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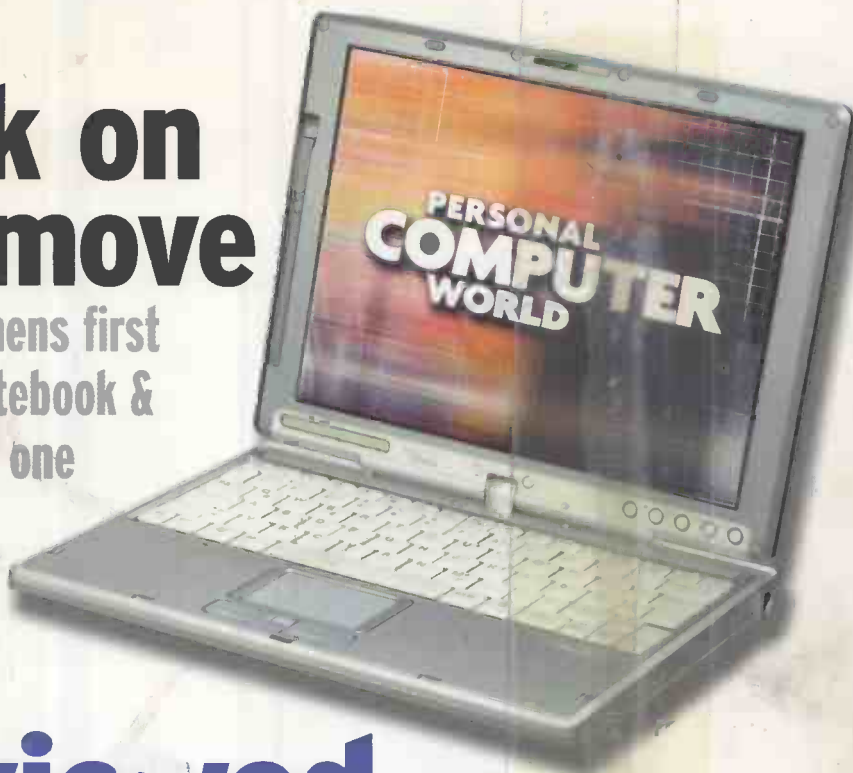
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MPx200 SmartPhone >> Netobjects Fusion 7.5
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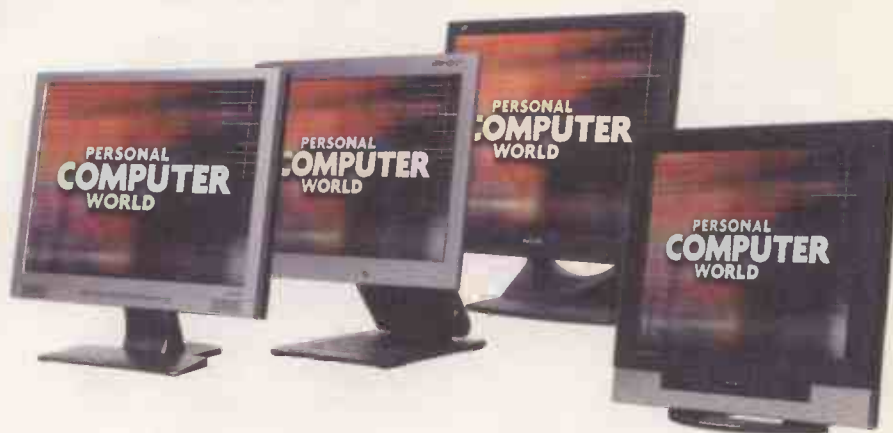
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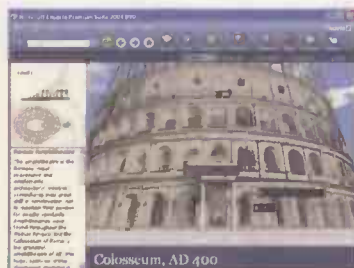


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As the first Athlon 64 PCs come on stream, Dylan Armbrust looks forward to faster performance



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>> **Speak up!**
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is finally with us –
see page 109

This past month has seen a whirlwind of activity in the desktop processor market, the likes of which hasn't occurred for many years. The whirlwind I refer to is, of course, AMD's launch of the Athlon 64 family of 64bit processors. It's not the first 64bit processor by any means, as Sun's Ultrasparc, Intel's Itanium and Apple's G5, got there first. But the Athlon 64 is special in that it not only copes with 64bit processing, but 32bit too.

What this means to the both you and me is that AMD has introduced 64bit computing into the mainstream. Intel's Itanium has always been aimed at the high-end enterprise level of computing while Apple's G5 is aimed at, well, Apple's own market. The jump to 64bit computing is akin to the same seismic tremor that hit the market when the first 32bit processors were introduced over a decade ago. That particular leap brought about the ability of home PCs to handle high-quality 3D games, video editing and more. In addition, we saw the spin-offs on TV and film screens with the advent of sophisticated computer-generated special effects.

Today, of course, we won't notice the true effects of 64bit processors, as there isn't currently any software available to make use of it. However, with Microsoft in the process of finalising a 64bit version of Windows XP and various games companies coding 64bit games, such as Atari's Unreal Tournament, it's only a matter of time.

In the meantime, AMD's Athlon 64 3200+ and its high-end FX chip look set to get the first true foothold into the important home market, able to handle current 32bit software, with improved performance, while being ready for any upcoming 64bit software.

For a review of the first available Athlon 64 3200+ systems take a look at our mini round-up on page 56 to see where they stand in the market. And be sure to check out our website www.pcw.co.uk over the coming weeks for the latest review of the Athlon 64 FX chip, as well as the intended spoiler, Intel's Pentium 4 Extreme, to see how well they compare.

September also saw one of the fastest growing computer shows, Computex, take place in Taipei, Taiwan. Although delayed by the Sars outbreak earlier this summer, it rebounded by showing an increase in attendance by 30 per cent over last year. While this is an impressive number, the real point here is that Computex has managed to become a fixture in the world of IT, and is now beginning to rival both Comdex and Cebit in terms of importance.

More product and technology launches are happening in the Far East than ever before, and this is technology that will shortly be on our shores. *PCW* covered the entire event, so be sure to read our Computex News special starting on page 21 to find out about the latest technology developments.

And lastly, in our continuing drive to improve *PCW* for you, you'll find a few more changes to the magazine. Last month we promised a completely new and improved interface for our CD and DVD covermounts, combined with our improved CD disc notes pages, to make using and installing our software easier. On this month's discs you'll see that it's easier to find and install your programs, with registration and upgrade details at your fingertips.

We've also introduced a new category to our Reviews section called Components. It's focused on all types of upgrade or custom PC products for the vast number of you out there who are interested in building or improving your PC. So as you can see, the whirlwind continues.

'AMD's Athlon 64 3200+ and its high-end FX chip look set to get the first true foothold into the home market'

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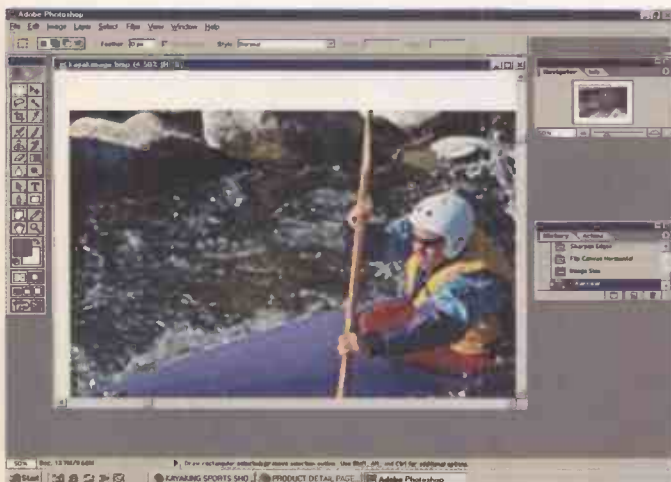


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Results explained

Explained below is a list of the benchmarks we use to test the products we review



Adobe Photoshop 6.01 is part of Sysmark 2002



3Dmark 2001 tests DirectX performance

Sysmark 2002

Sysmark 2002 is an application-based benchmark made up of 14 applications. These are divided into two categories: office productivity and Internet content creation. A predefined script, with data, is run on each application at an execution speed that includes one-second pauses between operations to simulate human activity. Applications are also run concurrently to reflect the way most people use PCs today.

The time taken for each application to complete an operation is recorded. Sysmark calculates the geometric mean of the application times for each category, and converts these into a score for each category.

These scores are based on a comparison between the test system and a reference PC featuring a 1GHz Pentium III processor, an Intel 815EEA chipset motherboard, 256MB of PC133 SD-Ram, a 64MB Creative Geforce Annihilator 2 graphics card, a 30GB UltraDMA100 IBM hard disk and Windows XP. A score of 100 indicates that the test system has a performance equal to the reference PC, 200 indicates twice the performance and so on. An overall Sysmark score – the weighted geometric mean of the two category scores – is then calculated.

We run the benchmark at a resolution of 1,024 x 768 in 16bit colour. It is run three times, rebooting between each category. The applications are as follows:

Office productivity

Microsoft Word 2002, Microsoft Excel 2002, Microsoft Powerpoint 2002, Microsoft Outlook 2002, Microsoft Access 2002,

Netscape Communicator 6.0, Dragon Naturally Speaking Preferred v.5, Winzip 8.0 and McAfee Virusscan 5.13.

Internet content creation

Adobe Photoshop 6.01, Adobe Premiere 6.0, Microsoft Windows Media Encoder 7.1, Macromedia Dreamweaver 4, Macromedia Flash 5.

Sysmark 2002 is a commercial benchmark, available from Bapco at around £130 (www.bapco.com).

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

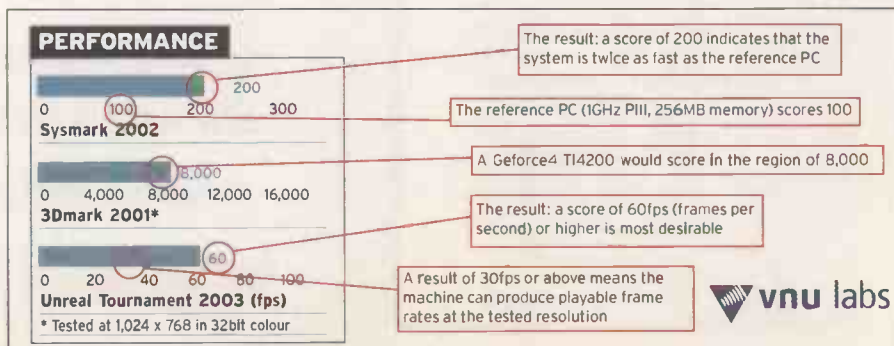
with Full Scene Anti-Aliasing (FSAA) and at 1,280 x 1,024, both in 32bit colour and textures, set to loop three times.

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.

The scores in the box below are provided as a reference to give you an idea of how graphics chips perform under this test.

3Dmark 2003

Run at its default settings of 1,024 x 768 and 32bit colour depth, this update to 3Dmark 2001 will only fully run on DirectX 9 compliant cards. As there are currently precious few of these in the market, this will not be replacing 3Dmark 2001 as our standard graphics test. However, it will be tested on all capable devices and, where possible, scores will be quoted.



vnu labs



Unreal Tournament 2003 is used to test real world DirectX performance

3Dmark 2003 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 3Dmark 2003 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.

See the graphs above right to get an idea of how a card performs on 3Dmark 2001 against 3Dmark 2003.

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 frames that will be achieved when playing the game.

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 then recorded to disk every 30 seconds until the battery power finally diminishes.

PCmark 2002

This test measures the performance of the hard disk subsystem. Both Read and Write operations are performed, cached and uncached. The tests access the disk in the same way as normal applications and are

not optimised to produce maximum throughput. High throughput numbers will be produced because no other tasks are running while the data is being transferred. Since Windows reserves a block of memory as the cache for file operations, the benchmark flushes the file buffer before each test to minimise the use of cached data in the tests. Each drive is defragged before testing.

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

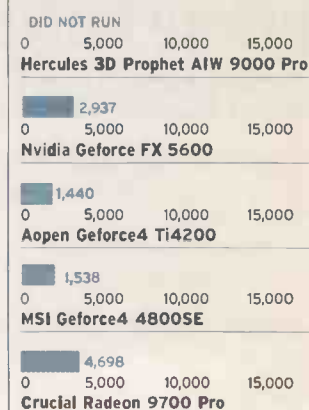
Test beds

When testing graphics cards, motherboards, hard disks and optical drives, we use two test PCs. The first uses an Intel Pentium 4 3GHz Northwood C with an 800MHz front-side bus (FSB), the second has an AMD Athlon XP3000+ using a 333MHz FSB. Each has two 256MB PC3200 modules of Crucial memory, a 120GB Western Digital hard drive with 8MB cache and a Crucial Radeon 9700 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.

3Dmark 2001



3Dmark 2003



A card's scores in 3Dmark 2001 differ greatly from those in 3Dmark 2003



3Dmark 2003 is so demanding it will only work on the latest cards



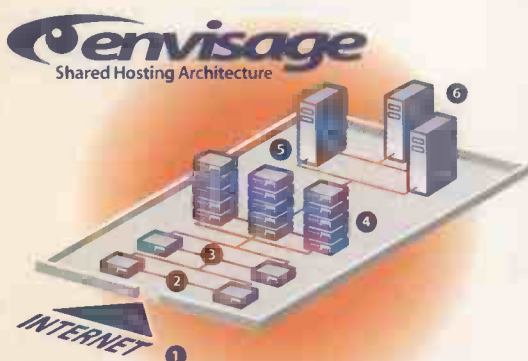
The Mother Nature test in 3Dmark 2003 will only run on DirectX 9 cards

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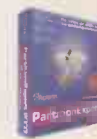
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DVD

Bitdefender 7.1

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For those of you who want to keep your PC virus-free the simple way, try this full program. Once installed Bitdefender 7.1 Standard just gets on with the job, without requiring too much user maintenance.



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Is it a bird? Is it a plane?

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New graphics contender

PCW numbers

Throughout the News you'll see references in stories to PCW numbers. To find out more information on these stories, or to read a fuller version, just go to www.pcw.co.uk and put the number in the box.

AMD thrilled to 64 bits

Intel reacted jumpily last month as AMD launched three 64bit chips into the consumer market – one of them, the 2.2GHz Athlon 64 FX-51, beating its leading 3.2GHz Pentium 4 even when running unoptimised 32bit code.

Early tests in VNU Labs showed a biggest-ever 3Dmark 2001 score of more than 20,000 using the FX with the ATI Radeon 9800 Pro card. You would expect it to score well on graphics but it compared well on other benchmarks too.

Machines using the mid-range Athlon 64 3200 are reviewed on page S6. AMD says the third chip in the range, the Athlon 6400 3000, is targeted at notebooks – hot and hefty ones, presumably, given that the chip has a thermal rating three times that of a dedicated mobile processor.

AMD's move to 64bit pre-empts what Intel would have to do at some point with its Pentium dynasty: all processors are likely to get at least a 64bit layer as system memory swells beyond the 4GB limit imposed by 32bit addressing.

Intel already has a 64bit line with its Itaniums, but these have



The new Athlon 64 FX-51. The figure 51 has absolutely no significance, AMD officials say

their own instruction set; the Athlons run classic x86 code with a few 64bit extensions. Officially the two ranges are not targeted at the same markets; but shortly before the AMD launch, Intel announced a 1GHz Itanium 2 with a cut-down 1.5MB cache for \$744 (£460), much the same as the \$733 (£453) Athlon FX.

A few days later came the announcement, universally seen as an Athlon spoiler, of a new 3.2GHz Pentium 4 Extreme, with 2MB of Level 3 cache, specifically targeted at gamers who are expected to be the main buyers of the Athlons. We were testing the FX and the Extreme as this issue went to bed, and benchmarks will be posted at www.pcw.co.uk.

Microsoft launched an AMD-optimised 64bit beta of XP simultaneously with the chip launch. It says a full version will be available in the new year.

The new 64bit chips are sure to find a market but they are not about to sweep away 32bit computing. The FX is beyond the price range of many of the young gamers who are most likely to want it – the slower chips are not cheap at \$417 (£257) and \$278 (£172).

There's also the issue, which we examine on page 30, of whether today's design priority should be making low-drain rather than high-speed chips.

The immediate problem with the new AMD chips was a shortage of supplies. Company officials denied that there had been manufacturing problems and said production would ramp up by Christmas. But Alex Kuo, president of chipset maker ULI (new spin-off of ALI), quipped: 'The AMD 64 is great processor. The only thing wrong with it is the lack of a CPU.'

Clive Akass

Psion goes mobile again

Psion may have got out of the handheld business it pioneered, but its Teklogix division is still going strong and has launched a new £950 Netbook Pro portable somewhere in size between a PDA and a laptop.

The device runs Windows CE on Intel's XScale processor and has a full-sized keyboard and an 8.5in SVGA touchscreen.

The format is roughly what many believed Psion, now a leading partner in the Symbian mobile software consortium, should have persevered with in its organiser heyday.

Psion did launch two subnotebook-like products, but they were too expensive and before their time – this was before web protocols and Wifi made novel mobiles more viable in the market.

The new Netbook Pro is not intended as a mainstream device. Psion Teklogix specialises in machines targeted at niche business applications.

Palmsoft, the new software spin-off of Psion's former rival Palm, is also reported to be designing for a similar format. ● See also three faces of Mobility p18 and Smart moves p21.

Sendo takes first round against MS

UK Smartphone vendors has won the first round of a multimillion dollar court battle with Microsoft. A Texas judge threw out one Microsoft plea to have the case dismissed, and another to have it transferred to Washington.

Texas courts are expected to deal far more quickly with the case, perhaps before the end of the year. Sendo claims Microsoft gave away its secrets when the two companies were developing a smartphone, which the UK vendor withdrew from the market at launch time last year.



Flat fantastic

If you're looking for a 15in or 17in monitor, don't miss our group test of 24 TFTs



Copy rights and wrongs

Find out what you can and can't do with copy and pictures you want to use on the web – and how to protect your copyright

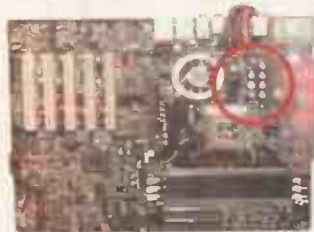


Spy caper melts PC hearts

A story worthy of a movie spy caper lies behind a spate of motherboard failures over the past few months, according to a US report. A scientist working for a Japanese firm stole the formula of an electrolyte for smoothing capacitors and sold it to a Taiwanese company, which began using it in its own products and perhaps some made for other companies.

But, in the best Hollywood tradition, the scientist did not have the complete formula and the capacitors had a tendency to melt, says the report on IEEE Online, website of the US engineers' organisation.

The problem surfaced in late 2001 and only motherboard maker Abit and IBM have as yet admitted being affected. But the



problem has been reported on boards of many other makes.

Abit was commendably open about the issue when I spoke to its man at Computex (though, of course, the component supplier not the motherboard maker had been at fault).

He said Abit had changed its supplier and was replacing motherboards that failed under guarantee. Out-of-guarantee boards would be looked at on a case by case basis but are likely

Abit of all right... recent boards like this one for AMD's new 64bit chips do not have the dodgy capacitors, which are similar to the ones seen as circles to the right of the fan

to be replaced if the capacitor is clearly at fault.

The capacitors involved are relatively large, about the size of a pencil rubber (see picture and caption above), and any problem with them will be immediately obvious because the system stops working. Abit says it only happens with hot overclocked boards.

The IEEE report says US repairers have been simply replacing the capacitors, which implies that processors and other components are not affected. **Clive Akass**



Wireless TV

You can use Sharp's Wifi-enabled 15in Aquos LC-1151E LCD TV (above) anywhere in the house or garden without needing to plug it in, and switch channels or even control a DVD player remotely.

At around £1,400 it's a luxury buy, especially when you can't use it as a monitor or link it into an existing home network. And more especially when it seems that TV functions look like becoming cheap add-ons to flat screens – see page 21.



Dancing robot recognises humans

PCW's Gordon Laing watched a demonstration of this robot at Sony Dreamworld in Paris and reckoned that it was the single most impressive piece of consumer technology he has ever seen.

The robot, called Qrio (pronounced Curio) walks about, dances, and picks itself up after being pushed to the ground, which is more than some of us can manage. It will understand spoken sentences and responds in its own voice and body language.

Qrio has stereoscopic vision and is said to be able to recognise people by appearance and the sound of their voice. Sony has yet to decide whether to sell it.

Help out abroad

An organisation called Digital Links is asking companies to donate old PCs for use in developing countries. It would also like to hear from computer experts who would be willing to spend a couple of weeks in Africa or elsewhere helping to set up and maintain PCs and train people how to use them. Details are at www.digital-links.org.

Register now to get your FREE ticket to The Computer Show

Thinking of treating yourself or someone else to a PC goodie for Christmas? Or do you want to get up to speed on the latest and greatest in computing? The Computer Show 2003 at the National Hall, in London's Olympia, from 5-7 December, will feature new products, technologies and applications with advice on buying and using them.

There will be booths from Britain's leading IT vendors, and free seminars and half-day masterclasses. The first 5,000 people to register will be entitled to FREE entrance. All you need to do is enter your details at our website at www.pcw.co.uk. Or go to www.computer-show.co.uk. Entry will be £10 at the door.

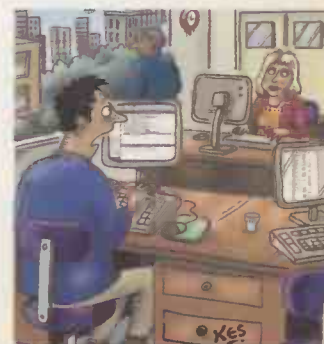
The show is sponsored by Personal Computer World and our sister titles Computeractive and Webactive.

IM not okay for net flirts

Office flirts are using instant messaging (IM) to avoid email monitoring in firms, says new research. IM is banned as a bandwidth hog in some firms but is becoming a security hazard spiralling out of control.

Security appliance firm Blue Coat surveyed 200 UK workers, 65 per cent of whom said they used IM at work. Almost half admitted using bad language in IM chat, and nearly one in three had made sexual advances.

PCW number 1143710



It looks like we'll have to start talking to each other

Three faces of mobility

The latest crop of handhelds illustrates three different design approaches. But as mobiles get more feature rich and powerful, will any of them win in the long run? Clive Akass reports

Three products launched in the past month mark a new round in the competition between Palm and Microsoft in the handheld arena and illustrate three distinct approaches to mobile design.

The Motorola MPx200, reviewed on page 69, has the size, look and feel of a mobile phone, though it includes many of the features you would expect in an organiser. It is only the second model in many months to use Microsoft's Windows Mobile for Smartphones operating system, which may indicate a reluctance among phone makers to embrace the Seattle giant in a market it would love to dominate.

Handspring's new Treo 600 (pictured right) is also billed as a smartphone, but it looks like an organiser, albeit one sculpted for holding to the ear. It has a tiny Qwerty keyboard, designed to be operated with just thumbs, and uses Palm OS 5.0 software – an obvious choice as Handspring is about to be merged into Palm (see box below).

Then there is the new Palm Tungsten T3 (reviewed on page 60) which is emphatically an organiser and contains no phone – although it does have Bluetooth, which can talk to a separate phone.

All three are excellent designs in their classes and illustrate the importance of low-cost removable storage. Cards



We've only had a cursory glance at the Treo 600, but it has some very nice touches and justifies Handspring's boast that most functions can be used with just one hand. Opinions vary on the BlackBerry-style keyboard but it has to be better than a numberpad for writing text. The interface is friendlier than Microsoft's, which has the smack of the office about it. There are some excellent context-sensitive screens that encourage one-click negotiation of tricky tasks like simultaneous calls and conferencing

available shortly will put 1GB of storage into their SD (Secure Digital) slots, allowing them to carry anything from a sales database to video. These devices will be used for business, games, playing music or movies – so why carry a dedicated MP3 player when you can use your phone?

The billion-dollar question (this is a huge market after all) is which, if any, of these three formats will dominate? Do people want a separate phone, or an organiser that can talk to a phone, or an organiser that doubles as a phone? Most vendors I talk to believe there is a market now for all three formats, and that there will always be a demand for a small mobile phone.

I am not so sure, because the handset format has limitations for anything other than making voice calls. These smartphones can send and receive emails, and numberpads like that on the MPx200 are unsuitable for anything longer than an SMS message. Moreover, its tiny screen will be a strain for lengthy reads. This argues for Handspring's Treo 600, with its thumbboard and larger screen.

Palm, which was remarkably slow to latch on to wireless, believes some people prefer a

separate phone and organiser so they can on occasion carry one without the other. A standalone organiser avoids the compromises in screen size and features needed by the Treo.

My hunch is that none of these three formats will win in the long run. People will tire of squinting at tiny screens as device capabilities increase – especially with broadcast data creating what will effectively be a new medium (of which more next month).

Wireless headsets will improve in both ergonomics and appearance, eliminating the need for a handset. Headsets for MP3 players are already fashion items, though they are probably wrecking a lot of ears, and there is scope to make them a lot better (again, more about this next month).

Mobiles will always come in sizes as various as books, but one will dominate: something the size of a paperback that can fold or scroll out larger. It will become as central to our lives and culture as the book or TV, and it needs to be big enough for the task.

● What do you think would make the ideal mobile? Write to letters@pcw.co.uk

Palm splits as Handspring joins

Handspring is to become a division of Palm when their merger goes ahead this autumn. Handspring will concentrate on phone-enabled devices, leaving its new parent to concentrate on standard PDAs.

