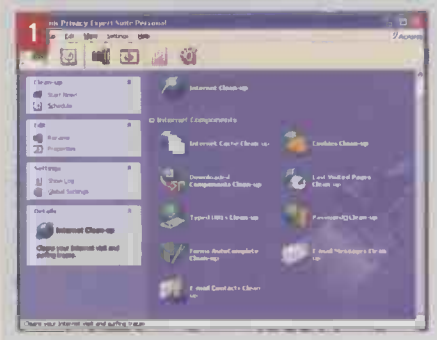
And it's just as easy for anyone else to check the sites you've been visiting recently. So if you value your privacy, maybe the best solution is to install Acronis Privacy Expert Suite Personal. This straightforward tool makes it a breeze to wipe away those telltale Internet tracks (IE, Netscape or Mozilla) manually or at a schedule of your choice.

The program helps delete a wide range of browser trails, such as your cache, cookies and history. Less obvious candidates for the bit bucket include typed URLs, passwords and Form Autocomplete data. Privacy Expert can clean up email messages (for Outlook and Outlook Express) and your address book.

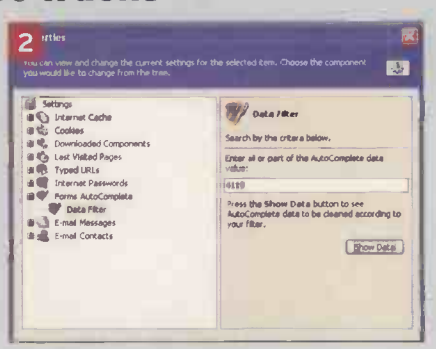
Do you need to be selective about what you delete? Filters make this easy. You might choose to erase only cookies from a particular domain, for instance. To explore the options for this, or any other Internet component, right-click on it in the main Privacy Expert window and click Properties.

With an attractive XP-style interface Privacy Expert is particularly easy to use, and the chances are you'll quickly configure the program to suit your needs. Once you're happy, click Clean-up, Schedule, set it up to run automatically, and start enjoying real Internet privacy.

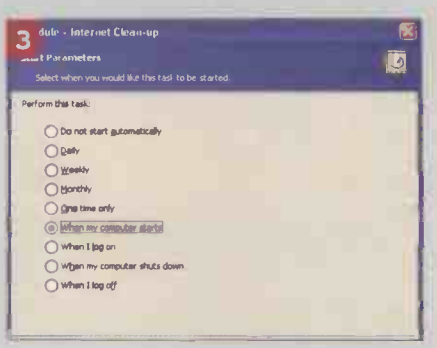
Wipe away your Internet tracks



1 Privacy Expert comes with an XP-style interface, which makes it familiar to use. You could try double-clicking on Internet Clean-up immediately to clear away those Internet trails, but you need to configure the program first. Right-click Internet Clean-up and select Properties.



2 Scroll down the list to find Internet components you'd like to clean up. To get rid of Cookies, click on it in the tree, then check Enable cookie cleaning. You can customise what Privacy Expert will delete, erasing only credit card numbers for Form Autocomplete, for instance.



3 To check your Privacy Expert filter is doing the job you expect, click the Show button (Show URLs, Show files) to see what information you're about to delete. Once you're happy, click Schedule and choose when you'd like the program to run. It'll then clean your PC automatically.

Upgrade offer >> Privacy Expert Suite 7

New features
- >> Spyware module
- >> Pop-up blocker to remove ads
- >> File shredder

SAVE CASH ON RRP

The latest version of Acronis' Privacy Expert Suite offers a spyware module, ready to detect and remove adware components, hidden diallers, keyloggers and more.

A new pop-up blocker removes unwanted ads, the file shredder prevents deleted files from being recovered and a drive cleanser securely wipes a complete hard disk (ideal if you're selling a PC).

PCW readers can upgrade and save by heading to the special page at www.acronis.com/mag/vnu_privacy.

Panda Anti-virus Platinum

FULL PROGRAM

Protect your PC and get an industrial-strength firewall

Need to know

System requirements
Windows 98 or later, 128MB Ram, 50MB of disk space, 16bit colour display

Information
www.pandasoftware.co.uk

Registration
Not required

Limitations
Three months of upgrades included

Are you tired of bulky anti-virus tools or overweight software that reduces your PC's performance to a crawl? Panda Anti-virus Platinum is a simple, compact program that goes about its business without conflicting with anything else.