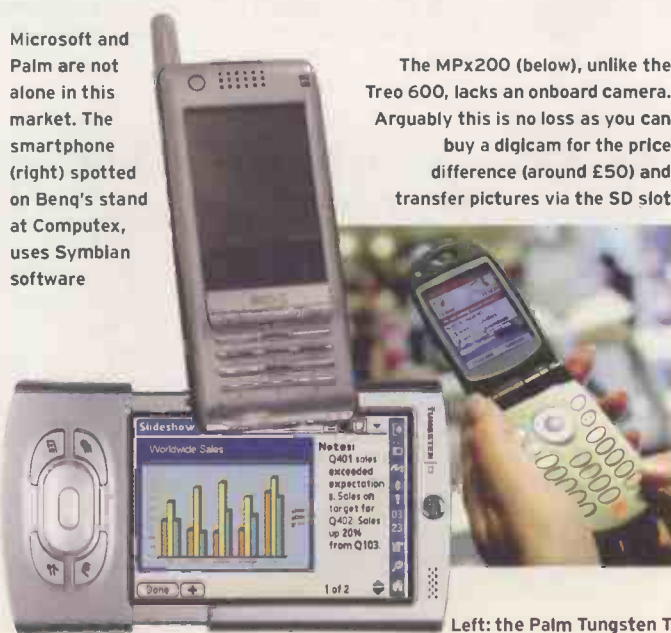
At the same time, Palm's software operations will split off into a separate company called Palmsoft. Palm still claims a considerable lead over rivals worldwide for its operating system.

For legal reasons Palm cannot retain its name and will be called Palm One. Palm actually claims a considerable market lead over Microsoft on handheld software worldwide and Palmsoft chief technology officer Albert Chu is confident this can be maintained in the face of Microsoft's dominance of back-end software.

He claims Palm already offers better file compatibility with Office than Microsoft's own pocket software.

Microsoft and Palm are not alone in this market. The smartphone (right) spotted on Benq's stand at Computex, uses Symbian software

The MPx200 (below), unlike the Treo 600, lacks an onboard camera. Arguably this is no loss as you can buy a dslr for the price difference (around £50) and transfer pictures via the SD slot

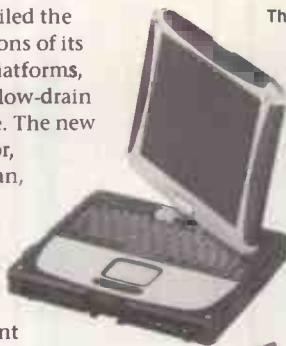


Left: the Palm Tungsten T3

Xscale steps into games

Intel has unveiled the next generations of its two mobile platforms, Centrino and the low-drain ARM-based Xscale. The new Centrino processor, codenamed Dothan, will be first built with 90nm-scale technology, and will include better power management and 2MB of Level 2 cache.

It will be at the heart of a platform codenamed Sonoma, with a chip called Alviso which will work with DDR2 memory. It will also support all current Wifi flavours, including 5GHz 11a and 11i encryption. In the longer term, it will support location services using GPS and other data sources.



This Panasonic Toughbook CF-18 was one the winners of an IDF innovation award

Anand Chandrasekher, VP of Intel's mobile platforms group, said the latest 855GME chipset for Centrino can save up to 25 per cent of the power drained by laptop screens by tweaking brightness and contrast.

The forum was told that Speedstep technology used to minimise power drain on Intel's mobile chips is to be applied to the new Xscale, codenamed Bulverde. Speedstep adjusts a processor's clock rate and

operating voltage to suit the task in hand. Bulverde is designed to optimise games performance on devices such as mobile phones and PDAs.

Intel believes games phones are a rapidly developing sector. 'We already see that in Japan with the I-mode service, and the same is happening over here,' said Ronald Smith, senior vice-president and general manager of Intel's wireless communications and computing group. 'The [new processors] may cost a little more, but they'll have the ability to bring arcade games to the mobile.'

Bulverde, available early next year, will also feature advanced imaging, supporting images of up to 4MB, and will be the most powerful Xscale to date.'

● See page 30 for more on chips.



Gelsinger: wireless revolution

Smart radios push up transfer rates

Two new technologies, smart antennas and adaptive radio, will revolutionise the use of wireless links by mobile computers, according to Intel president Pat Gelsinger. Multiple antennas will maximise transmit rates and increase reliability at the receiver by taking the strongest signal from each antenna and blending them. 'This has always been theoretically possible, but it requires advanced computing power that is only now becoming available,' Gelsinger said.

A four-antenna rig would give four times the bandwidth and 16 times the reliability of a single antenna, he said.

Increased processing power has also enabled adaptive radio, which uses high-speed modulation and channel selection to boost performance.

Intel has built a prototype 'universal communicator' with 802.11b, GSM and GPRS connectivity, automatically switching between them to give the best connection. It also packs a video camera and SD storage.

Express news

Intel has demonstrated its first chipsets supporting the new PCI Express bus, writes Robert Jaques. It says the bus, which offers a bandwidth scalable from 2.5 to 80Gbits/sec will meet the I/O needs of systems clocking up to 10GHz plus, with Gigabit Ethernet (GE) and 10GE.

Intel showed the chipsets, codenamed Lindenhurst and Tumwater, using a GE networking application.

A P4 in the handheld

A billion PCs and 2.5 billion P4-class handheld devices will be linked in a global computing network by 2010, predicted Intel chief operating officer Paul Otellini, pictured left with a chip wafer.

Graphics capabilities will be built directly onto the chip to cut costs and increase performance of low-end PCs as feature size decreases. 'By 2005 our processor transistors will be down to 65nanometres (nm), with all the benefits in reduced size and power consumption,' he said. 'By 2007 we'll cut that to 45nm, then 32nm by 2009, and in 2011 we expect to be at 22nm, [narrower] than DNA molecules.'

Otetlini also revealed that Intel is setting up teams in India, China and South America to design PCs for low-income users in the developing world.



Matchbox PC will pack a lifetime's talk

A personal computer the size of a matchbox capable of storing every word we say in a lifetime will be available within 10 years, according to Intel.

Senior researcher Roy Want showed a prototype that could store many different types of information and make it available to a variety of devices. 'Storage capacity is growing in leaps and bounds. By 2012 you will be able to carry a device that could record

a lifetime's conversations. It would take about three terabytes of data to do,' said Want. 'To include video you'd need 97 terabytes, which is expected to be economically viable at current development rates by 2014.'

The Personal Server would also have a powerful processor and wireless links. It could be controlled with a unit built into a watch, and would interface with whichever device you

happen to be using. Security would be a major concern and Want proposed a new system of access control based on what the user can do uniquely – perhaps picking a correct set of images from a random selection.

Want said he would be surprised if early versions of the Personal Server were not available within five years, and in some situations they could become a legal requirement.

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See www.pcw.co.uk for more Computex news and contact details

Towering trade of Taiwan

You could see it as tempting fate to build, in the middle of an earthquake zone, what will be the world's tallest building – and call it the World Trade Centre (right). But it's also a sign of technological confidence, as is the Computex show held in three halls around it in Taiwan's capital Taipei.



Sars delayed this year's show, but attendance was said to be 30 per cent up on last year; also up was the number of exhibitors (1,241) and booths (2,306). It is smaller than Cebit, but it is an IT show like no other. As one exhibitor said: 'Everyone showing here is a manufacturer.'

Most attendees are dealers or system builders. Taiwan has made

itself the workshop of the IT world. Its products are sold not only under local brands like Via, Gigabyte and Benq, but rebadged as well-known foreign makes.

Computex is tricky to report because many items on show are components, or samples that may or may not be exported.

Bear this in mind when you read the following pages: you won't necessarily be able to go to your local dealer and buy what you read about. Similarly it's hard to quote prices, as they depend on quantity. Taiwanese companies quote an FOB (free on board) price; it's what you pay, so to speak, at the factory gate. Add to that taxes, mark-ups, and the cost of transport, marketing and (with good dealers) testing.

Products sold may not be the same as those exhibited as big dealers can have them tweaked for a particular market.

So successful has Taiwan become that it is exporting work

to China (which still lays claim to the island and periodically rattles sabres in its direction).

Most Taiwanese are ethnic Chinese, either from families who fled Mao's China or from earlier migrations. Far from being the inscrutables of stereotype, islanders seemed from my short acquaintance to be so uniformly charming as to make Westerners look gauche. The nearest I came to an argument was at a market stall, where the owner protested that I was trying to overpay him.

It seemed incongruous to hear Elgar's Pomp and Circumstance played at the Computex opening ceremony, with the chorus of Land of Hope and Glory linked in my mind to embarrassing displays of British nationalism. But why should it not swell Taiwanese chests too? After pulling themselves up from a hell of a century, they have a lot to be proud of. CA

Exit the grey box and the floppy disk



Above: Barebones mini-systems from Elite

Left: Is it a PC or a hifi system? Actually this Gigabyte system is both

Left: Back to front... ports migrate to drive-bay panels

The multiple-panel case (above left) was one of the few traditional towers visible at Computex. Just about every motherboard maker was offering 'barebones systems' in novel cases in the style popularised by Shuttle. Though Elite (top right) and Gigabyte were showing thinner sandwich box designs.

You buy these systems with no processor or storage and put in your own or get your dealer to do

so. Many of the products, like the Gigabyte pictured above right are designed more for the living room than the office.

Shuttle was putting a brave face on being so comprehensively copied. Marketing director Steve Lin said: 'We have been doing it longer than anyone else and believe our solutions are better.'

The panels on the tower system tell a story, too: the death of the floppy. This has been predicted

for some years, with the zip and superfloppy drives being among the pretenders to the throne.

The floppy is being squeezed out by a combination of broadband (which limits its use as a transfer medium), the USB drive (faster and stores more), and now the multibay drive, as shown in two of the lowest three panels in the picture far left. These fit into the floppy bay and we were told the price to PC makers is no more than \$10, about the same as a floppy drive and more useful. At that price you can bet they will become standard.

Perhaps the oddest design at the show was the curved PC (below) from FIC, with the keyboard set into the monitor.

See our website for more systems and contact details.



>> TV-on-a-chip

Several companies, including Prolink and Vision Plus, were offering USB2 TV adaptors. But the most interesting exhibit was at the booth of a company called Lifeview, which had a TV on a card fitting the MiniPCI expansion slot used in notebooks. At least one notebook vendor plans to implement models with two MiniPCI slots, one for Wifi and the other for TV.

The card uses a new Philips TV-on-a-chip the size of half a postage stamp. It uses digital techniques to eliminate the usual bulky passive tuners. We're told it is of most interest to implementers as it works with all world standards but it is not yet cheaper than traditional technology. That could change, so you could see TV modules in monitors as standard.

>> Smart moves



What's needed now is a cheap module, not to implement TV (see above) but to turn a TFT monitor into a smart display that can be used untethered, mirroring a desktop XP PC.

Amtek, which makes webpads almost identical in spec to smart displays, told us it's currently nigh impossible to build one for less than \$1,000 because the volumes are not there. The company says even Microsoft does not expect smart displays to take off until 2005. But Amtek is interested in talking to vendors that want this type of device.

Amtek was one of the few companies showing Tablet PCs. But FIC showed the concept model (above) weighing just 1kg.

>> Folding drive

There were lot of USB dongles on show, including Flash drives supporting fast USB2. The neatest drive used the simplest idea: it folded into its cover like a penknife. With dongle caps challenging keys as most-lost objects, it looked like an idea whose time has come.

Routers pack print port



>>KVM switch

The Aten KVM switch (above) is similar to Avocent's Switch View reviewed last month, except that it has a two-port instead of a four-port USB1.1 hub. Both can switch keyboard, video and mouse between up to four PCs or Macs; and can also switch the hub separately between machines. However, the Aten uses hard switches rather than hotkeys, which is less confusing. Another useful touch is that it uses spare wires in the video lead for the mouse and keyboard, cutting down the number of cables.

www.aten.com.tw

>> Slide scanner

Microtek showed its Artixscan 4000t that can be used for biological specimen slides and film strips. Its smart autofocus allows tiny depth variations.

www.microtek.com

>>Instant studio

A good idea from Ortery is a 24 x 24 x 28in box with internal lighting to photograph objects. Ideal for snapping products for sites and magazines, it comes with a 4megapixel camera and stand, and software for \$2,300 (£1,420) in Taiwan. Or you can buy it without the digital camera. www.ortery.com

>>TV over mains

Superstar Technology showed a range of devices using the mains to send data. They included a USB adaptor, two 14Mbit transceivers for audio and video and an Ethernet router with 15 powerline ports.

www.homenetwork.com.tw

>> Client module

Ace Plus offers a £60 (dealer price) module that fits a ATA hard-disk connector to turn a PC into a thin client that can be used as a front end to Windows running on a server. It supports major protocols, such as RDP and ICA, and Ace Plus says it is a good way to use old PCs. www.ace-plus.com

Routers for homes and small offices will have more features, judging by examples showing at Computex. Draytek and Inexq were showing wireless routers with a USB port, a feature so useful you can expect it to become standard in this class of device.

It will allow any PC on the network to use an attached printer, avoiding the need for either a network adaptor or an always-on machine acting as a

print server. Incidentally, the Inexq supported 11b Wifi and the Draytek 11g, but be aware that configurations may vary, if and when products ship into the UK. Similarly the Draytek Vigor 2600G router packed an ADSL modem, limiting its market. One version, the Gi, will be of especial interest to small businesses because it includes

an ISDN fallback port to maintain a connection if the ADSL goes down.

Draytek UK does not stock this precise combination as we went to press, but variations on the theme can be seen at www.draytek.co.uk.

Available now is the 2600V, which includes all that the G version does, plus two Voice-over-IP ports into which you can plug standard phones.

The router also has a look-up table of your VoIP enabled contacts that translates dialled numbers into an IP address, so you can send or receive calls as if using an analogue phone. A firm called Amit was showing a router with similar features.



Fit to print: The Inexq ISW054U router includes a USB printer port

11a/g Wifi scarce but still looks worth waiting for

Many Taiwanese manufacturers are wary of supporting the latest 11a version of Wifi, fearing that 11g will dominate the consumer market. Both versions are rated at 55Mbps/sec, but 11a uses the less crowded 5GHz band and offers more channels, while 11g is more established, backward compatible with slower 11b and for better or worse has a longer range.

We were told more than once: 'We are waiting to see how the market goes.' Which is ironic, because PCW has been advising

readers to wait for the price of dual 11a/11g products to fall before upgrading from 11b. This advice still stands as there were a few dual products available, mostly using Atheros chips, and it seems that dual client cards should be only £6 to £12 more than 11g ones (at least in cost price), which is not much to pay for future proofing and clear channels. They are thinner than early models, and look identical to 11g cards.

Access points are more of a problem because they have two

transceivers, one for each wireless band. There are two versions: one you have to switch off to switch modes; the other, whose cost price is around £20 more, switches dynamically and can simultaneously support 11a, g and b. The price difference is likely to erode with mass production.

Atheros tells us its chips are already enabled for Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS), which the UK wants written into the 11a standard.

Bluetooth finally lives up to promise

Bluetooth seems finally to have cracked the sub-\$5 (£3 approx) cost that was envisaged when the short-range wire replacement was launched. Texas Instruments showed a

\$4 (dealer price) module that can Bluetooth-enable a phone, a relatively complex task, so you can expect to see a lot more BT-enabled devices.

Bluetooth-enabled stereo headsets have been conspicuous by their absence, so much so we suspect there must be a technical reason. Toshiba has demonstrated one and there was another at Computex, from a company called Global Sun.

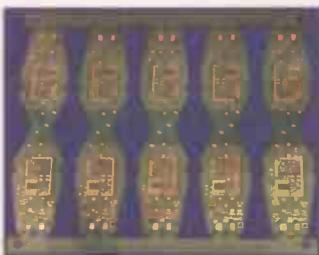
Global Sun also showed a Bluetooth thermometer that allowed central monitoring of patients' temperatures, while Mavin showed a hands-free kit



Hands-free kit for cars

that plugs into a car lighter socket to act as a speaker phone for mobiles. Several companies showed Bluetooth earpieces and printer adaptors – see our website for details.

A Bluetooth boom would be yet another reason to hang on for 11a/g Wifi (see box above), as the 2.4GHz band it shares with 11b/g is going to get even more crowded.



Bluetooth modules for headsets

MESH Award Winners

Feature packed systems favoured by the experts

MESH recommends Microsoft® Windows® XP

Award Winning PCs since 1987

"Stunning combination of features, value and performance"

PC Pro - Matrix 3000+ MX TFT - Oct 03

The MESH Matrix 3000+ MX TFT doesn't just look stylish - it's a good performer and the ultra-secure casing offers peace of mind.

MESH has produced a fine-looking, fast and well-specified PC.

PC Advisor - Matrix 3000+ MX TFT - Nov 03



Matrix 3000+ MX TFT

'A near-perfect Power PC'

★ NEW PRODUCTS ★



**NEW
ATHLON
64-BIT
PROCESSING
SEE INSIDE**

AMD Athlon™ XP 3000+ Processor
Microsoft® Windows® XP Home Edition
ASUS A7N8X NVIDIA nForce2 Deluxe Mainboard
(Dual Lan/2x 1394 FireWire/2x Serial ATA ports)
512MB DDR 400 Memory
120GB 7200rpm with 8MB buffer
128MB ATI Radeon 9800 8x AGP with TV out & DVI
17" SHARP TFT Flat Panel Monitor with stereo speakers
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Games Bundle + Joystick + Game Pad
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- ▶ DDR 333
- ▶ ATA 133
- ▶ AGP 8X
- ▶ 10/100 LAN
- ▶ USB 2.0
- ▶ 6 CHANNEL AUDIO

On-Board features Include

- Dual Channel DDR 333 support
- 10/100 Ethernet LAN
- 6 USB 2.0 ports & 1 VGA port
- 1 Serial port & 1 Parallel port
- 1 Audio I/O
- 1 RJ-45 jack
- Slots include 3x PCI & 1x AGP 8x

Additional features include

- TISCALI Internet & E-mail Access
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MESH Matrix M Series

Ideal for the Home/Office User

Matrix M2400

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The Matrix M series features
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- AMD Athlon™ XP 2400+ Processor
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- 80GB 7200rpm with 2MB buffer
- 128MB NVIDIA GeForce4 Graphics (SMA)
- 15" TFT Flat Panel Monitor
- SONY 48x CD Re-Writer & 16x DVD-ROM Drive (combo)
- 5.1 Surround Sound 6 Channel Audio
- For Speakers see Sound Upgrade (right)
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Ideal Home/Office User



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- 120GB 7200rpm with 2MB buffer
- 128MB NVIDIA GeForce4 Graphics (SMA)
- 17" TFT SHARP Flat Panel Monitor with stereo speakers
- SONY 48x CD Re-Writer & 16x DVD-ROM Drive (combo)
- 5.1 Surround Sound 6 Channel Audio
- Stereo Speakers integrated into TFT monitor
- Internet Ready V.92 56Kbps data/fax/voice modem
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- FREE Microsoft Works 7.0
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- 128MB NVIDIA GeForce4 Graphics (SMA)
- 18" TFT NEC 1860NX D/A Flat Panel Monitor
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- 5.1 Surround Sound 6 Channel Audio
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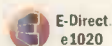
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- 128MB NVIDIA GeForce FX 5200, TV out & DVI
- 15" TFT Flat Panel Monitor with stereo speakers
- SONY 16x DVD-ROM Drive
- 52x CD Re-Writer Drive
- Dolby Digital 5.1 Audio with Soundstorm™ technology
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- 120GB 7200rpm with 2MB buffer
- 256MB NVIDIA GeForce FX 5600SE, TV out and DVI
- 17" SHARP TFT Flat Panel Monitor with stereo speakers
- SONY 16x DVD-ROM Drive
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- Dolby Digital 5.1 Audio with Soundstorm™ technology
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▶ 5.1 DOLBY DIGITAL AUDIO

On-Board features include

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- 1 Serial port & 1 Parallel port
- 1 Audio I/O
- 2 RJ-45 jack
- Slots Include 5x PCI & 1x AGP 8x

Additional features Include

- TISCALI Internet & E-mail Access
- Microsoft Internet Explorer (v.6.0)
- DVD includes decoding software
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- ▶ ATA 133
- ▶ AGP 8X
- ▶ 10/100 LAN
- ▶ USB 2.0
- ▶ IEEE 1394
- ▶ SERIAL ATA
- ▶ 5.1 DOLBY DIGITAL AUDIO

The X-treme Series features are the same as those from the Matrix A Series this includes onboard features - see previous page.

POWER GAMES BUNDLE



The X-treme Series comes with a bundle which includes a Joystick, a Joypad and 3 popular games

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- Forgotten Battles

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X-treme 3000+

Great Value Gaming System



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- Creative Labs Sound Blaster Audigy 2 ZS
- Creative Labs Inspire 6700 6.1 Speakers & Subwoofer
- Internet Ready V.92 56Kbps data/fax/voice modem
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- FREE Pinnacle Studio 8 SE Video Editing Software
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- Black Midi Tower Case, Plus X-treme Features

INCLUDES
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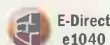
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X-treme 3200+ Platinum

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- 160GB 7200rpm with 8MB buffer
- 128MB NVIDIA GeForce FX 5200 Personal Cinema
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- SONY 16x DVD-ROM Drive
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- Creative Labs Inspire 6700 6.1 Speakers & Subwoofer
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- Logitech Cordless Desktop Optical Keyboard and Mouse
- FREE Games Bundle - Joystick - Game Pad + Tomb Raider2
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- Microsoft® Windows® XP Home Edition
- ASUS A7N8X NVIDIA nForce2 Deluxe Mainboard (Dual Lan/2x 1394 FireWire/2xSerial ATA ports)
- 512MB DDR 400 Memory
- 160GB 7200rpm with 8MB buffer
- 128MB NVIDIA GeForce FX 5600 Personal Cinema
- 18" NEC 1860NX D/A TFT Flat Panel Monitor
- SONY 16x DVD-ROM Drive
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- Creative Labs Sound Blaster Audigy 2 ZS Platinum
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- FREE Microsoft Works 7.0
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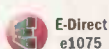
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- Dolby Digital 5.1 Audio with Soundstorm™ technology
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- Internet Ready V.92 56Kbps data/fax/voice modem
- Logitech Cordless Desktop Optical Keyboard and Mouse
- 6-in-1 Memory Card Reader
- FREE Microsoft Works 7.0
- FREE Pinnacle Studio 8 SE Video Editing Software
- Cubex Case (200x185x300mm), Plus Cubex Features

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- 120GB to 160GB 8MB buffer Hard Drive **£35** EX VAT (**£41.13** INC.)
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CUBEX 3200+

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- AMD Athlon™ XP 3200+ Processor
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- 512MB DDR 400 Memory
- 120GB 7200rpm with 2MB buffer
- 128MB NVIDIA GeForce FX 5200 *Personal Cinema*
- 18" NEC 1860NX D/A TFT Flat Panel Monitor
- SONY Multi format DVD Writer**
- Dolby Digital 5.1 Audio with Soundstorm™ technology
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- Internet Ready V.92 56Kbps data/fax/voice modem
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Entertainment bundle

Includes USB TV Tuner, Games pad and joystick and Games bundle which includes

- Championship Manager 4
- Forgotten Battles
- Splinter Cell



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MESH recommends
Microsoft® Windows® XP

Turn over for the Intel based Elite Series
and the latest MESH Notebook Offers

CUBEX Features

- ▶ FSB 400
- ▶ DDR 400
- ▶ ATA 133
- ▶ AGP 8X
- ▶ 10/100 LAN
- ▶ USB 2.0
- ▶ IEEE 1394
- ▶ PCI 1X
- ▶ 6 CHANNEL AUDIO

On-Board features Include

- Dual Channel DDR 400 support
- 1x 10/100 Ethernet LAN
- 2x IEEE 1394 Firewire ports
- 2 USB 2.0 ports
- 1 S/PDIF out + 1x Surround L/R audio Jack + CNTR/LFE
- 2 Serial port
- 1 Audio I/O
- 2 RJ-45 jack
- Slots include 1x PCI & 1x AGP 8x

Additional features Include

- TISCALI Internet & E-mail Access
- Microsoft Internet Explorer (v.6.0)
- DVD includes decoding software
- CDRW includes burning software
- Windows XP is a full version - OEM
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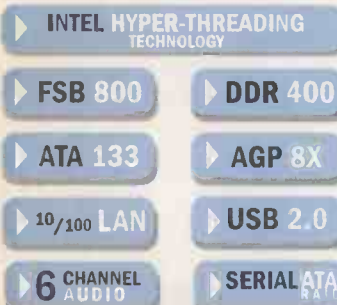
Notebooks

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Elite HT Features

3000 & 3200 systems



On-Board features include

- Dual Channel DDR 400
- 10/100 Ethernet LAN
- Max 8 USB 2.0
- 1 Serial port & 1 Parallel port
- 1 Audio I/O
- 1 RJ-45 jack
- Slots include 3x PCI & 1x AGP 8x
- 1x Line In/Line Out/Microphone ports

Additional features include

- TISCALI Internet & E-mail Access
- Microsoft Internet Explorer (v.6.0)
- DVD includes decoding software
- CDRW includes burning software
- Windows XP is a full version - OEM

**3 YEAR
WARRANTY**

All MESH PCs carry a 3 Year Parts & Labour warranty as standard, plus lifetime telephone support - giving you total peace of mind.

Matrix M and Elite Series possess 1 year on-site + 2 year back-to-base Warranty.

Matrix A, X-treme and Cubex Series possess 2 years on-site + 1 year back-to-base Warranty.

All Notebooks possess a 3 year back-to-base Warranty (parts & labour in year 1 + labour only in years 2 & 3).

Pick up & collection available at £50 inc. VAT.

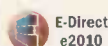
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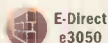
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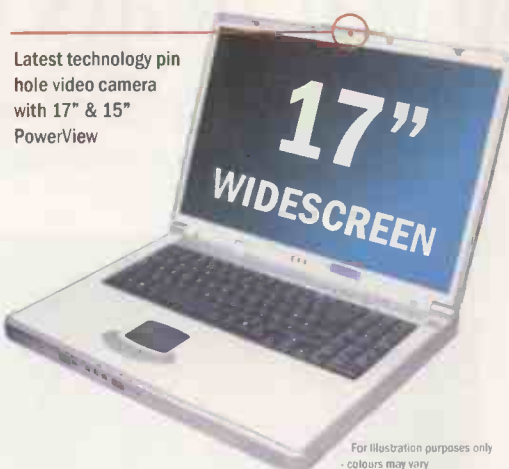
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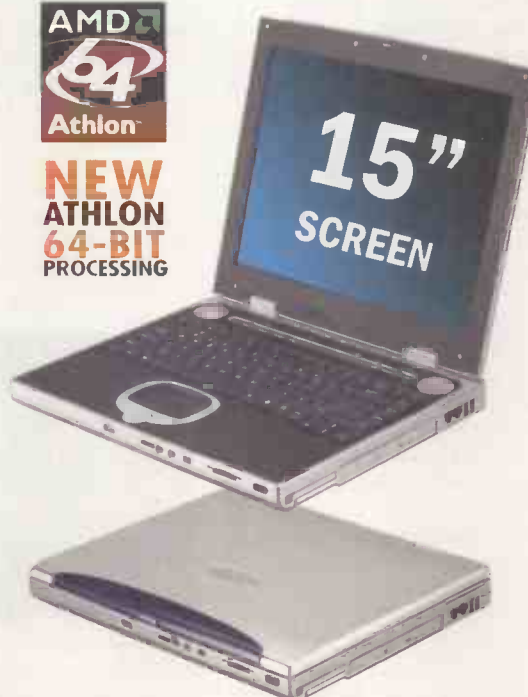
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64bit chip war heats up

You couldn't fault AMD for having the hottest products in town with its new 64bit chips. But speed isn't everything and... er... don't we need something rather more power efficient?

Marty Seyer, general manager of AMD's microprocessor business unit, could not bring himself to say 'Intel', as if it were the name of some dreadful deity whose very mention incurred agonising death. Instead, he referred repeatedly to 'The Opposition', who he claimed had no answer to the Athlon 64. All it could do, he said, was 'repackage a server part' as a spoiler - Intel's new Pentium Extreme is widely seen as a tweaked Xeon.

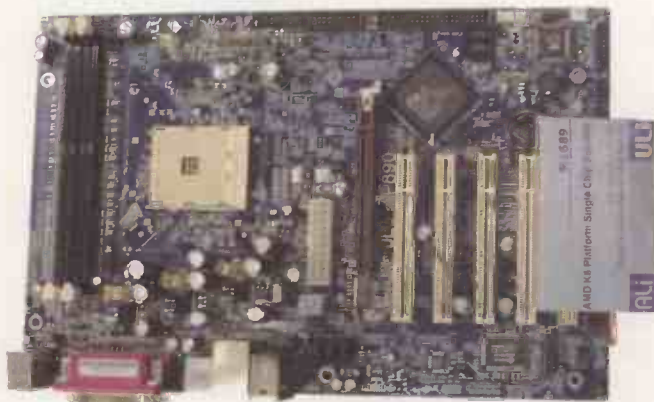
AMD was on a high. For the first time in its history it had caught Intel on the hop, at least as seen from Computex, where the Taiwanese developers were showing off their K8 (64bit generation) motherboards. All agreed the new Athlon 64 FX blew the P4 away, or at the very least matched it, even on unoptimised 32bit code.

Few doubted that Intel has a fallback 64bit design that it will launch if K8 succeeds in the consumer market. There have been rumours of one for some time, and the latest is that Intel's coming Prescott architecture has a 64bit layer. If so, the news had escaped companies that are already designing Prescott chipsets - though they design to a given spec and are told nothing about the guts of the processor, as one engineer told me.

If Intel does launch a K8-style chip, it could face the indignity of having to adopt AMD's 64bit extensions to its own classic x86 instruction set - if only to run Microsoft's 64bit version of XP, a public beta of which was launched with the Athlon 64.

Then there is the question of what this would mean for Intel's 64bit Itanium, which uses a different instruction set and has yet to have big sales.

But even AMD says it is not targeting the Itanium's ultra-high-end market. The new K8 chips will find a ready market among gamers but with PC cooling becoming an industry



A K8 board using the ULI M1689 chip that merges the usual Northbridge and Southbridge chips into one. ULI president Alex Kuo reckons his MP1683 P4 Northbridge chip will also be favourite with overclockers as it supports front-side speeds of up to 1Gbit and 400MHz DDR memory

in itself (see caption below and opposite page), the question has to be asked: does the wider world, at this time, really need yet another superfast superheated processor?

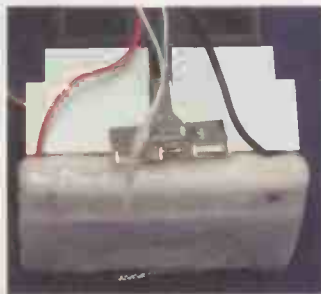
In the future, when pen and voice input are seriously and co-operatively useful, we will need still greater processing power, but it is by no means clear that this will come from massive general-purpose central processors. The priority now is surely power efficiency, for the sake of ecology (no wasted energy), ergonomics (cool, untethered computing) and world peace (no noisy fans).

What I could not get out of AMD was the power overhead of 64bit computing. I suspect that it will push up peak power, by switching more transistors at a time, but cut the overall drain by being more efficient - maybe a reader could enlighten me.

The point is important because K8 is not the only 64bit architecture AMD has up its sleeve. A few months back it bought a company called Alchemy, which designs chips using MIPs cores - the nearest there is to a rival for Britain's low-drain ARM cores that are at the heart of Intel's XScale chips and most handheld devices. On the AMD stand at Computex

there were a couple of Alchemy-based PDA reference designs. They were only 32bit, but MIPs has 64bit designs that AMD has the right to use.

Low-drain chips like this could become as important as desktop processors, as the trend towards untethered working gathers pace. And, as prices fall, mobiles will have more memory than the 4GB that can be addressed by 32 bits (see page 18 for Intel's view).



Cool aid acid test: the thermostat has been removed from this heatsink to show the icy effect of its thermo-electric cooling system from Taiwan's GlobalWin. The wires go to a PCI card with its own exterior power supply, highlighting the fact that in order to extract waste energy you are wasting still more energy. It's effective, but hardly power efficient. The system, for the P4 or Athlon 64, will cost about £60 from www.rainbowcomponents.co.uk

Also worth pondering were the Geode boards showing alongside the PDAs. AMD recently bought the Geode system-on-a-chip technology from National Semiconductor, which developed it to power webpads and other connected wireless devices. The idea is similar to that exploited by Arm and MIPs: you have a central standard processing core around which specialist modules can be fitted to produce a chip tailored for a particular task. Only in the case of the Geode, the core is an x86 PC chip.

As feature sizes shrink on chips, designers will be faced with the problem of what to do with all the extra transistors that can be packed in, and they will draw more and more functionality into the processor. One effect will be that processors will become much more like Geodes, tailored to a particular task. The other will be to absorb functions that are now done by separate chipsets.

This is already happening with the Athlon 64, which has ingested the memory controller and enabled ULI, the new chipset spin-off of ALI (see caption above), to merge the usual Northbridge and Southbridge support chips into one. So what is going to happen to all those Taiwanese chipset vendors if their work disappears completely into the CPU?

AMD's Seyer said the snag with systems-on-a-chip is that the whole processor has to be re-engineered each time there is a minor change in, say, a protocol. In fact, AMD will have to tweak its K8 on-chip memory controller for the introduction next year of DDR2 memory, and has modularised the design to make this easy. But Seyer said: 'Even if we did [absorb the chipset functions] there would still be features we would want to put on the motherboard... There will always be a healthy market for a discrete chipset.'

Clive Akass

A really cool look for the fast PC

Souped-up PCs are getting like souped-up cars: not only must they be fast, they have to be seen to be fast – even when stationary. So PCs are beginning to sprout the computing equivalent of the flashy motoring accessories favoured by young men who burn rubber on bypasses.

You can get drive-bay panels that give you a temperature gauge, speed control and status light for each fan in your PC. All absolutely necessary, of course, to tweak your system for best performance and minimum noise dynamically as you slave away at your spreadsheets.

Some water-cooling systems, like Evercool's WC-201 kit, fit into the drive bay, with an LCD status screen and control knob set into the fascia.

None of which is to say that cooling is not a serious business that can destroy your PC if you get it wrong. Globalwin, which makes the Ice Age cooler



Cold comfort from CoolerMaster

pictured above right, will be selling a good-value water-cooling kit into the UK in a few weeks. Some of the new barebones boxes took innovative approaches to cooling, with heatpipes transferring energy from the processor to fans at the rear.

Shuttle's system keeps the coolant at low pressure so that it boils at around 55 degrees C and condenses when it reached the



Globalwin cooler: water on the brain

rear fan. Shuttle reckons this will suffice for the next-generation P4 and Athlon 64 chips, but to be sure it showed an alternative



A cool case: the Hush PC

system with a large heatsink and fan clamped to the back panel.

Fanless heatsinks are usually beautiful, which is odd because they are the one thing in the fad for ostentatious cooling that gets hidden away. Not so in one of the UK designs on show at Computex. The fanless Hush

CL1000 PC uses its entire case as a heatsink (centre picture).

Which brings us to that mystery object pictured on page 16. It is stuck onto a heatsink at the rear of an Abit barebones system and it's intended to be used as an aromatherapy oil distiller. You stick your aromatic oil with some water in the back and it evaporates therapeutically as you work.

Next thing we'll have a kettle bubbling away on our P4s giving us a constant supply of hot water in a modern version of an Aga range.



Mystery object: an Abit oil well

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All eyes on web

Remote surveillance is sure to become a major use of broadband, as reservations about privacy and intrusion crumble in face of the advantages, like being able to check up on the kids or office from anywhere in the world.

We saw nothing at Computex to match the value of the Veo Observer, with its pan-and-tilt facilities (see PCW September), but there were many interesting products to fit various scenarios.

These slot into two categories: IP cameras that plug straight into the network and have their own web address (as opposed to dime-a-dozen webcams that hang off a PC) and servers that give you access to a number of cameras in a building.

Sunvalley showed a low-cost server (around £140 in Taiwan) supporting up to four cameras. More upmarket is Moxa's Vport 2140, which has very clear

functions, as the display pictured below shows. A big advantage is that this type of server can web-enable an existing analogue surveillance setup.

It can take a feed from up to four analogue cameras and from two sensors (a pressure pad or infra-red beam) which can be used to trigger an alarm.

More expensive servers support more inputs, and most devices of this type support or include movement sensors that will send you a picture of suspicious activity; there's also specialised storage and software to record and manage sites. A number of companies were showing IP cameras, some Wifi enabled so they need only a power connection. See our web Computex special for details - but be warned that products may not be available here yet.

● For more on remote home security see our feature on p101.



Surveillance hub supporting up to four cameras, each accessible over the web

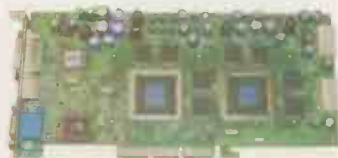
XGI joins graphics fray

Computex saw the debut of XGI, a new player in the graphics-chip (GPU) market, and a partial retreat by Nvidia, one of the top two vendors. XGI, a spin-off from SIS, showed two reference boards with dual Volari chips.

The V8 and V8Ultra chips support DirectX9, and early reports say they are on a par with ATI boards of their class.

Nvidia launched a new graphics processor for mobiles,

but said GPUs would no longer be its central focus. ATI launched its latest Radeon 9600 XT shortly after Computex.



V8Ultra: see www.pcw.co.uk for bigger pic

Off we go into the wild, Blu yonder

Once you've had a taste of Blu-ray's discs, which can hold 27GB of high-definition pictures, you'll want to bin your TV. J Mark Lyttle explains why we should envy the Japanese

The wealth of amazing technology and services in Japan can be enough to turn British technophiles green with envy. Take Sony's recently launched addition to its range of hard disk-based digital video recorders – the Cocoon CSV-EX11 (costing 160,000 yen or £865). Its attractively styled exterior gives no hint of the 500GB of storage inside, enough to store up to two weeks of brain rot. Sony has thoughtfully fitted two tuners in the system so you can record one program while watching another.

Fujitsu's Hada Chekki is one item we don't mind seeing restricted to its Tokyo birthplace. Fujitsu has taken a USB camera, capable of taking close-up magnified images, and teamed it with a simple software package to provide an upscale home skin-analysis system. By setting the price tag set at 47,000 yen (£255), the company is clearly aiming for a slice of the world's richest market for beauty products. A little, perhaps, like the England football captain and his pop star wife have done with the toe-curling TV ads for Tokyo Beauty Clinic; yet another Japanese creation you have to be thankful is staying put.

Being far beyond any redemption the Hada Chekki can provide, I skipped the offer of a demo and headed over to Sony's labs for a spin on something a lot more interesting – the world's



The Hada Chekki skin analyser can knock spots off rival products

Cocoon's lovely shell gives no hint of the power that churns within

The encoding rate is user-selectable to increase recording duration as needed, but the full-quality setting still manages two hours of glorious HDTV, including Dolby 5.1 audio, with no quality loss. Finally, Sony is clearly indulging in a spot of market priming by bundling a digital satellite tuner with the unit, which seems like an eminently sensible idea.

Seeing HDTV for the first time is an experience akin to switching from dialup to ADSL – most folk would rather have weasels rip their flesh than go back to the old days.

Speaking of ADSL, the half-dozen or so major ISPs in Japan simultaneously upgraded their consumer ADSL packages this summer to offer Internet access at up to 26Mbps/sec. Indulge my desire to make you jealous and let me tell you that I use it at home and habitually achieve download speeds of upwards of 15Mbps/sec without breaking sweat. Kazaa never looked so good, or so a friend tells me. The price? Oh, a mere 12 quid a month or so. If that doesn't have you cursing BT, then nothing will.



first commercial blue-laser DVD recorder.

The Blu-ray BDZ-S77 is aimed at the sophisticated user and, with a 450,000 yen (£2,432) price tag, costs about the same as a decent second-hand car. It's hard to see a product like this ever making it to the UK, not because of the difference between PAL and NTSC but because it is intended for recording high-definition television (HDTV). The Japanese have been researching HDTV since 1964 and, although still not widespread, it has about two million subscribers in Japan.

The machine uses a blue-violet laser to write to a DVD-

size (12cm) disc, squeezing in more data by virtue of the fact that the 405 nanometre light can burn smaller pits than the usual 650nm red laser. The theoretical maximum for a single-layer, single-sided disc is 27GB, although the current generation maxes out at 23GB.

The large quantity of data storage is not enough on its own to handle recording HDTV, which is why Sony developed a new digital signal processor (DSP) to handle up to 36Mbps/sec. A standard DVD can hold only about 4GB and records and plays back at around 4Mbps/sec.

The encoding is mpeg-2 and, naturally, random-access recording is the order of the day, much like a solid-state personal video recorder (PVR) or a DVD-Ram. You need special Blu-ray discs, but the BDZ-S77 can play DVD-Rom, DVD-R/RW, CD-Rom, CD-R/RW and CD-DA.



High fidelity: Sony's Blu-ray digital video recorder offers high-capacity storage for high-resolution videos

Picture this...

Japanese girls just can't get enough of those little photo booths (Puri Kura, as they're known in Japan). The latest versions, allowing full-length shots of the giggling teens crammed into the photo booths, are called Eropuri. Given that the 'ero' in eropuri comes from the word 'erotic', I'm sure you'll... er... get the Opicture.



>> Waitec for it

Waitec's £55 inc VAT MP3/CD player comes with a five-level music equaliser and supports ID3 tag 1.1 for displaying information about MP3 tracks.

>> £4.99 access

Plusnet is offering an entry-level service of up to five hours per week anytime dial-up net access for £4.99 a month.

www.plus.net

>> Light 40GB

Archos has launched a 40GB USB2 backup drive smaller in area than a floppy disk (76 x 77 x 8.8mm) and weighing 75g.

>> Grafigo 2.0

Corel has launched v2.0 of its Tablet PC application, Grafigo, with enhanced tools for content creation, annotation and document management features as well as leading-edge collaboration technology. It costs £68.15 inc VAT from www.corel.com/grafigo, where a free trial version is available.

>> Faster Raptors

Western Digital has doubled to 74GB the maximum capacity of its Serial ATA 10,000rpm Raptor drives, and claims to have boosted performance by 30 per cent.

>> Media centre

Hauppauge Digital's new £99.99 inc VAT MediaMVP device will pull music, video or pictures across a network from any PC and play the files on TV sets or hi-fi systems.

www.hauppauge.co.uk

>> Fast flash

Sharp Microelectronics has developed a 128Mbit Flash

memory with a maximum access time of 60ns, compared to a usual 85ns.



Dell goes for ink profits

Dell has begun selling printers under its own brand in a move that could have a big impact on market leader HP. The first six to be launched in the UK are all Lexmark models that have been given what the company calls 'the Dell touch'.

The most significant difference is that they will use Dell's own cartridges, moving the company into the most lucrative side of the printer business. This means you will not be able to buy a replacement from your friendly local dealer: as with all Dell products, you will have to buy direct from the company via its site or a special phone number.

Abizar Vakharia, senior printer marketing manager, insists that this is actually an advantage because people are confused by having to seek out precisely the right cartridge in shops.

Dell software that comes with the printer alerts the users well before a cartridge is finished and orders a one-click route to ordering a replacement. 'Dell already knows your model number so there is no problem choosing the right cartridge,'



The new Dell models include (above, left to right): the A940 all-in-one (£94.99), the £59.99 J740 Inkjet, and the A920 all-in-one at £64.99. Other models in its new range are the P1500 mono laser (£199.99); the S2500 (£339.58) and the networked S2500n (£515.83) workgroup lasers, delivering up to 22ppm; and the M5200n workgroup laser (£727), designed to print up to 175,000 pages a month. All prices quoted include VAT.

said Vakharia. Users who buy a printer with a PC will be spared setup problems because the correct drivers will already be installed. 'All they will need to do is plug it in.'

Vakharia dismissed the idea that people will be wary of being tied to a single source for print supplies. 'We are no different from other manufacturers. They also set the selling price.'

He pledged that, unlike some Lexmarks, Dell printers will not have a 'digital cutout' to curb the use of cloned cartridges. 'And we will dispose of all your

used products. When you buy an ink or toner cartridge you will get a package to send it back free of charge when finished. That goes for printers too: if you buy a printer from us, we will dispose of your old one.'

Peter Urey, HP's UK imaging category manager, said the company had the most robust portfolio of printer-related intellectual property, and was well placed to fight off rivals. 'We will continue to focus on innovation and delivering on customer needs better than any other competitor.'

P2P hijack 'saves bandwidth costs'

Sixty per cent of residential web traffic worldwide now consists of P2P (peer-to-peer) users illegally swapping music and video files, according to Canadian network specialist Sandvine. And it has some cheeky advice for service providers who have to pick up the bill: 'If you can't beat them, join them.'

P2P is a classic web application, allowing people to locate and use a resource anywhere in the world, said Chris Colman, managing director of Sandvine's European sales arm. The problem, so far as service providers and web users are concerned, is that it does not do so efficiently.

Users lose out because lines become clogged, particularly upstream, as people who may be the other side of the world download files from a peered PC – rather like a village being jammed by through traffic that brings it little benefit.

P2P is upsetting the finances of service providers because the bandwidth is used by people who contribute no revenue. All the obvious remedies have snags, said Colman: caching has copyright problems, P2P blocking can be circumvented and is unpopular with users, as is bandwidth capping.

His answer is to hijack the P2P process and make it work better by redirecting file

requests locally where possible, thus avoiding costly trunk-line charges (if not the congestion). The Sandvine system separates out P2P packets and redirects them to a router that has built up a database of local resources.

There would seem to be enough legal issues here to keep the wigs in fine claret for years. Is the system abetting copyright abuse? Could non-P2P users sue service providers for hogging their bandwidth?

But Colman says Sandvine's lawyers have declared the 'meta P2P' system legal. And indeed it could be made the basis of a legal version of P2P, perhaps paying royalties automatically on each file transferred.

Take a letter, Ms Remote

The typing pool is making a comeback after retreating in the face of the word processor. Digital recording is bringing in a more efficient, distributed way of working in which typists can be anywhere in the building, or the world, said Jeff Wrycraft, digital project manager at Philips Speech Processing.

Philips has just launched a new generation of solid-state dictation machines (see below) that can store several hours of speech, with a separate file for each task, allowing work to be prioritised, allocated and distributed more easily than with the old tape systems.

It is ideal for telework because it can be done by anyone with an Internet connection, giving the housebound or those in remote areas the chance to work. Less good news for UK workers is that transcription can also be done in low-wage anglophone countries such as India.

Philips also sells industrial-strength speech recognition systems for the likes of lawyers and radiologists, who dictate reports or letters that are transcribed first by machine and then corrected by humans.

But these systems require training, perseverance and changes in work practices, which some companies are reluctant to

implement. 'Digital dictation systems can be an interim solution because you can add speech recognition when you are ready for it,' Wrycraft said.

Happily, machines are not going to throw every typist out of work, if only because they do not work well enough when a recording is done in a noisy environment.

'We are getting new types of customer for these latest devices – people like engineers who need to dictate reports on site,' said Wrycraft. 'Some of these people are costing £200 an hour and it makes no sense wasting their time doing work someone else could do for less money.'



New cable ties

A company called Millepede claims to have a completely new take on the humble cable tie, which can minimise the tangles that seem almost inevitable when connecting PCs and peripherals. Its Mille-Ties are about 1ft (30cm) long, with a pointed end you simply wrap round your cables to be tied, thread through an appropriate gap and pull tight. They can be removed and re-used by simply reversing this process, provided you don't cut off the pointed end.

Unused portions can be used to make another tie or more, if the cables are small. The ties also give if the cables expand, avoiding the crushing that Millepede claims can happen with other designs. They can be bought for £1.99 for a pack of 25 from www.kosline.com/pcw.

Mobile Dragon

Scansoft has released a new mobile version of Dragon Naturally Speaking 7, designed to allow dictation in any location. It comes equipped with a digital recorder and costs £199.99 inc VAT – watch our for a review next month. Scansoft has also launched a £39.99 plug-in that allows pdf documents to be viewed and edited within Word.

Workgroup scanner

Visioneer's 9750 pdf workgroup scanner has a 50-page document feeder and scans up to 20 mono pages per minute at 200dpi. It costs £600. www.visioneer-europe.com

Pocket-hours of dictation

The Philips Pocket Memo 9350 has similar controls to traditional dictation handsets, which minimises the disruption in offices moving from analogue to digital systems. But it can do more than an analogue handset, letting you delete and insert passages as if you were using a word processor. This can save work because a typist working with tape may not reach the corrections until the original has been transcribed.

The 9350 records up to four hours on the 16MB MMC (Multimedia Card) provided, but supports higher capacities and SD (Secure Digital) cards, so you can put days of work into a device the size and weight of a mobile phone.

The PC sees the £239 9350 as a USB drive, so you can move the industry-standard Digital Sound System (DSS) files across directly from Windows, or you can use a bundled Philips utility that helps you manage the files.

Philips' £229 9250 differs only in having push-button controls; the 9220, which lacks a card slot and relies on 32MB of internal memory, costs £199. There is also a programmable 9400i, for which there is a development kit.

Cards can be slotted into the 9750 desktop transcription box instead of a PC. This costs £429, or £619 bundled with the 9350. The devices work with major transcription software, including Philips' own Speechmike Executive, which comes with a headset and foot-pedal control; this costs £489 bundled with the 9350. All prices cited are excluding VAT.

You should also check out the Olympus range, including its latest DS-660 voice recorder, which costs £279 ex VAT with 32MB of memory



Best try this at home

Gadget makers seem determined to tempt us into dying at the wheel by giving us new toys to play with in the car. Not content with mobile phones, navigators, TVs and stereo systems, they have now come up with the in-car printer.

You don't have to use Brother's £249 inc VAT M-Print in the car, though, especially if

you want to live. The device can be used via a wireless link from any Bluetooth-equipped PDA or notebook and prints on A7 thermal paper.

The 300g, 10 x 15.8 x 1.75cm machine is much the same size as a PDA and Brother says it can print around 300 pages on a single charge.

www.brother.co.uk





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Send your emails to:
letters@pcw.co.uk

Letters

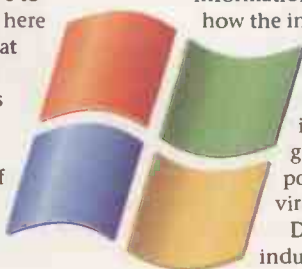
The summer of 98 > I read with some amusement Nik Rawlinson's response to the letter 'Thanks a bunch, Bill' (November 2003). In it he said that given the size of Windows you have to forgive it for the odd slip-up here and there. I do not consider at least one patch a week as an 'odd slip-up'. The problem is that the complexity of Windows means it is impossible to keep track of any potential problems.