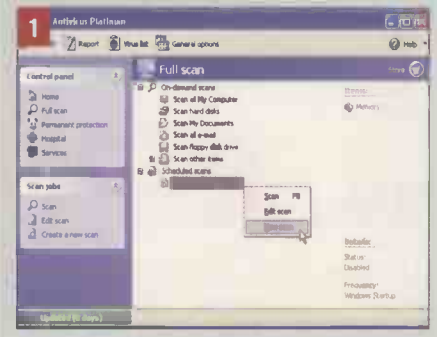
Make sure you don't confuse 'simple' with 'limited', though. The speedy Panda detection engine can locate and eliminate viruses, Trojans, worms, malicious ActiveX controls and Java applets. Completely automatic daily updates over your Internet connection ensure you're protected against the latest threats (this trial version comes with a three-month licence).

The system will also trap viruses regardless of how they arrive at your PC: by CD, downloading or email attachment. Add the ability to block scripts from running and your PC is fully protected. But Anti-virus Platinum is fully configurable, so if (for instance) you decide not to scan outgoing mail, that change is just a mouse-click away.

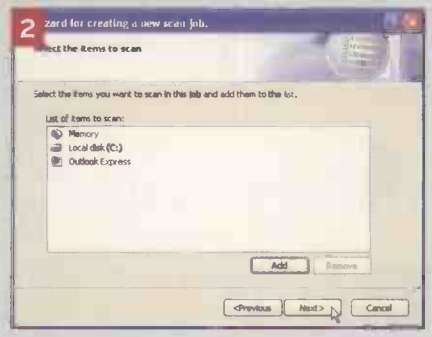
Panda has even integrated a powerful firewall into the same package. This prevents inbound attacks and monitors applications trying to use your Internet connection. It can restrict access to shared folders, so you can still share files with local PCs. And if that's not enough, create access rules for all the ports, protocols and IP addresses you need.

Despite all the features, a fast and lightweight network engine means Panda Platinum won't slow you down. Let it replace your existing firewall and anti-virus program, and you could be surprised at the boost in performance.

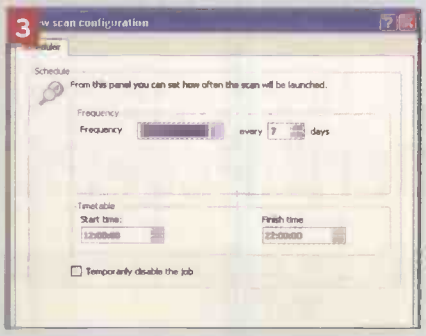
Schedule regular anti-virus checks



1 Platinum Anti-virus starts protecting your PC immediately, but you may want to run extra anti-virus scans. Right-click the Panda system tray icon, and select Launch Panda Anti-virus Platinum. Right-click Scheduled scans and select 'New scan' to create a regular checkup.



2 How intensive this check is, is your call. You may schedule a fast memory scan every hour, for instance, and a full check of your whole system every day. Click Add, then hold down Ctrl as you choose which files, folders and applications you want to scan.



3 Click Next, then check 'I want to perform this job frequently' and choose the Schedule button. Pick a frequency from the list (hourly, daily, weekly and so on), then choose when you would like the job to start and end.

Upgrade offer >> Extend your licence

Upgrade options
- >> Six months for £19.20
- >> One year for £38.40
- >> Two years for £65.90
- >> Three years for £82.40

Your copy of Platinum Anti-virus comes with daily updates for a full three months, but you'll need to upgrade to use the program after that. Purchase options start with a straightforward six-month (£19.20) or one year (£38.40) subscription, but choosing a longer period will save you money. Two years of upgrades are available for £65.90, while a three-year subscription costs only £82.40. Place your order at www.pandasoftware.co.uk.

Steganos Internet Anonym 5

FULL PROGRAM

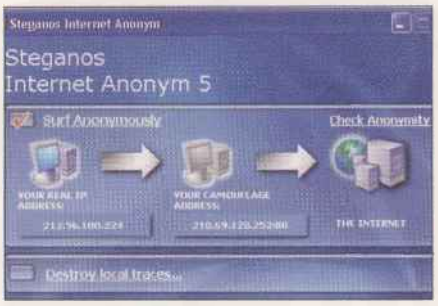
Need to know

System requirements
Windows 98 or later, 32MB Ram, 4MB of disk space, 16bit colour display

Information
www.steganos.com

Installation instructions
Go to www.steganos.com/magazine/pcwmagazine/sia5 and follow the instructions

Limitations
None



Anonym can block scripts, cookies and pop-ups, hide your browser ID and more

You can install a firewall, crack down on cookies and tighten your browser security, but that still won't make you anonymous online. Every time you visit a website you're giving away your IP address, probably revealing your ISP (or company) and location. And if you have a broadband connection with a static IP address, this becomes a unique identifier that can be used to log your movements forever.

Fortunately it doesn't have to stay that way. Run Internet Anonym 5 and it sits between your Internet applications and the outside world, rerouting data through a network of proxy servers. Your IP address is effectively changing every second, making it virtually impossible to track you online.