In Microsoft's twin aims of massive profitability and world domination it keeps shifting the goalposts by releasing new versions of Windows and never getting a single one perfect. It needs the profitability to develop new versions, but what's wrong with the one we already have? I now use XP because some piece of new hardware did not have drivers for Windows 98, but in all other aspects, 98 was more than adequate for my needs. It was fast and sturdy, and I can't see any real benefits to XP. Yes, its cuter in some respects but that's not worth the upgrade.

Mike Bennett

I'm not a moron! > I was recently watching a business report programme and it struck me what an immature view the television industry takes regarding computing. The report delved into complex statistics about the economy and how FTSE share prices will be affected this

way and that. Other information programs such as the excellent Horizon series go into great detail about the science they are portraying. If I decide to watch a computer information programme, do I see charts of how the industry is progressing or tutorials



on Java? Do I see in-depth reports on Microsoft Office 2003 or other extremely important IT news? No, someone greets me with an orange jumper pointing at a PC screen. 'This is a virus,' he says creepily. 'It is scary!' Does everyone in the television industry think all PC users are sat mortified about the horrors of viruses and wondering how to turn on their PCs? The majority of PC users know exactly what they are doing, and the capabilities of their computers. Thank goodness for magazines like PCW for giving us comprehensive information in an adult fashion and not just stating how 'scary' viruses are.

Leon Dean

Software's hidden costs >

I recently bought a piece of utility software to back up my PC, based on some good reviews in PC magazines. I then noticed on the manufacturer's website that there was an update from version 7 to 7.01 (bug fixes perhaps?).

However, imagine my horror when going to the download page and finding the download is 349MB in size. On a 56K dial-up account this is not a joke. Additionally, the

PCW and Lexmark will award a space-saving X5150 multifunction printer, scanner and copier to the author of our letter of the month.

This speedy device earned itself a Highly Commended award in our October MFD group test, due to its excellent photo-quality output and a scanning resolution of 600 x 2,400dpi that can pick out even the smallest detail in snapshots and documents. Capable of working even with your



PC turned off, the X5150 is the essential addition to any home office. For more information on Lexmark products, visit www.lexmark.co.uk or call 0870 444 0044.

WIN!

download page warns that there are problems when using a manager/accelerator to download the file (I tried Download Accelerator and Getright without success). At present I am trying an 'Old Skool' Microsoft 'save target as' from Explorer's right-click menu, but doubt that the line will remain stable for the 19 hours required to complete and, considering there is no option for a CD copy of the file, I am basically unable to upgrade my software.



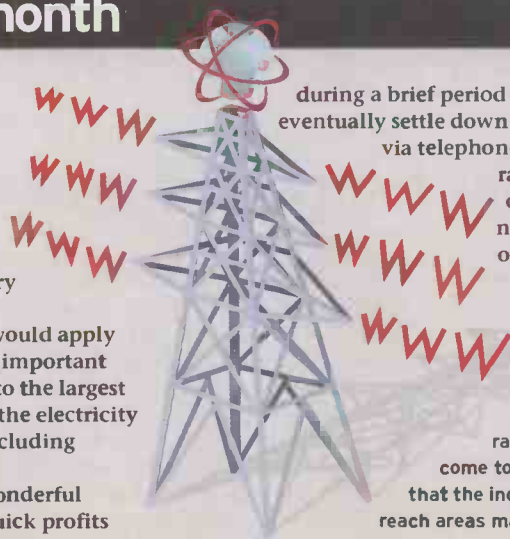
Letter of the month

Unseen pollution problem >

'Data-on-mains looks good' reports Clive Akass (PCW November 2003, p 22) – on the contrary, it looks very bad. If approved, proposals to put Internet access data on the electricity mains supply, despite many serious objections, could end in a disgraceful and unnecessary ecological disaster.

Power line transmission (PLT) of data would apply data signals occupying much of the most important and valuable short-wave radio spectrum to the largest antenna ever devised, ie all the wiring of the electricity supply system over the whole country, including virtually every building and street.

This incredibly crude assault upon a wonderful natural resource might well offer some quick profits



during a brief period of Internet development that must eventually settle down to far more satisfactory solutions via telephone lines, point-to-point microwave radio, microwave satellite radio, and cable (proper communication and non-interfering data cables, wire or optical fibre).

RH Pearson

Nik Rawlinson replies >

Good point, but little known. Past studies have looked at the ethereal ecological impact of running data (or radio) through the electricity network, and come to the same conclusion. It seems, though, that the incessant demand for broadband in hard-to-reach areas may finally see this plan come to fruition.

Therefore, may I suggest that on top of the minimum system requirements for processor printed on a box, manufacturers start informing users of the level of Internet connection required to gain future support.

Martin Clinton

Nik Rawlinson replies > Sadly, many manufacturers don't consider those users who are still connecting to the outside world using a plain old modem, and the hassle of duplicating and distributing patch discs every time there is a point-update is probably not worth it for the small amount of money they would be able to charge. Perhaps we should just think ourselves lucky that the virus-software manufacturers distribute their updates in free, small data files.

Picture paranoia > I am writing regarding October's letter of the month from Stephen Prowse, who complained that a delivery driver had used a camera-enabled mobile phone to prove he had made a successful delivery.

What a strange letter. Am I alone in thinking Mr Prowse is making something out of absolutely nothing? So he was not in to give permission for the delivery driver to take a picture of the consignment. So what? I'm not sure he needed that permission anyway but I can hardly believe anyone can be so small-minded as to care.

Mr Prowse stated: 'Bounds must be set and permission obtained where photography within one's own house takes place.'

Why? Joking apart this really does seem to be typical of the US-imported paranoia that would end up with the delivery driver being sued for everything he owns because the click of his camera resulted in the neighbour's dog having diarrhoea all over his master's new slippers, causing him stress and trauma that will prevent him from ever working again.

The company, in my opinion, does not need to be informed of the error of its ways. In fact, it should be commended for a new initiative that is in both the customer's and the company's interest.

Vinnie Wyre

Spam solution? > I have read many features in PCW on the subject of spam mail. It appears that nothing can be done to stop them. All the spam mails are offering goods and services. Perhaps it's time the providers of the goods and services that the spammers offer are involved. I have received many mailings offering Norton products at discount prices along with the normal septic tank and 'your mortgage is approved' mails from the US. Perhaps the providers of the goods being sold should be fined if they know their products are being offered through spam mailings – not that Norton, the banks or the septic tank suppliers, necessarily do. Along with the normal spam I also receive sexual content spam. These

mailings have myname@another.domain address. The mail providers, such as Hotmail, could stop this by taking unbilled confirmed credit card details from email applicants and charging them if abuse is detected. It's easy to spam, but it's also easy to reduce it.

John Kathawick

Nik Rawlinson replies > Very true, John. It would be easy to stop spam if such measures were taken, but taking the measures themselves is where the difficulty lies. Few manufacturers will cut off a supply to a spammer that is bringing in a lot of sales, and, although I, like you, receive several dozen offers for the same product from different companies each day, it is the spammer, rather than the manufacturer that goes down in my estimation. As for unbilled credit card details – it might just work. Assuming, of course, the policy of header forging ends, which it won't.

Luggable lover > I dislike laptop computers because they are too fragile, not ergonomic, and it's difficult to replace simple components such as optical drives. However, I do occasionally need a PC that I can carry across town easily and securely. I was wondering if your readers know of any LCD TFT monitors that easily fit inside a brief case. My thinking is that one of these could be coupled with either a Shuttle XPC or perhaps the Armari Iwill PC you reviewed in the October issue. I have seen shorter than normal cordless keyboards on sale which, as I never use the numeric keypad, would be perfect for my needs. That's just one part of the whole caboodle, though – can anyone help?

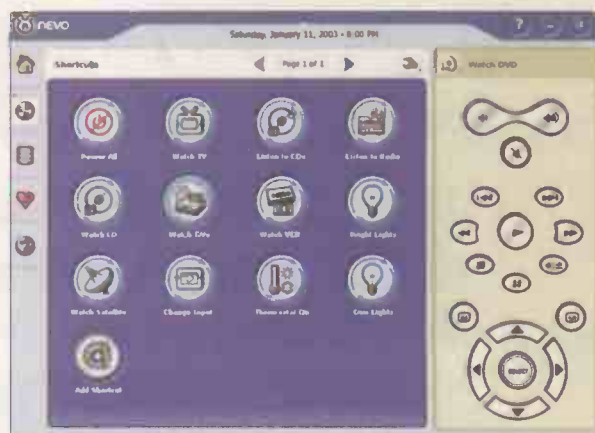
David Lee



The petite Armari Iwill PC could slip into a briefcase and become quite luggable

Well done > I just thought I'd send you a line to congratulate you on your latest ABC figures, which, if I'm not mistaken, place you as the best-selling computer monthly in the UK. I hope it continues, but please bring back the gadgets section.

Nick Kyrke-Smith



Nevo on a PDA is a pricey solution to the problem of juggling remote controls

Nik Rawlinson replies > Thanks Nick for your good wishes on our top-dog status. And as for the gadgets section – watch out for our special Christmas gadgets feature in next month's Reviews section.

Money to burn > I own a small TV repair business in Cromer and have just read Guy Kewney's column on using a PDA as a remote control.

I have owned an Ipaq 3970 with Nevo pre-installed since Christmas day and had lots of fun controlling the TV (JVC), video (JVC) and the set-top box (Philips), much to the dismay of 'er indoors who didn't seem to find it either clever or funny!

I went on to control the portable in the kitchen, the portable and video in the bedroom and even the kids' portables – and, yes, it annoyed them too.

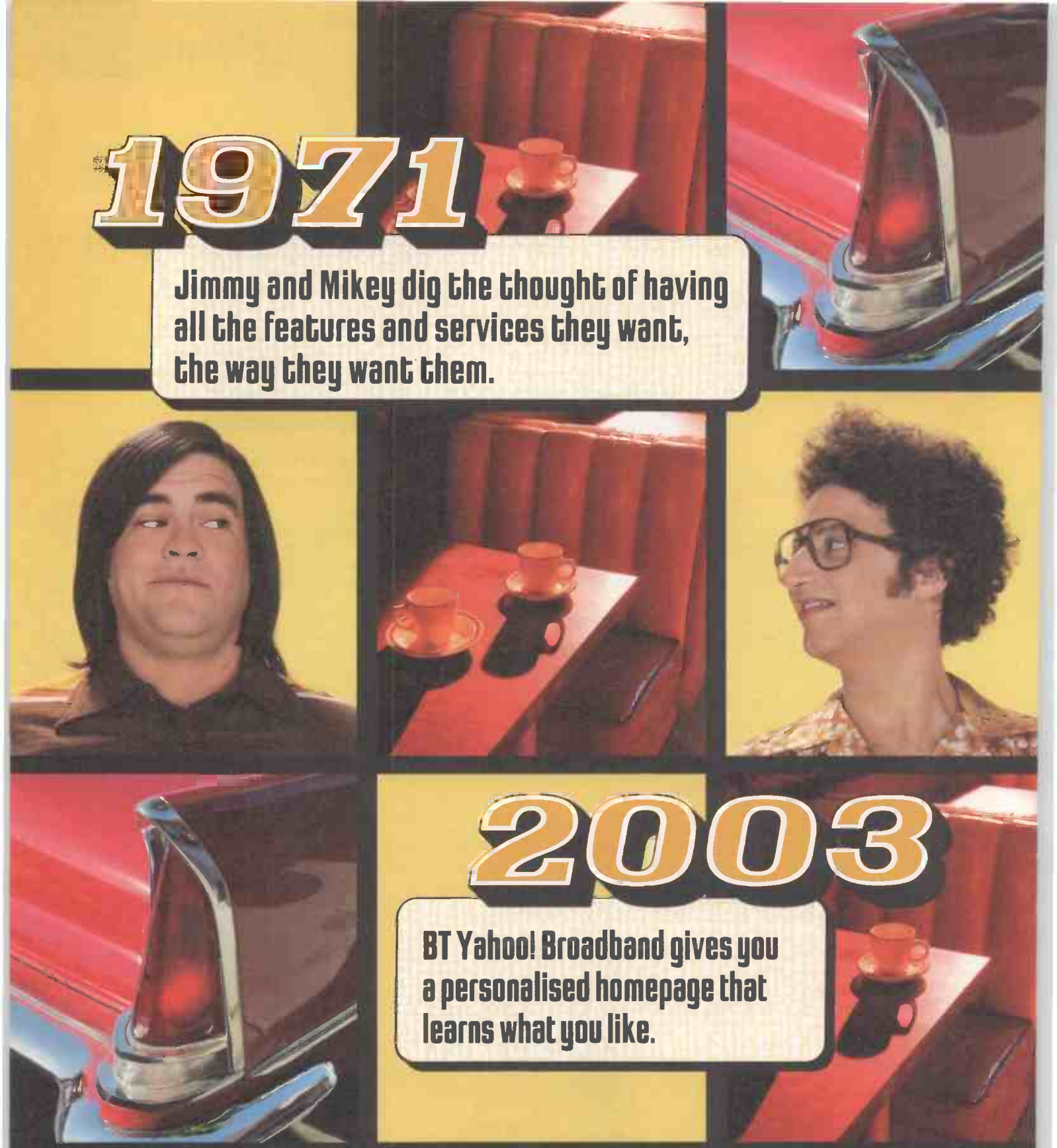
I have now found Nevo to be an invaluable tool in my shop, as most TVs require a remote to operate and tune-in, and most customers 'forget' to bring in the remote. I have so far only found two models that the Nevo software could not control and, as for the range, I can stand on one side of the shop and operate a TV on the other side.

As this is a lot longer than your average front room I can't see why Guy had problems with it. I will admit that the angle you can operate at is a bit reduced – probably around 45 degrees – but as you are normally in front of the item you wish to control this shouldn't pose a problem.

So, let's all waste £500 on a PDA and use them as £14.95 remote controls!

Nigel Robinson

Unless otherwise stated, letters sent to the editor, PCW team or contributors will be considered for publication. Letters may be edited for clarity or length. Views expressed are those of the author and not necessarily those of the editorial team. If you wish your letter to be considered for the monthly prize, please include a full postal address for delivery. An email address alone is not sufficient.



1971

Jimmy and Mikey dig the thought of having all the features and services they want, the way they want them.

2003

BT Yahoo! Broadband gives you a personalised homepage that learns what you like.

BT  **YAHOO!**
Broadband

From now on you can have the internet your way – up to ten different family members can have their own unique homepage, and customise it the way they want, so everything is just a click away, all for just £29.99 a month. Free activation – call 0800 015 8793. For a free modem as well, sign up online at www.btyahoo.com

The way the internet was meant to be.

Online modem: offer ends 21.12.03, standard price £70, offer price previously £40.
Subject to availability, survey & min computer specification. BT line required. Min 12 months. BT terms apply.

BT 



guyk@pcw.co.uk

Mobile data – more fantasy than fact?

Phone network infrastructure will need to improve to support serious business apps, warns Guy Kewney

I have met some people who live in fantasy worlds, but those who dream of turning GPRS into a serious proposition for computer users have to be up there with the wackiest of them.

As a frequent user of what is wittily called '2.5G phone services' on my trusty Thinkpad, I knew that all was not well with the world, but it wasn't altogether clear exactly why. Then someone gave me some statistics.

'You may be interested to know,' said one reader, 'there is an operator in the States that has a single 64Kbits/sec link to provide backhaul data, for about one-third of the country,' he said.

Provision for mobile data in Europe is substantially higher, of course. Exactly how much higher is a pretty tricky metric to uncover.

One of the problems that faces mobile data users – and not just over GPRS – is that the IT world talks a good fight about 'convergence', but when you actually get down to it, there's a lot of giveaway signs proving that they aren't actually all that interested.

For example, when I was chatting to Novell people at Brainshare a few months ago, one of the top technical guys was impressing me with a particular new service the company was rolling out. The details were impressive, the strategy inspiring, and it relied completely and absolutely on a 100Mbps/sec Ethernet connection. Anything slower, or with longer latency, and it simply doesn't work.

A consultant I know had managed – through extreme cleverness – to provide remote control services for his clients from anywhere. What he'd done was obvious enough: he'd started using a virtual private network (VPN) from his notebook computer. He could dial into his ISP from anywhere, set up the VPN link to his client, and then take over their machine. Such direct control eliminates all those tedious 'move the mouse up' instructions where the hapless user picks the mouse off the desk and holds it a foot above the desk – he could see what was happening.

Being clever, he one day decided to run his VPN across GPRS using his phone as a modem. It worked! It required substantial patience, but it eventually worked. And then a few months later, it stopped working.

I checked with the mobile networks. The only one that actually knew what was going on was Orange – and it knew because it was setting up a VPN-friendly GPRS service. In doing so, it had discovered that most VPN software can tolerate IP address translation, but simply dies if you try to do port translation.

Orange now provides a genuine commercial 'VPN over GPRS' service. 'It's really not easy, because none of the protocols are designed for this,' said one of the technical staff setting it up. 'Almost all these commercial programs assume a latency of well under 100 milliseconds. Over GPRS, it is routinely three seconds. If you switch from one cell to another, you can have eight seconds' delay before data flow resumes – and, believe it or not, you can switch cells without moving.'

The thing that puts all this into perspective is the small number of people who use this 2.5G wireless for anything serious. The amount of data that goes through a simple mobile phone looking at Wap sites is very small – hence the absurd charges per megabyte that GPRS fetches.

But plug a notebook PC into the system, and you're looking at spending your month's data allowance in one Outlook email session. And the software, of course, isn't grateful; it chokes on the data retransmission delays faster than you choke on the bill.

So what are the phone providers doing? Actually, very little. What is happening, at last, is that they are really and truly starting to build third-generation networks. In the UK this time next year you will genuinely have a choice of three 3G providers, including 3!, in most urban areas. So there's not that much incentive (or budget) for spending huge sums on building new data-carrying facilities onto the current GSM network.

What's worse is the providers don't see the demand. They look at

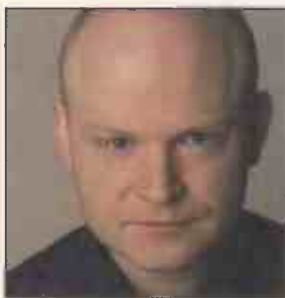
new IT-centre software and they see code which can't work at all over GPRS. The typical FTP program, for example, is simply not capable of adjusting to the demands of a user who is travelling; and if you ask the authors to produce a new protocol, they say they'll doubt that there's any demand.

I'd like to be able to prove them wrong, but so far, all the evidence is on the side of the cynics.

In the circumstances, I'm starting to doubt the sanity of people who say: 'Data services and convergence are the solution to getting average revenue per user up and making phone networks profitable.' At the rates they charge, nobody is going to shift much data. At the data amounts people will shift, there's no demand for infrastructure provision. With the infrastructure we have, there's no way of boosting the amount of data we send to the point where it would make a serious market opportunity. Round we go, again...

It's all, frankly, a chimera. A good joke for some phone users, but not to be taken seriously by computer users. ■

'This time next year you will genuinely have a choice of three 3G providers – including 3!'



gordonl@pcw.co.uk

Bring down costs for hotspot users

Gordon Laing makes a plea for more affordable wireless communication for those on the move

You know the guy who switches on his phone at the first safe opportunity after a plane's landed? The one who smiles when he sees GPRS coverage or spots a nearby wireless hotspot? The same fellow who gets online wherever he goes even though he knows there aren't any urgent messages waiting? That guy is me.

I admit it; I'm hooked on electronic communication, not because I have to keep in touch, but because I'm fascinated by the where, when and how you can do it. Bitten by the bug, I can't help but try and find the cheapest and most cunning ways to communicate wherever I am.

You might think me a tad obsessive, but once you've received your first horrific phone bill or faced the price of most wireless hotspots, you too will suddenly become more interested in reading the small print and working the system. Certainly as more and more devices become connected, finding the best data deals will soon become a goal of anyone not on a carte-blanche expense account.

I'm a big fan of text messaging and frequenting cyber cafés when abroad, but there are times when you must get your notebook or PDA online. Here the two most important technologies are GPRS and Wireless Lan. On the surface, the choice between them seems to be one of simple location. If you're in range of a wireless Lan then use it. If you're not in range or are on the move, then switch to GPRS. While many people stick to this plan, it's actually fraught with unexpected cost and performance issues. Take it abroad and the whole thing can also be flipped on its head.

Technically speaking, GPRS is a neat technology which seems ideally suited for the mobile worker. You're only charged for the data used and the overall performance is usually (but not always) faster than a traditional dial-up mobile connection. The major downside, though, is cost, with most users stunned at how many kilobytes they use. As an experiment, next time you go online with a dial-up connection, check the networking details to see how many kilobytes you've sent and received during a web browsing or email session.

I recently used GPRS on my notebook in the UK to go to a single website and make a transaction. It must have been no more than five clicks worth over five minutes, but it used 600KB, which on my Orange tariff worked out at £1.20. Now much of this data was spent downloading images from web pages – the more cunning of you might disable these to save money. But this particular website used images to specify which Pin numbers were required, and therefore wouldn't have worked without them.

Had I been near a wireless hotspot, I wouldn't have got away any cheaper. Most charge prepay rates of around £5 for 30 to 60 minutes' use, which must be taken in one session. So in this instance, GPRS was expensive, but worked out cheaper than a wireless hotspot. Ironically though, an old-style dial-up connection might have worked out cheaper still, especially if you could use inclusive airtime minutes. Beware of ISP numbers which can't be taken from inclusive minutes though – you may need one which starts with, say 020.

I've found the high cost and inflexible billing of most wireless hotspots frustrating. It's a great technology for the mobile user, but unless you have big files to exchange or need broadband speed, it's normally cheaper to use your mobile phone – unless you're abroad. We reluctantly accept that using phones abroad will incur higher charges, and GPRS data is no different. Taking Orange again as an example, GPRS works out at £8.51 per megabyte for most of western Europe, but rockets to a staggering £20 per megabyte in the US and £25 in Hong Kong. Admittedly, other mobile networks can be cheaper, but you're still looking at over a fiver per megabyte from most countries.

Buy a prepay card for a wireless hotspot, though, and the charges remain the same whether you're local or a visitor. So while the locals complain that £5 is a lot for 30 to 60 minutes of broadband, the foreign visitor has quite literally struck gold. For example, Nice airport has a wireless hotspot which charges €5 for 30 minutes. That's

expensive for locals, but as a visitor in France the same money would only get me a paltry 300KB of slow GPRS data, which I'd go through in just two minutes. Amazing as it seems, foreign wireless hotspots are a bargain when you're abroad. Anyone visiting the UK will no doubt find our hotspots represent amazing value for money.

Part of me feels relieved I've found a situation when wireless hotspots work out as being economical, but this is only compared to the prohibitive alternative of using your mobile abroad. Wireless hotspots should be an affordable proposition for all types of users, including PDA owners who might only want a few minutes' access to check a message or location while sipping a coffee.

So my plea to café owners is to consider fitting your own wireless hotspots and offer, say, 30 minutes of free access with every order. I'm sure I'm not the only one who'd favour these establishments over those with expensive third-party facilities. I believe this is the only way wireless hotspots will attract anyone other than rich business users or canny foreign visitors.

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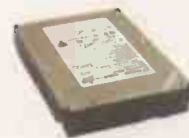
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barryf@pcw.co.uk

Art treasures set for plundering

The digital pirates won't stop at stealing music and film, warns Barry Fox. They're eyeing up fine art, as well!

Heaven protect us from people who promote technology that they do not understand. As sure as night follows day, and just as predicted in this column last year, London's congestion charging scheme has run into trouble. Mayor Ken Livingstone's Transport for London (TfL) is giving Capita, the company that runs the scheme, £31m to improve the technology – and so catch more drivers without room for appeal.

It's probably money wasted because, as anyone who has ever used a scanner and optical character recognition (OCR) software knows, number plate capture will always make mistakes.

You can get a fix on how much TfL understands about technology, just by emailing TfL a plain text question. I asked how to change credit card details on TfL's computer records. The reply was a plain text email telling me to download an HTML attachment, which contained the answer. I pretended to be a punter who didn't know how to handle an attachment. TfL's customer services suggested I download Acrobat from Adobe's website, adding that I may not be able to open an attachment if a virus checker is set too high.

HTML attachments instead of plain text? Download Acrobat to read HTML? Little things like this make it easier to understand how TfL came to scorn the traffic-checking system used in Singapore – with smart cards in cars read by gantries and cameras only used to snap cars without valid cards – and rely entirely on flakey OCR.

Recently the National Gallery in London announced a plan to earn revenue by printing while-you-wait copies of all the paintings on show. At the launch party, both the National Gallery and project partner Hewlett-Packard proudly proclaimed that they wanted to model the future of fine arts on the music industry. Vyomesh Joshi, executive VP of HP's Imaging and Printing Group, announced: 'The music industry has gone digital, end-to-end. Distribution can be on the Internet. We want to see the same process in the world of Fine Arts. This is the first baby step to becoming just like the music industry. A whole new revolution has happened.'

Is this really wise, we asked? Just look at what happened in the music industry! At a recent anti-piracy meeting held in London, Jay Berman, the chairman of the IFPI (a global recording industry trade body), blamed poor security in CD technology for making one in three music CDs a pirate copy, with pirate sales at a billion dollars a year, losing the legitimate industry \$4.6b a year.

Berman stated: 'If we had ever envisaged CD-R, we would have pressed for greater protection in the CD system. We tried to talk to the computer industry about copy control. No way, they said. Nothing. We were desperate, but there was no level of co-operation.'

What he didn't say was that it was the record industry's blissful ignorance of technology that created the original problem. Back in June 1989 at a meeting in Athens, the RIAA agreed to the Serial Copy Management System (SCMS). This stops a digital recorder make a copy of a digital copy, but it lets it go on making as many digital copies of the original as the user wants. So SCMS offers only token protection. But it bamboozled the music industry people round the table. The rest is history, and making copies of music CDs is now a way of life.

The National Gallery has been working with HP for eight years on a scheme to digitise all its 2,300 paintings. The images were captured with a digital camera that steps backwards and forwards over a painting to achieve a resolution of 100megapixels – that's 20 times better than the best consumer camera. A six-colour printer in the Gallery's shop prints out high-quality copies on demand, in just five minutes.

You'd think the National Gallery might be worried about people buying and scanning one of the its high-quality prints, for posting on the Internet or selling prints in street markets and fine art shops. Not so.

So I contacted Michael Kuhn, who was at the sharp end of Polygram when

the music company was working with Philips on launching CD technology 20 years ago. Kuhn then went on to run Polygram Filmed Entertainment, which made a stack of hits such as *Four Weddings and a Funeral*. He has recently been trying to warn the film industry that it will soon be suffering what the record industry suffers.

I asked him what he thought about the National Gallery plan. 'Looking back,' he told me, 'top management at record companies should have spent 9am to noon every day thinking about piracy and the Internet and nothing else. Film studio brass should be doing that now. So, too, should the fine arts bosses.'

The audio, video and film industries now routinely use watermarks to identify the original source of recorded material. But I discovered the National Gallery system uses no watermark in its prints, either visible or invisible.

Does this worry them? Hardly. A National Gallery spokesperson assured me: 'We own the paintings and the copyright in the digital scans.'

Oh well, that's all right then.

'Top management at record companies should have spent 9am to noon thinking about piracy'



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HEART OF TECHNOLOGY



nikr@pcw.co.uk

Simple ideas prove to be big winners

Nik Rawlinson reflects on some unlikely winners on the Internet in the past six years, before his final sign-off...

After six years at PCW, it's time for me to move on, and I'll be leaving just as soon as this column is done. In those six years, the world of computers has transformed almost beyond recognition. Sure, you still have a keyboard and a screen on your desk, but there are better chances now that they will be combined as parts of a notebook.

When I started, I had an original Pentium PC, running at a mind-blowing 90MHz, and it did everything I could possibly want. It was one of the best in the office, but now it would barely run a firewall.

Perhaps the biggest changes, though, have been online. While a 14Kbytes/sec modem may have seen you gallivanting through pages at a fair whack in 1997, it cuts no mustard in this era of broadband connections where – illogical, but true – a Pentium 4 really does drag streaming media through your ADSL connection faster than a PIII ever did. Perhaps there is something in the claim that it's more than just your modem after all.

The following year – 1998 – saw the launch of Freeserve, championed by high-street retailer Dixons and since sold off to French ISP Wanadoo.

Freeserve marked a sea-change in the way companies charged (or didn't charge) for Internet access. Within a few short months there was a legion of imitators and the UK Internet boom had begun. The virtual value of the companies behind well-known online names rocketed, and millions lost millions on the stock market, while a tiny few made millions more on the back of the boom.

And then something rather different came along – Blue Carrots, the ISP owned by its users. Sign up and you were given shares. Jump through a series of fairly simple hoops and you got a whole lot more. I still have mine, I think, but have not really kept track of what to do with them so I guess I'll not be making enough to retire on them just yet. Has anybody?

Beyond the widespread rollout of broadband (and some would argue we are still waiting for that) perhaps the biggest indicator of the way the net has changed during my six years on the mag has been the rise of just one brand. Not BBC Online, not Friends Reunited, but Google! The site is named after a misspelled number (a googol is a 1 followed by 100 zeroes).

According to the company's website, 'A googol is a very large number. There isn't a googol of anything in the universe. Not stars, not dust particles, not atoms.' But pretty soon, it seems, perhaps there could be a

googol of web pages, and one engine will know all about them.

Sergey Brin and a guy called Larry Page who had once built a working printer out of Lego, founded Google in a university dorm. They tried to sell the underlying technology to a variety of companies, including Yahoo, which it has since gone on to eclipse, but nobody wanted to know. It seems a site that did nothing but search was of little interest to anyone. How wrong they were, for, as we all know now, it was this very simplicity that was the secret of its success.

I was first shown Google at the back end of 1998 by a guy called Jim Martin, who at the time worked in VNU's Labs as a tester. I couldn't understand why he'd want to use that over and above Yahoo, but I gave it a go and, a month later, couldn't imagine ever using anything else. For a while, at least, I couldn't imagine that something bigger and better wouldn't come along in the next few months. But, of course, it didn't.

Google still wins prizes for being the best search engine available, and the name itself has even become a verb (how many of us have not 'Googled' a potential date or interview candidate before a face-to-face meeting?) Microsoft Word still underlines 'Googled' as a spelling mistake, but I'd wager it's in the dictionary of the next release.

Yet while Google has moved away from its roots, offering image search, news aggregation and even newsgroup archiving it has retained the simple front

page that has kept it on top of the search engine pile.

There are hidden features too. Type 'how many pounds in a kilo' into the search box and Google Calculator will give you an answer ('1 kilogram = 2.20462262 pounds'). Likewise, enter '128/8' and hit Google Search, and its response will be '128 / 8 = 16'. Clever, eh? And a feature pretty much unknown.

The task for which I most often use Google, though, is keeping track of friends and, although I may not be gracing the pages of this fine journal any more, you can always find me through Google. And I hope you will. I'm hit number one.

Right now, though, the production editor is peering over my shoulder. Seems I've reached my word count and it's time to shuffle on and make way for my successor. I hope that they enjoy writing this column each month every bit as much as I have done.

I'll part with a word of thanks to you, the readers of PCW, for all the feedback – good and bad – you've given me over the last six years. Thank you.

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googol of anything
in the universe –
not stars, not
dust particles,
not atoms'**

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Reviews

EDITED BY CHRIS CAIN

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

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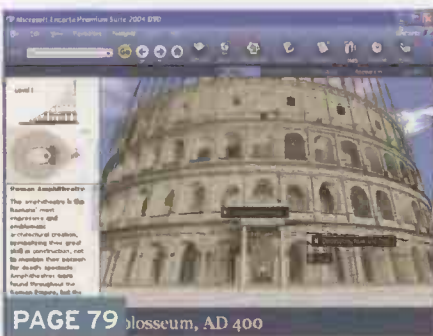
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Should you get ahead of the game with an Athlon 64 PC? Read our reviews of three front runners



PAGE 60

Sony's Clie PDA should watch its back now that Palm has released the excellent Tungsten T3



PAGE 79

Find out why Microsoft Encarta 2004 Premium Suite is still our top electronic encyclopaedia

Following our focus on AMD's 64bit processor technology in the November issue, this month sees the first wave of PCs powered by Athlon 64. Evesham, Mesh and Time have all launched machines based around the 2GHz 3200+ chip, packed with high-end features and dressed to impress. Do they offer the performance boost we've been expecting, and value for money when compared to the latest Pentium 4 systems? Should you be an early adopter or wait until the dust settles? Find out by turning to page 56.

Those who like the idea of building their own Athlon 64 system should check out page 74 for an exclusive review of Gigabyte's K8VXP motherboard, which sports the Via K8T800 chipset.

In another first, we look at Evesham's E-Media machine running the new Media Center edition of Windows XP. The latest attempt to get the PC and American spelling out of the office and into the living room, Media Center provides an additional consumer-oriented interface to help users view digital images, manage their MP3 collection, listen to the radio, record TV programmes and create their own DVD videos. With a number of key manufacturers showing interest in the software we find out just what's on offer, and bring you an exclusive preview of Hi-Grade's upcoming Media Center system, the Digital Media Station (see page 51).

Other reviews include an exclusive hands-on test of Acer's Travelmate 661, a Centrino desktop replacement notebook with just about every feature you could want and a true battery life of almost four and a half hours. If we see a few more notebooks like this, Intel's mobile dream may finally become more of a reality.

Digital photographers will be interested in Sony's high-end DSC-V1 and Fujifilm's F700 (see pages 66 and 71). Incorporating fourth generation SuperCCD SR imaging technology, the latter promises 6megapixel-quality images at 3megapixel prices.

Additional highlights for gadget fans include Palm's sexy Tungsten T3 PDA, the first eight-speed DVD writer from Plextor and Motorola's latest (and hopefully bug-free) Smartphone – the MPx200.

It's not just the hardware that's exciting. This month also sees improved versions of a raft of perennial software favourites from Microsoft, Norton, Netobjects and Corel.

Dylan Armbrust





Fujifilm Finepix F700

A digital camera with one of the best movie modes we've seen – see page 66



Gigabyte Athlon 64 board

An exclusive review of the feature-packed GA-K8VNXP motherboard – see page 74

MEDIA CENTER PC

Evesham E-Media 2.6

An ideal option if you're after a new PC and entertainment centre



The main control screen for Media Center 2004, with a live TV window in the lower left corner

Evesham's E-Media 2.6 is the first PC we've tested to feature Microsoft's Windows XP Media Center Edition 2004 software. Media Center PCs operate just like any other Windows XP systems, but also offer an alternative, even friendlier interface, for playing DVDs, accessing photo, video and music collections, and viewing TV schedules and recording shows.

Of course you can already play DVDs and enjoy media collections on most PCs, or record TV shows with the aid of a tuner card, but Media Center ties them together with an easy-to-use, consumer-styled interface. It's designed to look great on all types of displays and be operated by remote control from the comfort of your sofa.

The first version of Media Center was launched last year in the US, Korea and Canada, but the new improved 2004 Edition is now also available in Japan, China, Germany, France and the UK. Sadly, the software itself cannot be bought separately, preventing existing XP owners from upgrading. If you want Windows XP Media Center Edition, you'll need to buy it pre-installed on a new PC, such as the E-Media 2.6 here.

Hardware

Evesham's E-Media 2.6 has an attractively styled and relatively compact case, which, while still identifiable as a PC, looks much better than a standard box. Behind a flap on one side are front-mounted Firewire, USB, microphone and headphone

jacks, and on the opposite side is a 6-in-1 memory card reader (accepting everything but XD media). In between is a Sony Dual-RW DVD recorder, which can write on both DVD-R(W) and DVD+R(W), along with CD-R(W) media.

Inside are a 2.6GHz Pentium 4 processors (800MHz bus) and a pair of 256MB PC2700 Dimms, configured for dual-channel memory access. A second pair of memory slots on the MSI motherboard allow for further expansion.

Of the three PCI slots, two are occupied by a Hayes V.92 modem and a Genesis DVB-T digital terrestrial TV tuner card; DVB-S digital satellite or analogue TV tuner cards can alternatively be fitted if preferred. This leaves one PCI

slot spare, but it's blocked by a blanking plate housing the motherboard's electrical and optical S/PDIF digital audio outputs. The motherboard's Intel 865G chipset features integrated video, but Evesham has fitted a superior Radeon 9600 128MB DDR AGP graphics card from Connect 3D. Finally, storage is delivered by a 120GB Maxtor hard disk.

Thanks to a careful choice of components, including fanless motherboard and graphics chips, the E-Media 2.6 runs in virtual silence; even the optical drive is pretty quiet. Beyond a few hard disk clicks now and then, you need to check the case light to see if it is on.

Our system was configured to connect directly to an existing display and sound system, so it came without monitor or speakers – Evesham can supply a display though, such as the LCD monitor pictured here. A Microsoft wireless RF keyboard and mouse were supplied, although, with a range of just 2m, those who want to type from a longer distance should request a different model. Like all Media Center PCs, the Evesham system included a specially designed Microsoft infra-red remote control, and a receiver that connects to a spare USB port.

And so to the Media Center software, which we tried with three different displays: a PC monitor, a high-resolution widescreen projector and a modest 14in TV set. The graphics card offers VGA, DVI and composite or S-Video outputs, and it's possible to drive both a TV and monitor at the same time, or just one display if desired. Since Media Center PCs can also work as normal Windows XP systems, many will use a normal PC monitor for the XP desktop, then switch to a TV for the Media Center experience.

Unsurprisingly the best quality image came from high-resolution displays connected to the VGA or DVI outputs, but we must admit the Media Center





interface looked remarkably good on a 14in TV running at 800 x 600 using a basic composite video connection. Media Center 2004 also supports 16:9 widescreen displays and, rather than just stretching the interface, it exploits the additional real estate to show more icons, thumbnails or listings, depending on its mode.

Media menu

The main Media Center interface presents a vertically scrolling list to access different types of media, such as pictures, videos or music. Arrow keys, along with OK and Back buttons on the remote, allow easy navigation, while its garish green Start button returns you to the main menu.

Selecting My Pictures is essentially no different to browsing the same folder in Windows XP. Images can be viewed, rotated or printed, while slideshows can incorporate slightly cheesy but surprisingly addictive gentle zooms and pans. You can also view photos directly from an inserted memory card, although this didn't work with a Sony Memory Stick on our system.

My Music presents album covers and track details (where downloaded) and, if you're playing music during photo slideshows, it briefly overlays the track information – just like watching MTV. It's all very slick.

My TV acts as a personal video recorder, with the ability to 'pause' live broadcasts and offering a free local 14-day TV guide that can be regularly updated over the Internet. Shows

can be selected for recording directly from the guide, and like any good EPG (Electronic Program Guide), you can request an entire series; if the schedule changes, Media Center should adjust accordingly. Like Tivo, Media Center can also automatically look out for shows featuring favourite actors, directors, or even specific keywords in their title.

If you're using an analogue TV tuner card, Media Center offers a choice of recording quality settings. If you're using a digital card, you've no choice but to record the bitstream unmodified, but at least this means you get perfect quality, and with 114GB free on our disk, we had room for over 40 hours.

Recorded shows will only play on other PCs if they've downloaded the compatibility patch from Windows update, but with the right third-party software, such as Sonic's Prime Time, you can make DVDs which should work in a domestic DVD player. This software wasn't available for our test, but Evesham hopes to include it, or something similar, on shipping units.

Finally, My Videos allows you to watch video files stored on the system, such as home movies, leaving Play DVD to do exactly what its name suggests.

So far so good, but Media Center is not without its faults. All music must be registered and playlists generated in Media Player before they'll be visible in Media Center. There may be support for radio, but only from TV tuner cards with FM facilities – support for digital radio



The TV Guide lets you select a single show or a whole series for recording

delivered through a DVB card is not yet recognised. And while the PC can power itself up from sleep to make a scheduled recording, ours wouldn't then go back to sleep mode afterwards.

It's also annoying that, despite having an Internet connection to download the TV guide, Media Center doesn't offer any other kind of online facilities. There's the Online Spotlight section, but it's far from a proper web browser, and there's no email or instant messaging in the friendly Media Center style. You can switch back to the XP desktop, but it's not very usable on a TV screen.

Then there's the sad fact that all but the most obscure PC graphics cards are limited to either composite or S-Video connections to TVs, with no support for component video or RGB Scarts – a shame since these are the highest quality connections on most domestic displays. There's also the concern the PC may crash while you're on holiday and not record your shows, although, to be fair, many DVB set-top boxes also suffer from freezing.

That said, once you know its limitations, Media Center works well, is fun to use and looks great. Third-party applications designed to integrate with the interface also offer the promise of home automation and security.

But who'll buy it? Those with media collections may already have a PC and be understandably reluctant to buy a new one just to enjoy a friendly interface. They could install Showshifter for a similar front end, or look into streaming their media collections to convergent appliances.

If you're in the market for a new PC and like the idea of using it as an entertainment centre, Media Center is an ideal option and the Evesham E-Media 2.6 a great implementation. Ultimately, though, we'd prefer it if Media Center were either available separately for upgraders, or built into Windows XP as standard.

Gordon Laing



My TV is able to pause live shows, and offers a free 14-day TV guide

DETAILS

RRP £1,068.99 (E909.78 ex VAT)
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SPECIFICATIONS

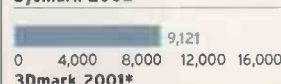
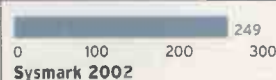
Windows XP Media Center Edition • Intel Pentium 4 2.6GHz (800MHz bus) • 512MB DDR memory • 120GB hard disk • Sony DW-U14A DVD Multi • Radeon 9600 128MB DDR graphics card • Microsoft wireless keyboard & mouse • 2yrs OSM, 3yrs RTB

PROS Interface works well on TVs
CONS Media Center software still has many foibles

VERDICT

Media Center delivers an easy interface for accessing media collections on a variety of displays. The E-Media PC is also fast, yet virtually silent

PERFORMANCE



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

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

NOTEBOOK**Rock Pegasus DTS**

An incredible hulk of a desktop replacement



Rock's latest entry into the expanding world of desktop replacements – the Pegasus DTS – is a large beast weighing a hefty 2.5kg. And at 312mm wide, mostly due to the 15.4in widescreen display, monitor size is among its biggest assets. A large, usable keyboard complements the display.

In terms of specification, our Centrino-based test model came equipped with a 1.4GHz Pentium 4 M processor, 30GB hard drive and 256MB of Ram. While configurations with up to 1GB are available, our test system managed a Sysmark score of 124 – average for this specification and enough power for most applications on the market. Meanwhile, with the help of its Centrino backbone, the DTS' battery managed two hours and 49 minutes of continuous use.

Elsewhere, Rock's latest endeavour features a built-in video camera module, an internal DVD-Rom/CD-RW combo drive and 5.1-channel sound. The built-in subwoofer is somewhat laughable, but at least

there's the option to connect better external speakers. In addition, while it's not the best example of a polygon-pushing portable, a reasonable 3Dmark score of 1,779 and the inclusion of a TV-out connector shows the DTS is also a notebook willing to make an effort for gamers.

At £1,173 including VAT, the Pegasus DTS offers good value for money. While a large display can be attractive, sacrifices made in terms of size and weight mean that recommending the DTS is a matter of personal taste.

Rory Reid

DETAILS

RRP £1,173 (£1,378 ex VAT)
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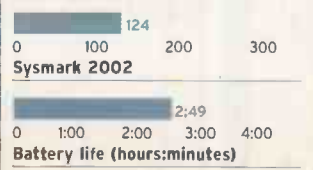
SPECIFICATIONS

Windows XP Home Edition • Intel Pentium 1.4GHz • 256MB DDR memory • 30GB hard disk • DVD-Rom/CD-RW combo drive • 32/64MB • Shared graphics • 15.1in TFT monitor
PROS Great screen; surround sound
CONS Size; hard disk size

VERDICT

If size isn't everything to you and you're looking to work and watch DVDs, the Pegasus DTS is a sound investment

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

PERFORMANCE**MEDIA CENTER PC****PREVIEW****Hi-Grade DMS**

The Digital Media Station has a radical edge

EXCLUSIVE

Hi-Grade has chosen a radical design for its Digital Media Station (DMS), its version of the Media Center PC. Finished in silver, the DMS sports a metal chassis that's more like a standalone DVD player than a traditional PC.

The final unit will have a smoother finish than the one seen here, along with power and hard disk LEDs at the front. Unlike Evesham (see page 49), Hi-Grade has included two Scart connectors on the rear, along with S-Video, composite and aerial sockets.

There's also an array of more traditional PC goodies, including Firewire and an Ethernet port for connecting cable/broadband Internet access. The DMS can be fitted with a standard or ADSL modem and, while the test unit didn't, the final hardware will have optical audio out and 802.11g Wifi.

Based around a 2.6GHz Pentium 4, the system has a 120GB ATA hard drive, 512MB DDR-Ram and a Panasonic DVD writer. The latter is a notebook drive, helping to keep the size of the system down. The preview model employed an MSI 865 motherboard, but this will be replaced by an Asus board in production.

In tests, Windows Media Center made it easy to display pictures, play CDs and MP3s,

and watch and record TV. The DMS also let us quickly burn video files to DVD – something missing from our Evesham.

While the DMS is easy to use, we found the consumer feel was let down as the Windows Desktop reared its head too often when moving between functions. It is early days, but the transition must be smoother if this PC is to earn its place in lounges across the land.

We look forward to getting our hands on the final hardware.

Chris Cain

DETAILS**PRODUCT INFORMATION**

Hi-Grade 020 8532 6123

SPECIFICATIONS

Pentium 4 2.6GHz • 512MB (2 x 256MB PC-3200 DDR-400) • Seagate Barracuda 120GB hard disk • MSI Geforce FX 5200 128MB • 4 x USB2, 1 x Firewire, 2 x Scart, 2 x S-Video, 1 x Composite, 1 x D-Sub, 1 x Aerial in, RJ-45, RJ-11 • Panasonic UJ-815 (2x DVD-R, 2x DVD-Ram, 1x DVD-RW, 16x CD-RW, 8x CD-RW, 24x CD, 8x DVD) • 2 x RCA in, 2 x RCA out, 2x S/PDIF • Infra-red with integrated trackball • Microsoft MCE remote • D-Link 802.11g/802.11b wireless network • Asus P179 MCE TV Card • Windows XP Media Center Edition • NVDVD, Sonic Primetime DVD Authoring
PROS Fits perfectly with general hi-fi equipment; easy to use
CONS Consumer feel not there yet
VERDICT

When Hi-Grade sorts out Media Center issues, this really could be the PC for the living room

NOTEBOOK/TABLET PC

Fujitsu-Siemens Lifebook T3010

Combining two formats, this novel device is a very capable system

Bridging the gap between notebooks and tablet PCs, the latest Fujitsu-Siemens Lifebook offers a twist on traditional designs. The T3010 supports Intel's Centrino standard and incorporates a rotating screen, allowing it to be used either with a keyboard or as a pen-based pad.

Aside from this, the Lifebook has a neat if unadventurous design. Finished in a grey blue, it's unlikely to astonish but, by the same token, is far from offensive. On the whole, our test model was sturdy and well built – despite the initial shock of the monitor twisting around somewhat too freely upon its initial opening. Once we got over the initial feeling that we may break it, everything was fine.

Measuring 12.1in, the T3010's screen is sharp, well defined and can be viewed in both landscape and portrait orientations, regardless of its angle. In practice, this provides a tremendous degree of flexibility, and the included stylus, dictation software and surprisingly good handwriting-recognition capabilities provide a realistic alternative to the keyboard for data entry.

Inside the T3010 is powerful. A Pentium 4 M processor running at 1.4GHz provides the main grunt, and Fujitsu offers options for 256MB, 512MB or 1GB of DDR memory. Sadly, our 256MB test model failed to complete our Sysmark tests, but the integrated Intel 855GM chipset returned a 3Dmark score of 1,946 – not bad for a notebook. Having said that, this isn't a system on which to play the latest 3D games. Up to 64MB of memory can be assigned to the display, which runs at 1,024 x 768 and supports 1,600 x 1,200 on an external monitor.

In terms of other specs, the Lifebook is as well featured a

notebook as you would expect for the price. While it attempts to save space by not having any form of internal removable drive, Fujitsu is bundling an external DVD/CD-R/RW drive as a promotion. Given the need for the drive, we suspect this will be an ongoing deal.

Alongside this are two USB2 ports, a 10/100 Ethernet port, a VGA output, two Type II PC Card slots, a modem socket, a docking station connection, an infra-red link and an 802.11b wireless network adaptor. While 802.11b is the slowest of the three readily available wireless formats – although by far the most popular – everything worked flawlessly in tests, despite the potential pitfalls of background noise and cross-chatter between various devices.

As a Centrino product, we expected good things in the

battery department and the T3010 did not disappoint. Fujitsu claims a battery life of around four-and-a-half hours; under our tests, the Lifebook's six-cell battery lasted three hours – still an impressive figure. Fujitsu has also included a bridge battery that allows 'warm-swapping' of power cells, reducing the risk of data loss even further.

While the T3010 is a capable machine, our test model was not without its faults. In particular, the screen was prone to pressure smudges. Bearing in mind that

the average user of this system will be spending a large proportion of their time tapping and dragging the stylus across the display, this is somewhat unsettling. However, Fujitsu has stated that it will rectify this problem in final retail models.

Weighing 1.9kg, the T3010 can become slightly unwieldy during extended use without the support of a desk and treads a fine line in terms of manageability. It's also not cheap, especially when compared with some of the other notebooks reviewed here, but £1,467 buys a lot of functionality and the freedom to use a notebook in ways you may not have considered before.

Apart from these few shortcomings, this is a capable system that combines the power of a notebook with the flexibility and convenience of a tablet PC.