It's a clever and effective system, but there are some drawbacks. Using proxy servers adds an overhead to your browsing, for instance, and will reduce performance. The program assesses proxy speed as you use it, though, dropping the slowest, so expect performance to improve over time.

You may also find some applications that can't get on with such a rapidly changing IP address. If you experience any problems, right-click on the Internet Anonym system tray icon, deactivate the program temporarily and normal service should be restored.

Upgrade offer >> Anonym Pro 6

The latest word in covert browsing now comes with an Internet Explorer plug-in, making private surfing even easier. There's a new world map showing your proxy location, so you can watch it change in real time. Password protection keeps your favourite Internet sites private, and Internet Trace Destructor 6.5 will clear away all your web tracks (even for Netscape, Mozilla, AOL, Office, Kazaa and more).

Normally £24.99, you can upgrade for only £19.99 from www.steganos.com/magazine/pcwmagazine/sia5.

Serif PagePlus 6

ON OUR COVER DVD

FULL PROGRAM

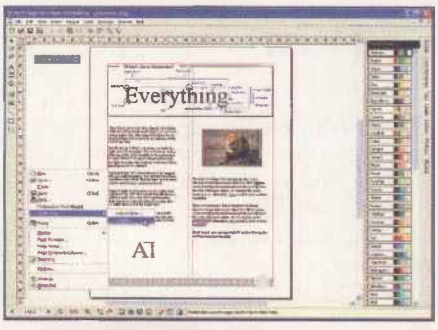
Need to know

System requirements
Windows 98 or later, 64MB Ram, 30MB of disk space, 16bit colour display recommended

Information
www.serif.com

Installation instructions
Follow the instructions provided when first launching the program

Limitations
None



Publish documents to the web in just a few mouse clicks

Desktop publishing software doesn't have to be dull. No, really. Install Serif PagePlus 6 and you'll immediately have access to a wide range of fun, creative projects, from greetings cards to notices, promotional flyers to CD labels.

It doesn't matter if you have no artistic talent, because pre-built templates provide everything you'll need and wizards walk you through the process of creating the finished article. Ease of use and bright, colourful graphics make PagePlus one of the more child-friendly publishing tools around.

That doesn't mean the rest of us are excluded, though. If you create a blank project instead, then click on the Gallery tab and you'll find options such as configurable business forms (invoices, expense reports, purchase orders and so on). There are mastheads you could use for the top of a newsletter, logos for your company or group, coupons to highlight special offers, and much more.

If you still can't find the exact template you need, find the closest one and customise it, or just build your own from scratch. Behind the friendly user interface is a powerful publishing tool, with a host of graphics and text formatting features. With output options including full spot and process color separation, PagePlus can handle even the most demanding of projects.

Upgrade offer >> PagePlus 9

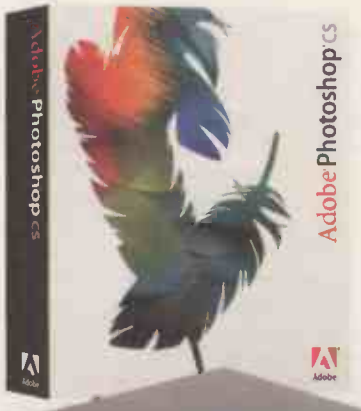
Do your documents look flat and dull? PagePlus 9 includes new 3D objects with lighting, texture and perspective control that will bring new life to your work. There's press-ready PDF output, complete with security features for document protection. And of course you get a host of new text and graphics effects. With an extra CD including resources such as wizards, objects, fonts and tutorials, it's all yours for only £99. Go to www.serif.com.

PERSONAL COMPUTER WORLD

Next Month

on sale 24 June 2004

We look at a group of A3 and A4 photo printers to see which will give you the best results



Whatever your budget, there's a photo-editing package to suit

Which small form factor system is best for you?

Don't miss August's PCW...

Build your own media centre

As you've seen in this issue, Windows Media Center PCs have some attractive features, but you're stuck with whatever functionality Microsoft wants to give you. So how about designing and building your own? We'll show you how to do it in our workshop feature.

Photo printers

Digital photography isn't just about saving money on film processing – it gives you control over the creative process. We've rounded up six top-end A4 and A3 photo printers to do justice to your prints, and we give you an outline of how much each will cost you to run.

Photo-editing software

Before you print your photos, it's crucial you make sure they're looking their best. Our group test of six photo-editing packages suitable for all pockets and skill levels will help you unleash your creative potential.

Small form factor barebones systems

The revolution started by Shuttle three years ago continues to gather momentum. With so many diminutive yet stylish small form factor PCs now available, our mini-round-up puts half a dozen through their paces.

For regular updates of what's in August's issue, go to www.pcw.co.uk/PCW/next.jsp

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PERSONAL COMPUTER WORLD

JULY 1984

Blowing the dust from the cover of our 1984 issue revealed the promise of an exclusive first look at the HP110 – a portable machine that offered a serious challenge to full-sized desktops. Notable inclusions to this exhilarating glimpse of the future included a massive 256KB of main memory, a unique hinged screen and a contrast button that doubled as a reset key if held down for 15 seconds.

Flicking from the front page through 90 pages of consecutive adverts brought us to the News section. Here, Guy Kewney shed light on such things as automatic text correction for word processors, the new trend of converting old television sets into computer terminals, and how to convert your desktop PC into a portable by transplanting its components to a suitcase.

A glimpse of the future – the HP110 was a portable machine which, in 1984, offered a serious challenge to desktops

Elsewhere, Tony Heathering gave up his day job as a home computing editor and became the Incredible Hulk, a Roman emperor and a Wild West railroad boss in three of the latest games. For readers who wanted a bit more mental stimulation, part six of our 'Teach yourself Assembler' series explained how to get to grips with common arithmetic operations.

JULY 1989

Five years on and mobile computing still dominated *PCW*'s cover – this time with the IBM PS/2 P70, a portable with no battery, a plasma display screen and the infamous MCA bus architecture. Rupert Goodwins decided that it was 'uncomfortably like another IBM portable mistake. It's got uneven engineering, adequate performance and a dearth of redeeming features'. It never set the world alight, that's for sure – perhaps the £5,819 price tag had something to do with it.

MCA was a hot topic in 1989, with the appearance of MCA clones from Olivetty [sic] (did we have sub-editors then?), Normerel and Mitac, which we looked at in a group test. According to the article, clone makers were lining IBM's pockets with licensing fees for using the MCA bus, a factor that ensured it never became an industry standard.

Writing this on a display with a 1,600 x 1,200 resolution at 32bit colour depth, our feature 'Beyond the VGA' reminds you how far graphics technology has advanced. Apart from a roll-call of extinct graphics vendors (including Tseng Labs, Orchid, Genoa and Video Seven), there was a look at the future of video hardware, including 'Gourard shading' (no, we definitely didn't have sub-editors) capability offered by graphics boards based on Intel's new i860 processor.

JULY 1994

Did you know the rich and famous also read *PCW*? If you don't believe us, turn to our letters page, where Arthur C Clarke wrote to congratulate us on 'the superb piece of faction, Microserfs' which had appeared in a recent issue.

It was a pithy letters section, with readers angry about the cost of inkjet printer consumables and a piece criticising a problem product. It came close to ending in tears as an exasperated Chris Bidmead asked one reader in his reply whether it was his brains or a fight that he wanted to pick.

There was more fighting talk from Microsoft in an article on the company's upcoming operating system codenamed Chicago, a pre-beta product we believed would be called Windows 4.0. Released some 13 months later and named Windows 95, it went on to introduce a generation to personal computing.

This issue also heralded the introduction of an Internet column, following the 'explosion of interest' in the US, which was spreading to the UK. It included a beginners' guide to the WWW, explaining that this was the easiest route onto the Internet for novices and outlined Mosaic, the then browser of choice.

Naturally, porn and the Internet went hand in hand, and we discussed the potential effects. While restricted access might stop criminals and pornographers using the Internet, this would also damage our competitiveness, wrote our columnist.

Ultimately, he concluded, Pandora's Box was already open and we would have to 'learn to live with the consequences'.

JULY 1999

If there's one thing Flashback teaches us, it's that technology trends are notoriously hard to predict. Take our news story, which featured a telephone combined with a TFT monitor and a PC. It's fairly evident now that these devices were never going to be the 'network computers of the future' – just ask Amstrad about the Emailer.

In 1999, though, we weren't even sure there would be a future if everything said about the Millennium Bug was true. Soothsayers of doom, Taskforce 2000, warned in a report that 'the bug will wreak havoc well before 1 January and continue to do so long after'. Presumably everyone involved in the Millennium bug industry is making a living flogging all those cans of food they hoarded in preparation of the upcoming apocalypse.

However, the interview with Bill Gates showed that the Kermit lookalike knew exactly what he was talking about. Specific mentions of wireless and tablet devices show that the Microsoft juggernaut has its course programmed years in advance.

Perennial IT favourite Sir Clive Sinclair also took time out of his busy schedule to talk to *PCW*. He bemoaned the grip Intel has on the processor market and hoped that games consoles, such as the Playstation 2, would show consumers what streamlined design can do.

There were also a few hints that a new Sinclair computer, perhaps based on Linux, could arrive. No sign of it yet, but we're sure it's something all *PCW* readers would like to see.

The *PCW* team

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PC PRO RECOMMENDED — PC PRO A LIST

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Jim Martin, Labs Editor, PC Pro - January 2004

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