Rory Reid



DETAILS

RRP £1,467 (£1,249 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Fujitsu-Siemens 08706 066 677

www.fujitsu-siemens.co.uk

SPECIFICATIONS

Windows XP tablet PC Edition • Intel Pentium M 1.4GHz • 256MB DDR memory • 40GB hard disk • Freecom Traveller 24x 24x 10x 8x DVD-Rom/CD-RW combo drive • Intel 855GM 64MB graphics • 12.1in TFT monitor • 1.9kg • 236 x 27.4 x 293mm (w x d x h) • Windows XP Tablet PC Edition • Norton Ghost 2003 • Easy CD Creator • PowerDVD

PROS Dual operation; battery life

CONS A little on the heavy side;

poor graphics

VERDICT

A stylish, novel and flexible machine

PERFORMANCE

★★★★★

FEATURES

★★★★★

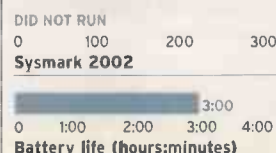
VALUE FOR MONEY

★★★★★

OVERALL

★★★★★

PERFORMANCE

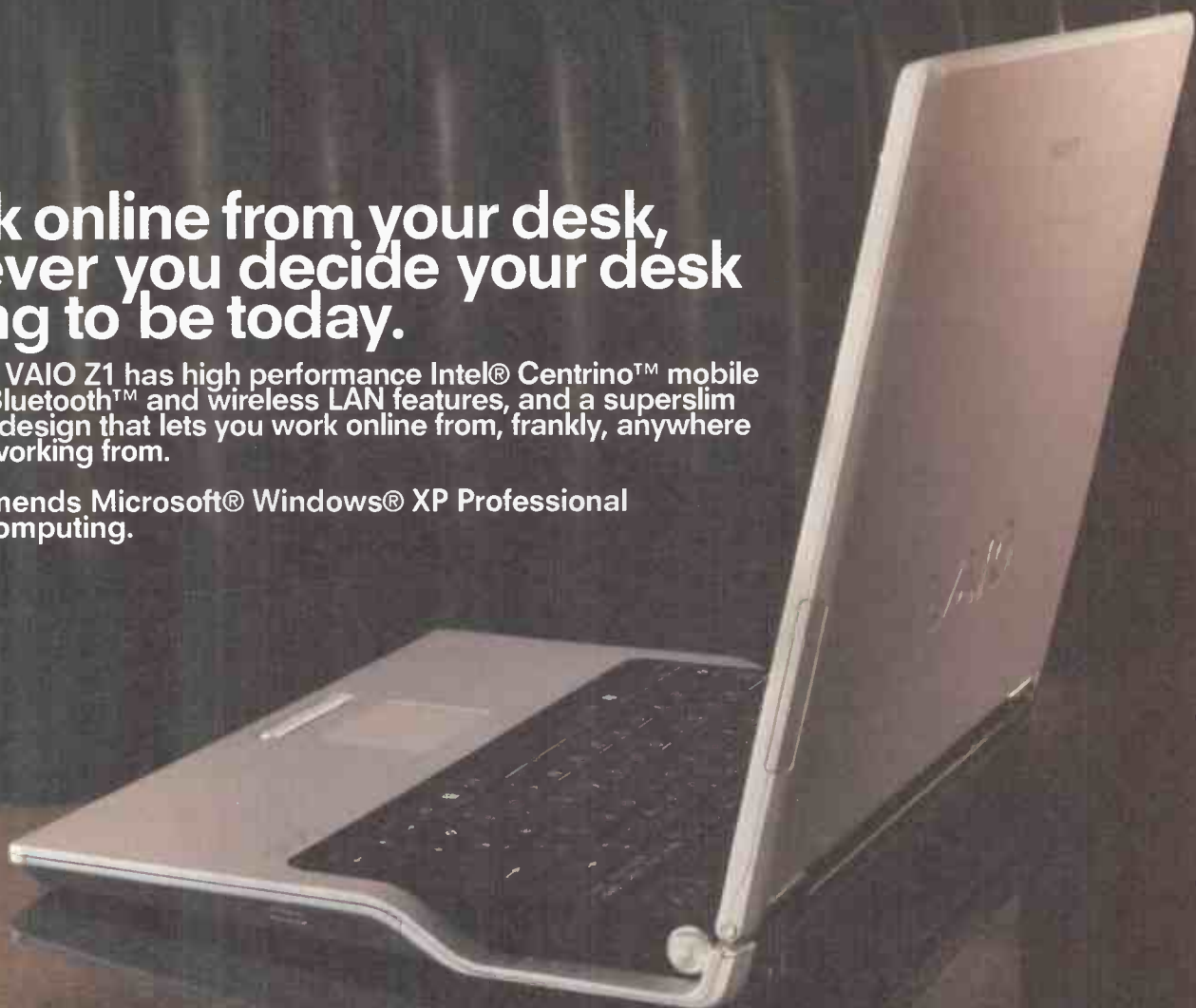


SONY

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Sony's new VAIO Z1 has high performance Intel® Centrino™ mobile technology, Bluetooth™ and wireless LAN features, and a superslim optical drive design that lets you work online from, frankly, anywhere you feel like working from.

Sony recommends Microsoft® Windows® XP Professional for Mobile Computing.



VAIO PCG-Z1

www.vaio.sony-europe.com

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Hardware drivers, if necessary, are available from Sony.

The BLUETOOTH trademarks are owned by Bluetooth SIG, Inc, USA.

This PC meets the minimum hardware requirements to run Microsoft® Windows® XP.

Due to the LCD panel manufacturing process we cannot guarantee that all pixels are functional.

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You make it a Sony

NOTEBOOK

Acer Travelmate 661LMi

EXCLUSIVE

Working on the move is easier with this Centrino laptop

Designed for anyone who wants the power of a desktop PC on the move, the Travelmate 661LMi is the latest offering from Acer. With a 15in screen, DVD writer and Centrino technology, this is a highly specified system with more than a few tricks up its sleeve.

The Travelmate looks ready for business, and its smart silver and grey casing provides a fitting corporate appearance. Due to the large display, the unit is much wider than A4, but it is still only about 1in thick. That said, it weighs 2.86kg: it's not the heaviest notebook in the world but, despite its name, you won't want to carry the Travelmate around for very long.

The screen offers an SXGA resolution of 1,400 x 1,050 pixels, which we found works best with Windows set to large screen fonts. The picture is crisp,

although the display isn't as bright or clear as some other panels we've seen recently, even on the maximum brightness setting. Overall, quality is fine, but not the best around.

The Travelmate's size provides room for a large, slightly curved keyboard and an oversized palm rest, but the touchpad is dwarfed by comparison. It's also surrounded by a 1970s-style silver bezel, making the active area of the pad even smaller. Along with left and right buttons there's an additional four-way controller set between them for scrolling, but we would have preferred a switch to toggle the pad on and off, as with HP's 5400 series. The keyboard is comfortable with a fair degree of travel; above it four extra keys provide quick access to Internet browsing, email and two other functions of your choice.

Parallel, external VGA, Ethernet, S-Video and modem connections lurk at the back,

while the left-hand side of the machine hosts four USB2 connectors, a single mini-Firewire port, a Type II PC Card slot and audio line out, microphone and headphone sockets. There's a smartcard slot for system security devices, and a useful built-in memory card reader provides support for Multimedia Card (MMC), Memory Stick, Secure Digital (SD) and Smart Media cards.

In terms of external drives, the system comes with either a DVD/CD-RW combo or a DVD writer, which slides out when not needed to lighten the load. Our review model came with the latter installed.

Internally, the 1.4GHz Pentium 4 M is backed by Intel's 855GM chipset, and our review model included a healthy 512MB of DDR-Ram, up to 64MB of which can be assigned to the integrated Intel graphics controller, while a 40GB Ultra

ATA100 hard disk provides mass storage. The drive is protected from day-to-day knocks by what Acer calls Dasp (Disk Anti-Shock Protection System). Intel Pro/Wireless networking provides Wifi and other sharing options.

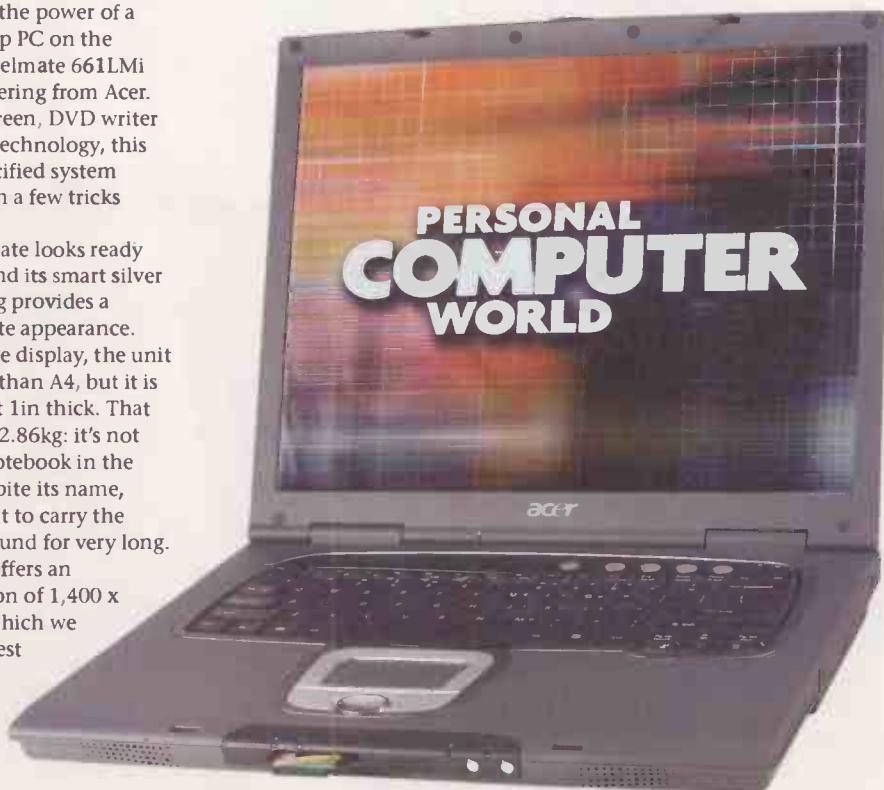
Along with Windows XP Professional, Acer bundles Norton Antivirus, Platinum Secret for security options, NTI's CD & DVD Maker and Cyberlink's PowerDVD for movie viewing. Also included is a neat Notebook Manager utility for adjusting various settings quickly. This is a functional

line-up, though we would have expected at least Microsoft Works 7 to get things going on the productivity front.

The Travelmate achieved a respectable Sysmark score of 154. Sadly, it fared worse under our 3Dmark graphics tests. Intel's integrated hardware could only manage a score of 1,874 and just 10fps (frames per second) in Unreal Tournament. If you're looking to play the latest 3D games, this isn't the machine for you. However, if you want to work on the move, it's perfect. The Travelmate lasted an outstanding four hours and 27 minutes under our battery tests – the longest we've seen. Clearly, Centrino is living up to its promises.

At just over £1,300, this isn't the cheapest option around but, in terms of features, you get a lot for your money. The four-in-one card reader and DVD writer really do make a difference. If graphics performance was, we'd be looking at a recommended award.

Chris Cain



DETAILS

RRP £1,304.25 (£1,110 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION Acer 0870 900 2237 www.acer.co.uk

SPECIFICATIONS

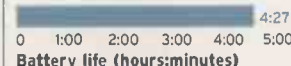
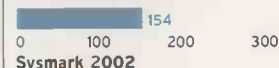
1.4GHz Pentium 4 M • 512MB DDR-Ram • 40GB hard disk • 24x24x10x CD-RW, 8x2x2x DVD-RW (read, write, rewrite) • 15in TFT at 1,400 x 1,050 • Four-In-one memory card reader • Smartcard slot • Ethernet, Infra-red and Wifi • Integrated graphics (up to 64MB shared graphics memory) • Optional docking station • 330 x 272 x 28.9mm (w x h x d) • 2.86kg • Two-year warranty
PROS Screen size; battery life; features

CONS Graphics performance; lack of productivity software; weight
VERDICT

Battery life and features add up to an excellent business machine

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

PERFORMANCE





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ATHLON 64 PC ROUND-UP

Evesham Axis XP64

The first of our three Athlon 64 PCs this month makes a good start



Depending on your point of view, the Evesham Axis XP64 is either a PC that's ahead of its time or a machine that's future-proof for two or three years to come.

Using the new AMD Athlon 64 3200+ processor running at 2GHz, the Axis XP64 ships with a copy of Windows XP Home Edition installed. This is a 32bit operating system, and Athlon 64 can run both 32bit software and 64bit software natively. However, you really need a 64bit OS to get the most out of it.

There are very few 64bit OSs in existence and none of them are what you'd call mainstream, unless you're a hardcore Linux guru. Microsoft has a 64bit version of Windows XP Pro for AMD 64 in beta right now, but it's unclear when it will be released to the buying public. There's a hint from Microsoft that Windows Server 64bit for AMD 64 will launch in 2003, but this Evesham is waiting for the desktop edition. Of course, an OS is little use without 64bit applications, and by that we mean something like a 64bit version of Photoshop. Give us an application that can use a massive amount of memory and the whole 64bit puzzle will start to fall into place.

A 64bit OS can address over a terabyte of memory, which is effectively an infinite amount when you consider the current size of memory modules and the fact that very few motherboards have more than four memory slots. The MSI K8T Neo board Evesham used here has three memory slots, but it only supports up to 2GB of PC3200 memory. The Athlon 64 differs from AMD's Opteron and the new Athlon 64 FX-51 as it uses standard DDR memory, rather than ECC memory.

It would be foolish to claim that a 2GB memory limit is any sort of problem in a desktop PC, but it also takes away one of the attractions of a move to 64bit computing. It's best to think of the Axis XP64 as a 32bit PC that could – just possibly – make the change to 64bit later in its life.

Evesham ships the Axis XP64 with 1GB of PC3200 memory in two modules, which compares well with the Mesh and Time PCs reviewed over the next two pages. Then again, this is a £1,799 PC and, although it flies through every benchmark that we can throw at it, it is directly comparable to a well-specified 3GHz Pentium 4 PC, which should cost you rather less money. It's unusual for us to be

looking at an AMD PC that is more expensive than its Intel competition, and in this case it's a real problem.

Evesham has packed its 64bit system with some quality components, starting with a Sony DW-U14A multiformat DVD drive that can write to both plus and minus media at four-speed. There's also a 52-speed Sony CD-RW drive.

Connections to the outside world include two PS/2 ports, serial and parallel ports, six USB2 sockets (four back, two front) plus both standard and mini-Firewire sockets.

A quick glance at our test results shows that the Sapphire Radeon 9800 Pro graphics card offers all the gaming power that you need, while the superb Philips 170b4 TFT display with a native resolution of 1,280 x 1,024 is a very good monitor. The card features analogue VGA, DVI-I and TV-out ports.

Moving to the audio side of things Evesham has installed the new 7.1-channel Audigy 2 ZS with matching Creative Inspire T7700 speakers, and there is plenty of storage on the 160GB Maxtor Serial ATA hard disk. These are all very good components, but the problem is that the Athlon 64 3200+ is being presented as the next great technology, and we are being charged a premium price as a result. Although Athlon 64 does have huge potential when we finally move to a 64bit world, this PC uses the new processor as the successor to the Athlon XP3200+ and nothing more.

There's no doubt that this is a quality PC, and Athlon 64 is making a far more auspicious start than the first Pentium 4 processor ever managed, but for now it's a matter of 'watch this space' rather than 'buy buy buy'.

Leo Waldoock

DETAILS

RRP £1,799 (£1,531.06 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Evesham 0870 160 9500

www.evesham.com

SPECIFICATIONS

Windows XP Home • AMD Athlon 64 3200+ 2GHz • 1GB PC3200 DDR-Ram • Maxtor 160GB Serial ATA hard disk • Sony 4x multiformat DVD writer and Sony 52x CD-RW • Sapphire Atlantis 9800 Pro graphics card • Creative Audigy 2 ZS sound card • Philips 170b4 monitor, 1,280 x 1,024 • Creative Inspire T7700 speakers • Microsoft Works 7, Pinnacle Studio 8 • 2yrs on site, 3rd yr RTB warranty
PROS 1GB memory; graphics power; multiformat DVD writer
CONS Price; limited to 2GB memory when 64bit Windows arrives

VERDICT

We are sure Athlon 64 has huge potential but the Axis XP64 is a very fast Athlon PC that can't quite compete with the P4

PERFORMANCE

★★★★★

FEATURES

★★★★★

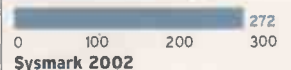
VALUE FOR MONEY

★★★★★

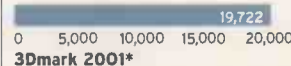
OVERALL

★★★★★

PERFORMANCE



Sysmark 2002



3Dmark 2001*

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

ATHLON 64 PC ROUND-UP

Mesh Matrix 64 3200 Plus

For gamers and video editors, this PC has a lot to offer



There's no way of breaking this gently, so we're just going to split it out. The Mesh Matrix 64 3200 Plus is very similar to the Evesham Axis XP 64 (reviewed left), sharing the same motherboard, graphics card and sound card.

The biggest similarity, of course, is the new Athlon 64 3200+ processor running at 2GHz. As we've mentioned in previous reviews of its bigger brother Opteron, this processor doesn't have a front-side bus (FSB) and clock multiplier, but instead simply operates at its given speed. One advantage of this architecture is that the chip's 1MB of Level 2 cache also runs at the full 2GHz, rather than a few hundred megahertz in the case of P4 or Athlon XP.

Although Athlon 64 is capable of running 64bit software, the majority of us who use Windows are restricted to running 32bit software for some time to come. Thanks to this we're only seeing part of what Athlon 64 is capable of at present and, while it's holding its own against Athlon XP chips, it has yet to approach the performance of the fastest Pentium 4s. Still, these are early days and as soon as 64bit

software arrives we are likely to see a significant improvement.

Of course, there's more to PCs than the speed of the processor. Features and price matter a great deal, and Mesh has priced its Matrix 64 3200 Plus at a not unreasonable £1,585.08 inc VAT.

Mesh has combined the processor with 512MB of memory and built the Matrix around the same MSI's K8T Neo-FIS2R motherboard as Evesham, so it's no surprise to find the list of available expansion ports and connectors is the same. The backplate of the motherboard has two PS/2 sockets, serial and parallel ports, a Gigabit Lan socket, four USB2 connectors, two more USB sockets on the front of the case, and another on a bracket along with diagnostic LEDs. Mesh has also installed a bracket with a gameport.

Other connectors include five mini jacks for the integrated surround sound, a coaxial S/PDIF socket and three Firewire ports – two on the motherboard and one on the installed Creative Audigy 2 ZS sound card. The only possible criticism that can be levelled at the number of ports is that there is no S/PDIF output on the latter. While the Audigy 2 ZS supports 7.1-audio, Mesh has supplied a

set of 6.1 Creative 6700 speakers. Both configurations offer Dolby Digital EX, so the point is moot.

Both Evesham and Mesh also opted for a Sapphire Radeon 9800 Pro to handle graphics, and this card offers yet more ports with VGA, DVI-I and TV-out connectors. As expected, this put in an excellent performance in our 3Dmark video tests, notching up a whopping 19,909 points. If you're into the latest 3D games you won't be disappointed with this system.

Moving further inside the case there are plenty more connectors, with three ATA133 controllers and four Serial ATA. We were surprised that Mesh chose to use the former with a Parallel ATA Maxtor Diamond Max Plus 9 hard disk, rather than go for a serial option, but its 160GB capacity should be more than adequate for some

time to come. Additional storage is provided by a Sony multiformat DVD writer, though this original model is slightly slower than the updated version supplied with the Evesham.

Mesh provides a fine monitor to go with this high-end system. NEC Mitsubishi's LCD1860NX TFT includes both DVI-I and VGA inputs, and has a maximum resolution of 1,280 x 1,024. In tests the display gave a sharp, clear picture with a huge viewing angle and there is very little change in colour as you move from side to side. It's a neat unit with an internal power adaptor and a kettle lead connector, and it has vertical height adjustment with fore and aft tilt.

Our review PC didn't come with the intended Logitech cordless keyboard and mouse, but we've seen them plenty of times before and have always been impressed.

Leo Waldock

DETAILS

RRP £1,585.08 (£1,349 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Mesh 0870 046 4747

www.meshcomputers.com

SPECIFICATIONS

AMD Athlon 64 3200+ 2GHz • 1GB PC3200 • Maxtor 160GB Parallel ATA133 hard disk • Multiformat DVD writer and 52x CD-RW • Sapphire Radeon 9800 Pro graphics card • Creative Audigy 2 ZS sound card • NEC Mitsubishi monitor, 1,280 x 1,024 • Creative Inspire 6700 speakers • Windows XP Home • Works 7, Pinnacle Studio 8SE • 3yrs on-site warranty
PROS Graphics card; TFT; DVD writer
CONS No Serial ATA hard disk; a bit slower in Sysmark than Evesham
VERDICT

It's hard to justify the price for a PC that isn't the fastest around, but if you want to edit video and play the latest games it's difficult not to recommend this system

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

PERFORMANCE

ATHLON 64 PC ROUND-UP

Time Platina: Viper 64 Ultra

Audiophiles may be attracted by the sound system used here



Not to be outdone by its direct-selling rivals, high-street giant Time has introduced a system based on AMD's Athlon 64. It's also done us a bit of a favour by using different components to those used in the Evesham and Mesh, which makes things more interesting when comparing PCs. It still has a 3200+ processor running at a true 2GHz, though, twinned with 512MB of PC3200 memory in two modules.

Time has gone for a Gigabyte motherboard with Nvidia's Nforce3 150 chipset, while the other PCs here feature a board built around Via hardware. As with previous Nvidia designs, this a single-chip solution, and the feature list is quite familiar. On the backplate are two PS/2 ports, two serial sockets, one parallel port, three mini jacks for the integrated ALC658 audio, dual Lan (Gigabit and 10/100) connectors and two USB2 ports. There are two more USB ports on the front of the case, and there are three full and one mini-Firewire socket too.

On the motherboard there are three memory slots of which one is free, so there is potential for Ram upgrades. There's an AGP 8x slot and five PCI slots, four Parallel ATA133 controllers and two Serial ATA connectors. We'd

like to have seen more USB ports, but this is a decent selection of connectors and interfaces.

In terms of graphics hardware, Time uses an MSI FX5900 Ultra card rather than a Radeon 9800 Pro. At low quality settings the Radeon has a distinct advantage, but at higher settings the two chips have similar performance. The Ultra card boasts DVI, VGA and TV-out options and it came in with an excellent 3Dmark 2001 score of 17,851. Armed with this the Platina will cope with even the most demanding of 3D games.

Under our Sysmark tests the Time scored 266 – lower than the Evesham and the same as the Mesh. This would suggest the choice of motherboard chipset makes little difference to overall performance.

We were surprised to see Time has chosen a Parallel ATA hard disk, just as Mesh did in the Matrix 64. The 160GB Seagate drive has plenty of capacity but, given that the motherboard has the capability, we'd prefer to see a neater, potentially faster Serial ATA storage solution as on the Evesham. For additional storage there's a Panasonic DVD-Ram drive, which can be used like a removable hard disk. It's ideal for connecting to your TV as a digital video recorder, as well as

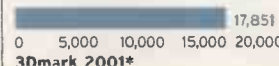
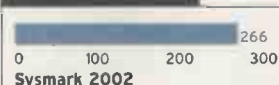
the more mundane jobs of writing to DVD-R and DVD-RW.

You'd expect a high-end audio system to complement the graphics card, and used here is the Platinum version of the Audigy 2 ZS sound card. This supports 7.1 audio and has a front panel mounted unit with loads of extra easy-to-access audio connectors. The ports are optical and coaxial S/PDIF input and output, RCA line-in, Midi-in and -out, Firewire and full-sized mic and headphone jacks.

The eagle-eyed among you may spot that the unit in our photo is an Audigy 2 Platinum, rather than the ZS model, as Time couldn't get the correct part in time for our review. The company assures us readers will get the ZS unit, although the two are functionally the same, and just have different logos. The speakers are the new Creative Inspire T7700 with 7.1 audio.

Time has installed a card reader below the floppy drive

PERFORMANCE



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

that's compatible with Memory Stick, Compact Flash (CF), Microdrive, MMC (Multimedia Card), SD (Secure Digital) and Smart Media. We're very happy to see all those ports and slots on a PC but it does make it look rather messy and cluttered. We weren't impressed by the look of the Samsung wireless desktop set, either, but we've no complaints about its performance.

Another slight oddity is that Time included an LG F900P 19in CRT monitor. This is a fine unit with a flat screen, an 18in viewable area and a maximum resolution of 1,600 x 1,200. However, we'd expect to see a large TFT with such a high-end PC. We would have also liked a digital video input – the LG offers VGA and BNC connections.

Also unimpressive was the return to base warranty, as we would expect at least one-year on-site support for a £1,700 PC.

Leo Waldoock

DETAILS

RRP £1,699 (£1,445.96 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Time 01282 777 555

www.timecomputers.com

SPECIFICATIONS

Athlon 64 3200+ 2GHz • 512MB PC3200 • 160GB Seagate Barracuda hard disk • Panasonic DVD-Ram and 16x DVD-Rom • MSI FX5900 Ultra • Creative Audigy 2 ZS Platinum • LG F900P 19in monitor, 1,600 x 1,200 • Creative Inspire 7.1 speakers • Windows XP Pro • 1yr RTB warranty
PROS Audigy 2 ZS Platinum; DVD-Ram drive; card reader
CONS Monitor; price; warranty
VERDICT

It's hard to separate the Time and Evesham PCs. If you want a strong audio package you may be swayed by the Audigy 2 ZS Platinum, but we feel the LG CRT is a black mark against the Time as we want a large TFT with a PC at this price

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

NOTEBOOK

Advent 7032

Style and substance combined make this a top-quality offering



Since the arrival of battery-friendly technologies such as Centrino, notebook users can enjoy using them away from the mains for longer. Taking advantage of this, the Advent 7032 swaps the muscle of most desktop replacements for greater mobility and multimedia capability.

At first glance, Advent appears to have taken inspiration from Apple's Powerbook and Ibook designs. Flipping open the lid reveals a semi-transparent keyboard and 15.2in widescreen TFT screen. These displays are becoming increasingly common, largely due to the arrival of integrated DVD-Rom drives and the desire to watch DVD movies, which are often coded at a 16:9 aspect ratio.

At the screen's native resolution of 1,280 x 854 (WXGA) everything looks crisp and sharp. While it's possible to lower the resolution, doing so results in squashed unsightly icons, text and images.

A set of tinny stereo speakers is built into the base of the

notebook, but they are only really suitable for basic Windows sounds. Those keen on their audio will find the sockets housed on the front of the case more useful, allowing for connection to an external amplifier. Next to these are controls for CD and DVD playback, while an integrated microphone sits by the touchpad. The pad itself seems slightly smaller than normal and lacks any form of scrolling device, which is a shame. On the other hand, the keyboard is large and comfortable, which makes it easy to type on.

Other notable external features include a keyboard lock, a PC Card slot, Ethernet, modem, S-Video and mini Firewire ports, three USB2 sockets and infra-red, parallel and serial interfaces. There's also a blue power LED – always a winner in our book.

As mentioned, the 7032 is yet another notebook using Intel's Centrino technology, which means longer than usual battery life and integrated Wifi networking. In our Batterymark

tests, the Advent put in a performance of three hours and 31 minutes before giving up the ghost. It may not be in the same league as the Acer Travelmate 661LMi (reviewed on page 54), which got an outstanding score of four hours and 27 minutes, but this is still plenty of time to do a good amount of work or watch almost two DVD films – unless you fancy a date with Kevin Costner and his dancing wolves.

The final part of the holy Centrino trinity is a 1.5GHz Intel Pentium M processor, combined with 512MB of DDR-Ram. In productivity tests, this produced a rather average Sysmark 2002 score of 153, and we would have expected a slightly higher mark given the clock speed. In real-world terms, this won't mean much to users who want to surf the web or write letters, but those looking to do a spot of image or video editing may want something faster.

Powering the graphics is an Nvidia GeForce FX Go5200 chip. With 64MB of dedicated memory, it runs 3D games fairly well for a notebook, notching up 45.6fps (frames per second) in our Unreal Tournament tests. We also managed to play through an entire level of the latest 3D-hungry Battlefield 1942 expansion pack without any drop in frame rate, albeit on a medium graphics-quality setting. In 3Dmark 2001, the Advent scored a whopping 6,623.

The supplied 80GB hard disk is standard fare for a notebook of this price, but more exciting is the inclusion of a DVD writer for creating DVD-R/RW discs. The maximum writing speed for

DVD is two-speed, while CD-Rs can be written at 10-speed. However, this notebook's most interesting characteristic is the slot-loading drive. As well as looking the part (and reinforcing our Apple theory), it also means there's no fiddling around with pop-out drives; just slide the disc into the slot and the drive gobbles it up. Press the eject button and the drive spits out the disc for you to remove.

In terms of software, Advent supplies Windows XP Home and Microsoft Works 7 to get you started with word processing, spreadsheets and other standard tasks. There's PowerDVD for getting the most out of your digital movies, while Nero Express allows you to create your own DVD movies and audio CDs.

While there are certainly faster and lighter notebooks available, the Advent provides a combination of style, substance and value for money. On the whole, it's a pretty good all-rounder.

Luke Peters

DETAILS

RRP £1,499 (£1,275.74 ex VAT)

BEST PRICE & PRODUCT INFORMATION

Advent 0870 546 4464

www.pcwworld.co.uk

SPECIFICATIONS

Windows XP Home Edition • Intel 1.5GHz Intel Pentium M • 512MB DDR-Ram • 80GB hard disk • 2x DVD-R/1x DVD-RW/10x CD-R/RW • 64MB Nvidia GeForce FX Go5200 • 15.2in TFT (1,280 x 854 native • Microsoft Works 7, Nero Express, PowerDVD • 2.7kg • 260 x 32 x 352mm (w x h x d) • 12 months collect and return warranty
PROS Excellent TFT screen; good battery life; decent graphics
CONS Small touchpad; no scroll wheel; weight

VERDICT

A well-balanced, well-priced and stylish Centrino notebook

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

PERFORMANCE

GPS NAVIGATION

Navman GPS 3300 Terrain

Ramblers may find this device useful



Most of the global positioning systems (GPSs) we review in PCW are aimed at drivers, but they're also great tools for anyone who wants to go off-road, whether hiking, orienteering or in a 4 x 4. Navman's GPS 3300 Terrain is aimed at just those people. It comprises a PC application on which you can manually plot a route, then download it to an Ipaq, and a GPS jacket that provides information as you travel. The quality of the jacket is as you'd expect from Navman – responsive, quick to start up and with a Compact Flash (CF) slot for extra memory.

The software can show you how much you're off-track, which way to get back on your route, average speed and ETA. And if you have, for example, an aerial photo and a map of the same area downloaded to the Ipaq, you can switch between the two views, with the same route appearing on both, which is great for getting your bearings. There are some niggles, though; the manual is close to useless, leaving you to rely on a fairly sparse help file for important information, such as where to get maps.

That point is particularly important because, although the CD includes maps for Europe boasting 25 countries, they're at 1:1,000,000 scale – not the

1:50,000 or 1:25,000 walkers will be accustomed to from OS Landranger and similar maps. In other words, they lack the detail to show footpaths, bridleways and even roads within cities. You can buy compatible electronic maps, but at £40 for an OS region of between two and eight National Grid squares, anyone who travels a lot will be laying out lots more cash. You can scan in and calibrate maps of your own, but if all you have is an A4 scanner that won't be much fun.

Nigel Whitfield

DETAILS

RRP £279.99 (£238.28 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Navman 01293 449 882

www.navman-europe.com

SYSTEM REQUIREMENTS

HP/Compaq Ipaq Pocket PC

PROS Easy to download from the desktop; useful sharing of routes across multiple charts

CONS Map data is not that useful; you will need to spend more money on the maps you need

VERDICT

Aimed at ramblers, this system could have been a boon. Sadly, you have to pay extra for detailed maps to make use of it

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

PDA

Palm Tungsten T3

Pocket-sized device with big functionality



One of two new entries in its Tungsten range, the T3 is Palm's latest pocket-size PDA. This time, the company has taken inspiration from Sony's Clie, providing a 320 x 480 pixel screen and offering the Graffiti area as a software-driven option that can be removed to allow maximum use of that screen space.

The Tungsten T3 incorporates the clever slide-down casing we first saw in the original Tungsten T, helping to reduce the overall size of the unit. A welcome addition to this is the ability to flip the screen from portrait into landscape mode. This is particularly useful for reading spreadsheet data and looking at digital images.

To flip the screen, simply tap an icon on the ever-present Status Bar, which also provides access to several other features, including built-in Bluetooth communication, the main application launcher screen, menus within applications and the Graffiti area. It also toggles on and off the onscreen handwriting recognition system and displays the time.

On the software side, Palm has implemented tweaks to the basic Personal Information Manager (PIM) applications, at last supporting appointments that span across midnight, and upping the size limit of memos and notes from the previous

4KB to a rather healthier 32KB. Up to 52MB of the 64MB of Ram is available to the user, with applications such as Real One Player (for digital music) and Versamail (for email) in the Rom.

Until recently, Sony has been a leader of style and innovation as far as Palm operating system licensees are concerned. Now it definitely needs to watch its back. The Tungsten T3 sets a new standard in slimline, light, stylish and functional Palm OS devices.

Sandra Vogel

DETAILS

RRP £329 (£280 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Palm 0118 927 8700

www.palmone.com/uk

SPECIFICATIONS

Palm OS 5.2.1 • Intel XScale 400MHz
• 64MB Ram • 16MB Rom • 3.8in, screen 320 x 480 • SD card slot
• Headphone, universal connector (docking and peripherals) • 153g
• 76mm x 130mm (100mm closed) x 16mm (w x d x h) • PC USB cradle
• Palm Desktop software

PROS Light; flip-screen; Bluetooth
CONS No Wifi connection

VERDICT

Neat and stylish. The high-res screen, Bluetooth and landscape screen support are enticing

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

MULTIFUNCTION DEVICE

Lexmark X215 MFD

Print, fax, scan and copy device for SMEs



Lexmark's X215 has been designed to meet the needs of small and medium-size offices, combining fax, copying, printing and scanning in one compact unit.

The two-tone shell houses a paper input tray that can hold up to 250 sheets and features a paper level indicator visible when the drawer is closed. Above this is a manual feed slot that can accommodate a variety of business media, including card, envelopes and transparencies. The paper output bin can hold up to 150 sheets.

A fold-down flap at the front provides easy access to the cartridge bed, and installation and removal is straightforward. The supplied starter cartridge in the box should be good for an estimated 2,000 pages at five per cent coverage. The top of the unit folds up to reveal a flatbed scanner that boasts a maximum optical scan resolution of 600 x 600dpi (dots per inch), although Lexmark claims a maximum resolution of 4,800 x 4,800 via software-based interpolation.

Print speeds were good, matching the claimed 17ppm (pages per minute) in our pdf and mixed-content tests, although the X215 printed our text document at 15ppm.

Output quality was hard to fault. The X215 did a great job reproducing all of our test documents, printing crisp

characters with sharp, clean edges. Characters were well-formed and legible, even at 2pt, while type at 72pt was solid with smooth outlines.

The Lexmark coped well with our test photo, reproducing rich blacks and picking out areas of contrast well so that no detail was lost. There was some slight banding in areas of shading, but this was a minor fault.

The accompanying software is easy to use and install, and includes a copy of Scansoft's Paperport SE 8.0.

Emilie Martin

DETAILS

RRP £383.05 (£326 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

08704 440 044

www.lexmark.com/uk

SPECIFICATIONS

600 x 600dpi printing/scanning (up to 4,800 x 4,800dpi interpolated scanning) • Laser printing • 13.6kg • 526 x 558 x 508mm (w x d x h) • 16MB memory • USB/parallel connectivity • Optional Ethernet networking • One-year warranty

PROS Superb, speedy output

CONS Networking optional extra

VERDICT

A great performer that is still cheaper than many rival models

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

INKJET PRINTER

Canon Bubble Jet i865

Big is beautiful, and so is its print quality



If you were a fan of the Canon Bubble Jet i850, you'll be impressed with its successor – the Bubble Jet i865.

This business-targeted printer is much like its predecessor but now comes with a second black ink cartridge – more on that later.

Canon claims the Bubble Jet i865 is the fastest inkjet printer on the market, with page per minute speeds of 23 for black and 16 for colour. Typically, our real-life lab tests found these figures to be way off – seven pages for black text and one for colour. However, our results include spool time and our colour test document also contains an image. Canon's estimates will be at just five per cent paper coverage.

The Bubble Jet i865 has a maximum print resolution of 4,800 x 1,200dpi and the results are fantastic. Printed on matt paper, our full-page colour test image was crisp, with sharp and vivid colours. The blacks were also very solid. Canon is likely to claim this is the work of the extra black ink cartridge; however, we're not sure why as the new cartridge simply holds more ink. The three other tanks contain cyan, magenta and yellow ink.

Another selling point is the i865's ability to print quietly. Even in draft mode, it produced pages almost silently. Digital image fans will appreciate the Pictbridge port, which allows

Pictbridge-compatible cameras and camcorders to print directly via USB without needing a PC.

Other features include A4 borderless printing, a dedicated paper tray to hold and feed 4 x 6in photo paper and a detachable CD-R label printing unit. Both USB and parallel ports can be used, and bundled software includes Canon's Easy-Photo Print Plus, Photorecord for auto-scaling images for specific media types, CD-Labelprint and Zoombrowser for managing digital images.

Luke Peters

DETAILS

RRP £169 (£143.83 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Canon 0870 514 3723 www.canon.co.uk

SPECIFICATIONS

Inkjet • One sheet/output paper trays • Quoted 16ppm colour, 23ppm mono • 4,800 x 1,200dpi • Five ink cartridges • USB, parallel • 5.8kg • 420 x 311 x 185mm (w x d x h) • Auto duplex printing unit • paper feed cassette • network adaptor

PROS Quiet printing; extra printing accessories; razor-sharp output

CONS Slow spooling; size

VERDICT

Spooling time could be better, but image quality is excellent, and it's reasonably priced

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

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KVM SWITCH

Avocent Switchview

Share devices using this four-port device



Three years ago, we featured Switchview, a useful little device from Cybex that let you run up to four machines from a single monitor, keyboard and mouse. Cybex has since merged with Apex, another KVM (keyboard, video, mouse) specialist, to form Avocent, the company that has developed this updated model. New features include a four-port USB1.1 hub and support for USB input on the client machines.

Along the front of the smart, matt-black box, measuring 140 x 210 x 45mm, are the hub ports, PS/2 inputs for a keyboard and mouse, and a silver button switch with a blue status light for each of the four clients. On the back are four corresponding client port sets (two PS/2, one USB and one video per machine), a single video-out for the monitor and a port for Flash upgrades. Combo leads are available to minimise tangles.

Ignoring the USB features, the device works flawlessly. But the mouse on a USB-linked Windows ME PC was slow to wake up. The hub, which lets machines share devices such as a printer, was trickier still because you have to beware of switching live links. USB drives are a hassle, even if inactive when you switch. We got repeated 'unsafe removal' warnings. To avoid still more prompts, all USB-linked machines need drivers for all

linked devices. Hot keys will lock the hub to one machine, but they could confuse novices.

Switchview can double as a docking station, allowing you to hook in a laptop. We used it to extend the display of a notebook running XP to the desktop monitor so we could view different documents on each. We also used it to share a monitor between a Mac (with a suitable adaptor) and three PCs. You can switch the keyboard and mouse if the Mac has a USB port.

Clive Akass

DETAILS

RRP £120 as reviewed (£102.12 ex VAT); £100 two ports; £115 four ports, no hub, with audio switch
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Avocent 01344 668 049

www.avocent-europe.com

SPECIFICATIONS

Four-port KVM switch (PS/2 to PS/2 or USB) with four-port USB 1.1 • Video support up to 2,048 x 1,536 resolution

PROS Saves space and money; looks good

CONS USB device switching is perilous; not USB2

VERDICT

Good buy for PS/2 switching alone. USB is a bonus, but handle with care. USB hassles are fewer with XP machines

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

EXTERNAL CD WRITER

Iomega CD-RW 48x/DVD

High-performance drive for PCs with USB2



Any PC new enough to have a USB2 interface almost certainly has a CD-RW/DVD-Rom drive installed already. However, there are quite a few older machines still in use that might benefit from a new optical drive.

Iomega's CD-RW 48x/DVD-Rom drive provides good performance, running at 48-speed for reading and writing, and 24-speed for rewriting. It's compatible with both Macs and PCs, although few Macs will be able to use it because Apple generally tries to ignore USB2 in favour of Firewire.

Owners of older PCs will also need to upgrade their systems with a USB2 card to get top performance from the drive. It will still work with an older USB 1.x interface, but at little more than quad-speed.

The drive is an external unit, and is solidly built, if not elegant in design. It's a bit more expensive than an internal drive unit – which would cost less than £100 – but an external drive will be easier to install for people who aren't keen on mucking around inside their PC.

Iomega's software bundle is pretty good. Its Hotburn package allows you to create data and music CDs, and has a simple interface, as does its Automatic Backup archiving package. A DVD player and MP3 player are also thrown in, so

you've got all the software you need to make full use of the drive. The installer's a mess, though, forcing you to install each program separately and restarting more times than is really necessary.

Iomega's a little slow off the mark, as usual, since there are already plenty of similar drives available. LG's Super Multi GSA-4040B internal DVD writer, for instance (PCW November), covers all five recordable DVD standards for £150. But if you need a new optical drive for your PC or Mac, this isn't a bad choice.

Cliff Joseph

DETAILS

RRP £110 (£85.10 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

020 7216 0003

www.iomega-europe.com

SPECIFICATIONS

48x read • 48x write • 24x rewrite • 16x DVD-Rom • Compatible with USB2 or 1.1 interfaces • 150 x 50 x 225mm (w x h x d) • Stereo audio input and output • Volume control

PROS High-performance external CD-RW/DVD-Rom drive

CONS Clumsy software installation

VERDICT

A well-built yet unremarkable optical drive upgrade

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

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65

DIGITAL CAMERA

Fujifilm Finepix F700

An impressive digital camera but is it worth the price?



Fujifilm's Finepix F700 is a slim, smart digital camera with a 3x zoom, fast performance and one of the best movie modes offered by any still camera available. It's also the first model to feature Fujifilm's latest Fourth Generation SuperCCD SR imaging technology, which, the company claims, can capture a higher tonal range than conventional camera sensors.

Fujifilm's SuperCCD SR sensor employs two photodiodes for each pixel: the larger primary photodiode (the S-pixel) has normal sensitivity, while the smaller secondary photodiode (the R-pixel) is four-times less sensitive and therefore capable of recording detail in bright light that would otherwise be lost. The sensor combines the pair to produce images that Fujifilm claims are more detailed than those produced by conventional sensors.

CCD chip also
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the camera. So, while the F700 may only have three million pixels on its sensor (albeit now with two photodiodes in each), it has the option to generate images with six million pixels.

The F700's metal-clad body feels great and is more pocketable than it looks; well-placed ridges on the front and back also make a surprisingly effective grip. The F700's slim lithium-ion battery recharges within the camera, and the supplied AC adaptor can either connect directly or via the cradle, which is also included in the package.

The F700 has a 3x optical zoom lens with a 35mm equivalent range of 35-105mm and a focal ratio of f2.8-4.9. The closest focusing distance in macro mode is an average 9cm, capturing 76mm across the frame. Power-up is very fast, with the lens out and ready for action in less than 1.5 seconds. The optics retract equally fast and are protected by an automatic sliding lens cover.

Images can be composed with an optical viewfinder or the larger than average 1.8in screen, which performs better than most in direct sunlight. Like other Fujifilm cameras, a 3 x 3 grid can be optionally

overlayed on the screen to aid composition, and the user interface is clear and easy to use.

The main dial offers Auto, Program, Manual, Aperture and Shutter Priority modes, along with four scene presets (via a screen menu) and a wonderful movie mode that delivers 640 x 480 video at 30fps (frames per second) with mono sound. This frame rate is double that of competitors and the quality looks much better, although it's still well below that of a camcorder. You'll also only get 13 seconds in 16MB. Shutter speeds range from 1/2,000 to just three seconds, which is disappointing for long exposure fans. Sensitivity ranges from 160 to 1,600 ISO, although at 1,600 you're forced to use 1megapixel resolution.

The F700 offers four resolutions, but no option to vary the jpeg compression level. However, there is a 14bit Raw mode and supplied software to later process the files on your PC. The F700's native resolution is 3megapixels, delivering 2,048 x 1,536 pixels, while its 6megapixel mode generates files with 2,832 x 2,128 pixels. The camera uses XD memory and is supplied with a 16MB card onto which you'll squeeze around 19

photos using the 3megapixel mode or 10 photos using the 6megapixel mode.

In our tests, the F700's images captured a greater tonal range than cameras with conventional sensors. Taking identical compositions with the F700 and Sony DSC-V1 (reviewed on page 71) revealed additional shades in overcast skies on the former, and wider histograms in Photoshop. The difference was slight, though. In terms of resolution, the F700's 6megapixel mode captured more than 4megapixels worth of detail, which, while impressive for a 3megapixel sensor, was below that of genuine 5megapixel models.

The only big problem with the F700 is its price. At £499, it's only £50 less than Sony's V1, which boasts genuine 5megapixel resolution, double the memory and a longer 4x zoom. Ultimately, this is a lovely camera to use and sports a slightly improved tonal range, but £499 simply puts it against more capable competitors.

Gordon Laing

DETAILS

RRP £499 inc VAT (£424.68 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Fujifilm 020 7586 1477

www.fujifilm.co.uk/di

SPECIFICATIONS

3megapixels max res, 2,832 x 2,128 recorded pixels, 4:3 aspect ratio • Optical & digital zoom: 3x, digital zoom only at lower recording resolutions • Focal length (35mm equiv): 35-105mm • Flash modes: on, off, red-eye, slow-synchro • 1.8in LCD • 16MB x D • 108 x 54 x 28cm (w x d x h) • 190g with battery • USB 1.1 • One-year warranty

PROS Great looks; quick handling
CONS Price puts it against higher resolution cameras

VERDICT

Superb build quality, but price is rather high

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



Designed to fit perfectly into your budget as well.

Whether you want to print efficiently in black & white or whether you want to create compelling colour documents, HP has the printer to fit your needs and suit your budget. The HP LaserJet 1010 series printers feature state-of-the-art HP LaserJet technology and easily fit onto a desk or shelf. The HP Business Inkjet 1100 series printers deliver impressive colour documents quickly at a remarkably low cost per page, thanks to four separate high-capacity ink cartridges. And all printers come with HP's renowned quality, reliability and ease of use. When HP quality is so affordable, why not choose both?



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150-sheet paper tray

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networking

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trays for up to 400 sheets and HP Jetdirect
200m internal print server



For more information on HP printers, visit www.hp.com/uk/stressfreeprinting

DIGITAL VIDEO CAMCORDER

Canon MVX10i

A well-specified model that meets the needs of video enthusiasts



While still photography has been a function available on most digital video cameras for some time now, low resolutions and missing functionality have always made it feel like little more than an afterthought. With a built-in flash, 2megapixel resolution, 10x optical zoom and a separate SD (Secure Digital) memory card, however, the Canon MVX10i has all the requirements to qualify as a pretty competent digital stills camera in its own right.

Let's not forget, though, that the MVX10i's primary function is as a mini DV camcorder. Happily, this one is capable of recording some of the best moving images we've seen this side of a three-CCD model.

Triple-chip camcorders will always win on image quality since they contain separate sensors for dealing with red,

green and blue colour signals individually. The trade-off is that three-CCD camcorders tend to be fairly bulky and, while the MVX10i isn't the smallest or lightest digital camcorder we've ever encountered, it's still pleasantly petite.

The designers have opted for the now-familiar upright approach, cramming in all the technology and features into a unit that stretches the categorisation of 'pocket-sized' to the limit. Thankfully, Canon seems to have found a decent compromise between size and image quality, and faithful colour reproduction for both movies and still photos is ensured by the inclusion of an RGB filter.

The MVX10i has almost certainly been built with video enthusiasts in mind and it is definitely one of the best-specified models of its type. Firewire input and output make

it ideal for desktop video editing, and an S-Video input allows for analogue-to-digital conversions or throughput – handy if you want to digitise older analogue recordings or capture them to your PC.

Experienced videographers will also be pleased with the inclusion of many manual controls, such as adjustable exposure, shutter speed and focus. Further manual settings are accessible from a menu screen and context-sensitive jog wheel combination. Even the microphone recording level can also be set manually. Unlike many other models, it doesn't have the infuriating habit of resetting itself to default whenever the camera goes into standby. However, the unusual choice of mounting the built-in microphone on top of the viewfinder might force many users to frame and shoot using the foldout screen in order to eliminate the possibility of recording a lot of eyebrow rustling. The LCD panel is another staple of the modern camcorder. In this instance, it's a reasonably good size (2.5in) and shows up pretty well, even in brightly lit conditions. Nevertheless, over-use will have an inevitable impact on battery life.

Nine different semi-manual program modes can be chosen by scrolling through AE settings. In automatic mode, however, choices are much more limited. It's a shame, for example, that the camera cannot be set to record in 16:9 widescreen or make use of any of its digital effects while set to the camera's Easy Recording mode.

Curiously absent from the MVX10i is a progressive scan mode – a feature that many previous generations of Canon camcorder have tended to include as standard. Only a year

or so ago, Canon was making a lot of fuss about progressive scan technology and how it could help improve the sharpness of fast-moving scenes. It seems strange that this feature has been left out entirely.

Nevertheless, the multi-function MVX10i includes many other features to make up for it – some of which are more useful than others. A front-mounted lamp can be used in Super Night mode to illuminate poorly lit subjects, while mini mpeg-4 movies can be saved directly to the memory card rather than to tape. Online chatters, meanwhile, might be interested to hear that this model can even be used as a kind of glorified webcam when connected to a PC via a USB cable. Our one criticism of the camera is that it tries to be all things to all people, which can occasionally confuse matters – particularly when it comes to tackling the slightly uncomfortable arrangement of buttons, dials and switches that clutter its diminutive chassis.

Jonathan Parkyn

DETAILS

RRP £1,149.99 (€978.71 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Canon 0870 514 3723

www.canon.co.uk

SPECIFICATIONS

2.2megapixel CCD • 1,632 x 1,224 pixel (max stills resolution) • 10x optical, 200x digital zoom • 2.5in LCD screen • Mini DV tape/SD memory card media • 450g • 52 x 118 x 102mm • Firewire in/out • USB

PROS Takes good photos;

high-quality video images

CONS Expensive; no progressive scan mode; too many buttons

VERDICT

Video enthusiasts and gadget nuts will enjoy exploring all the different features and settings. Picture quality is impressive

PERFORMANCE

★★★★★

FEATURES

★★★★★

VALUE FOR MONEY

★★★★★

OVERALL

★★★★★

THRIVE



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SMARTPHONE

Motorola MPx200

A smartphone-cum-PDA with great appeal



The MPx200 is the second Microsoft-based smartphone to hit the market. Like the first – the SPV – it will be available initially only through Orange. A third – Sendo's Z100 – was withdrawn before launch last year after a spat with the Redmond giant.

Microsoft says the MPx200 software has benefited from SPV's teething problems, incorporating all the bug fixes. The OS has been rebranded Windows Mobile 2002 for Smartphones, but a more important change is in infrastructure. Microsoft's latest Exchange Server 2003 software facilitates synchronisation, email delivery and instant messaging over a GPRS link. It can pack up to 1GB in its SD (Secure Digital) slot, making this device suitable for business use.

It is well-pitched for consumers, too, with an elegant case that closes to the size of a cigarette pack. MP3 files, pictures and video can be stored on SD cards or downloaded and fed to the pocket media player. But the MPx200 doesn't have a camera.

A thumbnail screen showing the time, battery level, signal strength and caller number is visible with the lid closed. Around the edges are an infra-red port, on/off button, a context-sensitive jog control, a headset socket, the SD slot, plus a mini-USB/power socket

that can be used for hardwired synchronisation.

Under the lid is a bright 35 x 45mm, 176 x 220 pixel full-colour screen, a recessed keypad and a four-way navigator with central select flanked by six more buttons – two context-sensitive, plus Home, Cancel, Call and Hang-up.

This design packs an office, web access and entertainment system into a trinket that can be operated with one hand. But, as discussed on page 18, it's also worth looking at the opposition.

Clive Akass

DETAILS

RRP £239 with Orange contract (£203.40 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Motorola 0500 802 080

www.motorola.co.uk

www.orange.co.uk

SPECIFICATIONS

GSM 900/1,800/1,900 • GPRS • ARM OMAP710 processor • 32MB Rom • 32MB Ram • USB/Irda ports • Pocket Outlook/Explorer • Battery life (claimed) 10 hours talk time

PROS Small, smart and powerful

CONS No Bluetooth or camera

VERDICT

Fine business tool for people with good eyes and nimble fingers

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

DVD WRITER WITH VIDEO CAPTURE

HP Movie Writer dc3000

All-in-one package for the budding director



While many of us like the idea of creating our own DVD movies, the hassle of actually doing it is enough to stifle any great plans. The DVD Movie Writer dc3000 attempts to change all that by combining video capture and DVD burning in a plug-and-play external drive.

The writer offers DVD+R recording at quad-speed and will burn +RW media at 2.4-speed. One disc of each type is included in the box and both the USB drive and software are easy to install. Moving around to the side of the unit reveals the built-in video capture facilities, with composite video, S-Video and stereo audio inputs. These can be used to connect an analogue camcorder or VCR, but there's no Firewire option – those wanting digital transfers will need a suitable connector on their PC.

Hitting the large record button on the top of the drive launches the software, which then takes you step-by-step through the recording processes. We were impressed at just how easy it was to use, and managed to capture, edit and burn a DVD, complete with custom menus, with no problems whatsoever. Arcsoft's Showbiz is supplied to help rearrange and polish your material, while Muvee's Autoproducer lets you apply

predefined editing styles to your footage – you can even add in MP3 music as a soundtrack, which the program will try to sync with the images.

At £279 the Movie Writer is expensive, especially compared to the latest multiple format internal writers, but the built-in capture and software facilities do make everything straightforward. If you're looking for a way to put old recordings on a shiny new DVD disc we really can't think of an easier way.

Chris Cain

DETAILS

RRP £279 (237.44 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP 08705 474 747 www.hp.co.uk

SPECIFICATIONS

2.4x DVD+RW, 4x DVD+R, 8x DVD (write, write, read) • USB2 • HP Video Transfer Wizard; Muvee Autoproducer DVD Edition • Arcsoft Showbiz DVD • Veritas Recordnow and Simple Backup • CyberLink Power2Go • 800MHz Pentium III • Windows XP or 2000 SP2 • 128MB Ram, 550MB hard disk space • 10GB free for DVD videodisc creation

PROS Easy to use and install

CONS Expensive

VERDICT

A great way to put your video recordings on DVD

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



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- Secure IDE™



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Siluro FX5900 OTES

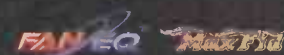
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KV7

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PROSUMER DIGITAL CAMERA

Sony Cybershot DSC-V1

Delivers professional performance more cheaply than its rivals



Aimed at prosumers – consumers who look for professional performance – Sony's Cybershot DSC-V1 is a 5megapixel digital camera with a 4x optical zoom and some neat gadgetry. While its basic specification looks similar to that of the Canon Powershot G5 and Nikon Coolpix 5400, the V1 is smaller, lighter and, crucially, £100 cheaper than its competitors.

As a 5megapixel camera, the V1 delivers images with 2,592 x 1,944 pixels and sufficient detail to produce good-looking 13 x 10in inkjet prints. There are four lower resolutions and two levels of jpeg compression from which to choose, along with an uncompressed tiff option. Best-quality jpegs measure around 2.3MB each, which means you'll squeeze about 14 on the supplied 32MB Memory Stick; the V1's slot is also compatible with the latest high-capacity Memory Stick Pro cards.

The V1 features a 4x optical zoom lens with a 35mm equivalent range of 34-136mm and focal ratio of f2.8-4. Unlike most high-end cameras that use lens caps, this model sports an automatic sliding lens cover. The closest focusing distance in macro mode is a disappointing 10cm, although you can achieve a fair result with the zoom set midway (capturing 76mm

across the frame). There's also a pair of optional lens adaptors which multiply the zoom range by 0.7x or 1.7x.

The V1 offers a manual focusing option with 14 preset distances, but its crowning glory is the laser-assisted autofocus mode first seen on Sony's DSC-F717 camera. The laser projects a fine red pattern onto challenging subjects, giving the autofocus something to lock on to even in pitch darkness.

Of course, there's the problem of composing a shot in pitch darkness, but the V1's got that covered with infra-red night modes, which illuminate nearby subjects with military-style night vision. Once focused, the pop-up flash will illuminate the subject or, if you desire, you can shoot with infra-red light alone for green-tinted results. The V1 is Sony's first camera with a

proper hotshoe designed for an external Sony flashgun.

Measuring a mere 99 x 65 x 57mm and weighing only 291g with a battery, the V1 is noticeably smaller and lighter than its rivals. It's also powered by one of Sony's Infolithium batteries, which tells you exactly how many minutes of life are remaining on-screen. The battery recharges within the camera, allowing the recharger to double-up as an AC adaptor. Images are composed using the optical viewfinder or sharp and detailed 1.5in screen.

The main mode dial offers Auto, Program, Manual, Aperture and Shutter Priority modes, along with six scene presets, and a movie option that can capture 640 x 480 video at 16fps with mono sound for as long as you have memory remaining. The movie mode can be set to Sony's Clip motion setting, which captures up to 10 small images and combines them into an animated gif.

Shutter speeds range from between 1/1,000 and 30 seconds, but there's no bulb for longer exposures. Sensitivity is rated between 100 and 800 ISO, and this is the first Sony camera to offer adjustment of contrast, sharpness and saturation, albeit with just three levels of each.

In use, the V1 performed well. The auto-focusing and night-framing excelled in darkened party environments where other cameras struggled. It was also good to know that the high-

resolution movie mode wasn't limited to 20-second bursts, although even at 640 x 480 it remains a novelty and is no replacement for a camcorder. About the only real criticism of the feature set is the paltry three-shot burst mode, which really trails competitors.

In terms of picture quality, the DSC-V1 performed as well as the best 5megapixel cameras we have tested. Images were highly detailed and virtually bereft of optical or electronic artefacts. In short, the photos looked great.

So what do you get for an extra £100? Cameras such as Canon's G5 and Nikon's 5400 both have flipout and twist screens, and more advanced photographic control. That said, the V1 features more than enough control for most photographers, while coming in cheaper, smaller and lighter. It comes highly recommended, although prospective buyers should also compare its Canon and Nikon rivals.

Gordon Laing

DETAILS

RRP £549.99 (E468.08 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Sony 08705 111 999 www.sony.co.uk

SPECIFICATIONS

5megapixel max resolution, 2,592 x 1,944 recorded pixels, 4:3 aspect ratio • Optical zoom, digital zoom: 4x, digital zoom at lower resolutions • Focal length (35mm equiv): 34-136mm • Flash modes: On, off, red-eye, slow-synchro • 1.5in LCD screen • 32MB Memory Stick • 9.9 x 6.5 x 5.7cm (w x d x h) • 291g with battery • USB2 (USB1.1 compatible) • One-year warranty

PROS Great quality and features
CONS Missing some control and features of pricier rivals

VERDICT

Photographers will find the V1 represents terrific value

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



PROJECTOR

Acer PD520 XGA DLP

Ideal for taking presentations on the road



Acer's PD520 is an XGA resolution portable DLP (digital light processing) projector. At just under £1,600, it's keenly priced, with an M1-DA port for digital and analogue connections and a 1.2x zoom.

In contrast to the Relisys RLP1000 reviewed opposite, the PD520 is all curves and cables. The M1-DA to D-sub lead has its own integrated USB cable providing mouse control from the remote, and various other video leads are included.

The PD520 has no dedicated buttons on the top panel, only the on-screen menu controls. Two of these buttons double-up – one as a manual source selector for when multiple inputs are connected, and the other to resync the image. Keystone controls on the projector panel are useful, but at least the digital keystone can be activated from the remote, which also features a disc for controlling the mouse cursor and a laser pointer.

Infra-red receivers mounted front and back make it possible to present in front of and behind the projector. A retractable foot at the front makes projection possible from a low table, but we found on a standard-height desk we needed a CD case under the rear foot to avoid the image wrapping up onto the ceiling.

It has a quoted brightness of 1,500 Ansi lumens, but the Acer produces a much brighter,

punchier image than the Relisys, and at shorter distances you could get by with the lights on. However, both fared pretty badly at resolutions other than their native XGA, so the Acer is not the model to choose if you need to connect machines running at SVGA resolution.

The PD520 is fairly quiet and the 2w internal speaker offers sufficient volume for a small room. The profusion of cables, small dimensions, light weight and carry case make it the perfect road warrior's companion.

Ken McMahon

DETAILS

RRP £1,580.38 (£1,345 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Acer www.acer.co.uk

SPECIFICATIONS

DLP • 1,500 lumens • 150w lamp power • 1,800:1 contrast ratio • Native resolution XGA • 4:3 & 16:9 aspect ratio • M1-DA, D-Sub (out), S-Video, composite video, audio-in (3.5mm mini-jack) serial • Remote • 1.7kg • 246 x 210 x 71mm

PROS Small; quiet; competitively priced

CONS Poor image quality at scaled resolutions

VERDICT

Good value portable DLP projector

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

PROJECTOR

Relisys RLP1000 SVGA LCD

Packed with features at a reasonable price



Relisys projectors are manufactured by Teco, a Taiwanese company that is probably better known for its LCD flat-panel displays. The RLP1000 is a silver brick, but what it lacks in curves it makes up for in features and ease of use.

The RLP is easy to set up and operate from the top panel or the card-style remote control. The remote's buttons are colour coded but not backlit, so you'd struggle in a dark room. While buttons for digital zoom, freeze and speaker volume are clearly useful, others, such as OSD transparency, black level and colour temperature could reasonably have been left to the on-screen menu.

The composite, component and S-Video connections are conveniently located on the side, with the computer connections at the rear. There's also a through-port for audio, though given the capabilities of the speaker and the lack of a cable, these are a bit superfluous. The front of the projector is raised and lowered via two screw feet, which is a bit fiddly, and there are dedicated buttons for digital keystone correction on the top panel and remote.

Picture quality is very good at the native 800 x 600 resolution. With a quoted brightness of 1,500 Ansi lumens, the picture is bright enough to be seen in a semi-darkened room, and at projection distances of less than

three metres you could get away with just turning off the lights. Screen resolutions up to 1,280 x 1,024 can be displayed by compressing the image, but the quality leaves a lot to be desired.

We wouldn't be surprised to see the RLP1000 retailing at or under £1,000. For an SVGA (800 x 600) model with analogue and digital inputs, a variety of video connections, 1.25:1 zoom lens and Faroudja de-interlacing for improved video performance, this is pretty good value.

Ken McMahon

DETAILS

RRP £1,092.75 (£930 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Relisys www.relisys.com

SPECIFICATIONS

LCD • 1,500 lumens • 150w lamp power • 400:1 contrast ratio • Native resolution SVGA • 4:3 & 16:9 aspect ratio • Connections (in and out) D-Sub, DVI, L & R audio RCA, audio-in/-out, 3.5mm mini-jack, serial, USB, composite video, component video, S-Video • Remote • 2.9kg • 290 x 190 x 95mm

PROS Multiple video connections; Faroudja video deinterlacing

CONS Lack of cables; remote

VERDICT

Excellent value feature-packed budget projector

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

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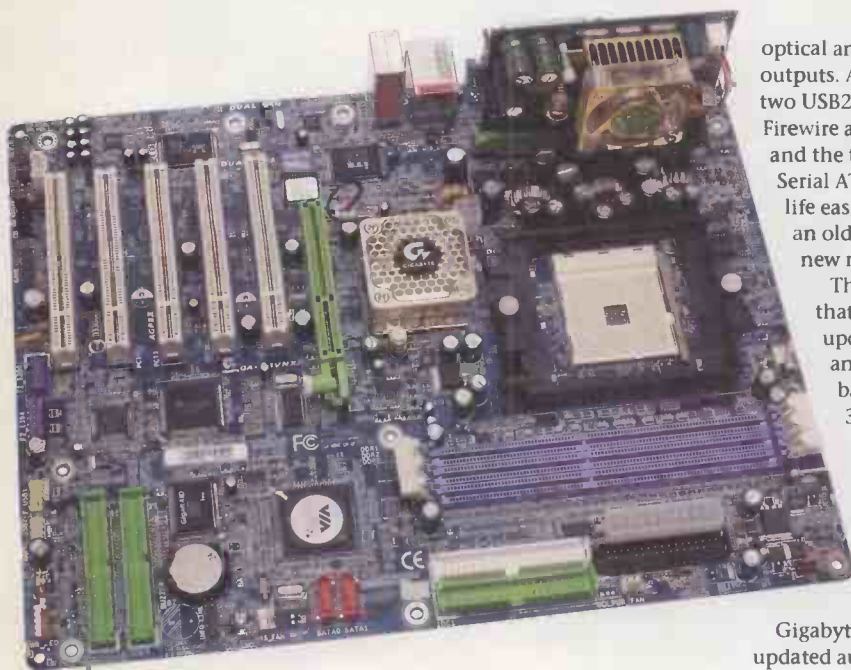
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ATHLON 64 MOTHERBOARD

Gigabyte K8VNX

A traditional design with numerous added features

EXCLUSIVE



Gigabyte has covered its options when it comes to the new Athlon 64 processor. In the Time Viper PC, also reviewed in this issue (see page 58), we found the company's GA-K8NXP motherboard, which uses the Nvidia nForce3 150 chipset. Here we bring you an exclusive review of the GA-K8VNX, based on the rival Via K8T800 technology.

If you covered up the processor socket and heatsink base, it would be difficult to tell which processor family this model supports. It all looks very similar to an Athlon XP board, and bears more than a passing resemblance to Pentium 4 designs.

When you consider how much Athlon 64 differs from other processors, it's a surprise that the K8VNX doesn't look more radical. The processor contains the memory controller, so the northbridge of the chipset does little more than connect the processor and graphics card together.

Athlon 64 doesn't allow for dual-channel memory, so this board has three memory slots

with support for up to 3GB of unbuffered PC3200 memory. While this is good by current standards, it could be a major limitation when a 64bit version of Windows is available, along with 64bit applications.

Looking at the backplate, we were again struck by how conventional it all looks. There are two PS/2 ports, one parallel and two serial ports, three mini jacks for the integrated audio, dual Lan (Gigabit and 10/100) and four USB2 ports.

The southbridge of the chipset is the VT8237, which offers a feature set to rival Intel's ICH5. It supports two Parallel ATA133 controllers and a pair of Serial ATA connectors with Raid 0 and 1, and there's a Gigaraid chip to add two extra Parallel ATA133 controllers. You could use a total of 10 hard disks and optical drives with that little lot. Two Serial and three Parallel ATA cables are provided in the box.

Gigabyte has also included three brackets to make sure you get all the ports you could possibly want. One bracket handles surround sound and has extra mini jacks, as well as

optical and coaxial S/PDIF outputs. A second bracket has two USB2 ports as well as one Firewire and one mini-Firewire, and the third bracket is a Serial ATA adaptor that makes life easier if you're upgrading an old PC case with your new motherboard.

The Firewire controller that Gigabyte uses is updated to IEEE 1394b and has increased bandwidth of 3.2Gbytes/second, rather than the older standard of 800Mbytes/second. As yet, we haven't seen any IEEE 1394b peripherals.

Gigabyte has also used an updated audio controller. We are used to seeing the Realtek ALC650 or ALC655, but the ALC658 is quite new and allows the mini jacks to be configured as either inputs or outputs. Realtek calls this 'Universal Audio Jack'.

Between the processor socket and the parallel port you'll find the Dual Power System module that Gigabyte includes with its high-end motherboards. It's a plug-in module that looks similar to a Pentium II slot processor and it adds power regulation circuitry to change the board from three-phase power to six-phase. In this case the module is called Dual Power System K8 and is apparently specially designed for the Athlon 64 platform.

You'll usually find extra power is beneficial when overclocking your processor, and we hope

that Athlon 64 is particularly good at overclocking as it doesn't have a front-side bus and multiplier, running instead at its true speed. That should make it easier to lock the AGP and PCI speeds before you start to work on the processor speed in isolation.

At standard speeds, the Gigabyte matched the three Athlon 64 PCs we have on review in this issue.

All these features are good, but they make the motherboard very cluttered. Everywhere you look you'll find a connector or another chip but, despite that, all these components have their space and nothing interferes with anything else. Gigabyte could probably take a leaf from Abit's Max range and remove a couple of PCI slots to create some space for the dual Bios chips, the dual Lan chips, and a few more besides.

The only other problem with the Gigabyte K8VNX is its steep price, but we're happy that it offers good value for money.

Leo Waldoock

DETAILS

RRP £144.53 (£123 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Gigabyte 01908 362 700

www.giga-byte.com

SPECIFICATIONS

Gigabyte GA-K8VNX • Socket 754 Athlon 64 • Via K8T800 • 3 memory slots • AGP 8x • Realtek 6-channel audio, optical & coaxial S/PDIF out • 5 PCI slots • 1 floppy, 4 parallel ATA133 controllers, 2 Serial ATA connectors with Via VT8237 and Gigaraid chips – Raid 0 and 1 • 6 USB2, 1 Firewire, 1 mini-Firewire • 2 PS/2, 2 serial, 1 parallel port • 10/100 Lan and Gigabit Lan

PROS Loads of ports; Serial and Parallel Raid; good performance

CONS Cluttered design; high price

VERDICT

This has loads of features, is pricey, but good value for money

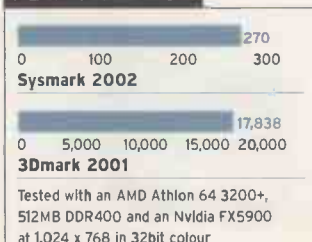
PERFORMANCE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

PERFORMANCE



DUAL-FORMAT DVD WRITER**Plextor PX-708A**

Top-speed DVD recording made easy



Following the release of the specifications for eight-speed DVD +R writers by the DVD Alliance, manufacturers have rushed off to produce even better drives. First to the PCW Labs is Plextor, with the dual-format PX-708A.

Besides eight-speed +R performance, the PX-708A supports quad-speed -R and +RW, dual-speed DVD-RW and 12-speed DVD-Rom reading. It's no slouch when it comes to CD performance either, able to read CDs at 40-speed, write CD-Rs at the same pace and handle CD-RW at 24-speed.

While these figures are impressive, we couldn't test the drive at full capacity as eight-speed media has yet to make an appearance. Indeed, Plextor supplies the drive with a four-speed disc. As with many things, buyers will have to wait for the full benefit of this technology.

Backing up the performance is a range of technologies to prevent writing errors, improve the quality of recordings and generally make the burning process less likely to fail. Buffer underrun technology makes sure the PC can deliver the data fast enough when recording, and users can adjust the laser power to reduce jitter, providing better sound quality when writing audio CDs. There's also Lossless Linking for DVD +R/+RW burning and Plextor's

own Power-Rec system, which helps combat errors when the drive is writing to disc.

Plextor supplies a standard software bundle with the drive. Apart from the company's own CD/DVD utility software, Plextools Professional, you also get Nero 5.5, InCD, Pinnacle Studio 8 and PowerDVD.

The PX-708A is a good starting point for anyone new to DVD recording. And with its eight-speed +R support, you get a degree of future-proofing too.

Simon Crisp

DETAILS

RRP £233 (£199 ex VAT)

BEST PRICEwww.pcw.co.uk/bestprices**PRODUCT INFORMATION**

Plextor Europe +32 2725 5522

www.plextor.be**SPECIFICATIONS**

8x DVD +R, 4x DVD+RW, 4x DVD-R,

2x DVD-RW, 12x DVD-Rom, 24x

CD-RW, 40x CD-R, 40x CD-Rom

• Cav reading • Buffer underrun • 2MB

buffer • Plextools Professional, Nero

5.5, InCD, Pinnacle Studio 8, Cyberlink

PowerDVD

PROS Dual-format; eight-speed

+R support

CONS Still have to wait for media

to get the best out of the drive

VERDICT

The fastest +R drive we've seen.

Good performance on all formats

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

TV CARD**GTA Digital PCTV Card Plus**

Digital convergence at the tip of your finger



Another step toward that holiest of grails known as digital convergence, GTA's Digital PCTV card brings Media Center-style features to your PC, without needing to buy a whole new system. The product combines a digital TV-tuner with the ability to record, pause and rewind live TV and manage your media files.

On the tuner side, the PCTV provides access to free-to-air digital services which, in essence, means Freeview in the UK – a package of 30 digital channels that includes all standard terrestrial channels, a number of digital offerings and 12 digital radio stations.

In use, video recording and playback standards were reasonable, although audio reproduction was disappointing at times. This was due, for the most part, to the difficulties associated with attaining a strong enough digital signal reception on our test PC. As any digital TV viewer will testify, annoying picture and sound break-ups are par for the course. While using a good signal booster or rooftop aerial can improve this, the fact that the PC can be noisy at the best of times means users face an uphill struggle from the outset.

Included in the package is a useful remote control, which provides one-touch recording, channel and volume adjustment, as well as radio, CD and DVD

control. It also allows users to manage their entire media collection, with quick access to pictures, movies and music by album, genre and artist. Personal playlists can also be created and accessed via the remote.

While GTA's Digital PCTV provides an easy way of joining the digital revolution, it is not without its faults. There is no facility for Teletext and multiple users can cause conflicting recording schedules – leading to a total failure to record anything. However, it's an excellent alternative to buying a set-top box, particularly in light of its ability to pause and rewind live television.

Rory Reid

DETAILS

RRP £99.99 (£85.34 ex VAT)

BEST PRICEwww.pcw.co.uk/bestprices**PRODUCT INFORMATION**GTA 01296 733 268 www.gta-ltd.co.uk**SYSTEM REQUIREMENTS**

1GHz PC • 128MB of Ram

PROS Record and pause TV;

digital radio

CONS Picture and sound break-ups**VERDICT**

Worth recommending for the Media Center functionality and ability to pause and rewind live television

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

GRAPHICS CARD

PNY FX 5900 Ultra

If you're serious about graphics, try this



While some regard the Radeon 9800 Pro as the finest graphics chip available, others beg to differ, most notably Nvidia. Offering an alternative to ATI hardware, PNY's Verto GeForce FX 5900 Ultra is based on the top-of-the-range GeForce FX 5900 Ultra.

Made using 0.12micron technology, the card is impressive on paper. Running at 450MHz, it has a 256bit memory interface, twice that of its predecessor, and a theoretical data throughput of 27.2Gbytes/sec. This means it can push pixels around the screen at an incredible speed, applying up to 16 different textures to each one in a single pass.

Also included is version 2.0 of Nvidia's CineFX engine, new vertex shaders and Ultrashadow technology, allowing developers to create a variety of special effects and more realistic visuals. The Ultra is fully DirectX 9 and Open GL 1.4-compatible, and supports AGP 8x.

PNY has combined this with 256MB of Ram, plus VGA, DVI and S-Video outputs. The card

takes up two expansion plates at the back of the PC and also has an impressive cooling system.

In tests, the card lived up to the hype, with a 3Dmark 2001 score of 17,226 – the highest we've ever seen. It failed to run 3Dmark 2003, however, demanding more power from a PC fitted with a 500w supply.

This hair-raising performance comes at a price, though. With an RRP of £449, this card is really only suitable for anyone who's serious about graphics. PNY's Verto GeForce FX 5900 Ultra is a fantastic performer and well worth considering.

Rory Reid

DETAILS

RRP £449.99 (£370.25 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

PNY 01784 224 220 www.pny.co.uk

SPECIFICATIONS

450MHz core • 400MHz Ramdacs • 256MB DDR-Ram running at 850MHz • 27.2Gbytes/sec memory bandwidth • VGA, DVI and S-Video • DX9 • OpenGL 1.4 • AGP 8x • Drivers, The Elder Scrolls: Morrowind, Tribunal

PROS Performance; visual quality

CONS Very expensive

VERDICT

A stunning graphics card that may prove prohibitively expensive for all but a select few

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

PERFORMANCE



CANTERWOOD CHIPSET P4 MOTHERBOARD

Abit IC7-MAX 3

A fast, feature-packed mother of a board



The IC7-MAX 3 keeps up Abit's tradition of innovation, offering an interesting mix of features.

Designed for Pentium 4 and based around Intel's 875P Canterwood chipset, the IC7-MAX 3 uses the ICH5-R version of Intel's southbridge, which allows users to set up a Serial Raid 0 array and supports hot-swapping of hard drives. Not content, Abit has added two more Serial ATA interfaces to the board (bringing the total to four) and a Silicon Image Sil3114 controller chip, enabling hard disks to be arranged in either Raid 0 or Raid 0+1 configurations.

The inclusion of an Outside Thermal Exhaust System (OTES) raised an eyebrow. This cooling system, normally found on Abit graphics cards, is housed over the capacitors, drawing hot air away from them and venting it through a fan. It does keep temperature down, but the unit adds another noise generator to

a board that is already equipped with a large northbridge fan.

Another byproduct of having a fan introduced to the I/O panel is the lack of room for serial or parallel ports, though there are still two PS/2 ports along with S/PDIF in and out sockets, six-channel audio, four USB2 ports, Firewire and a Lan port for Gigabit Ethernet.

The IC7-MAX 3 is a feature-rich, fast motherboard, and with its multi-Raid setup would form the basis of a fast workstation or high-end PC.

Simon Crisp

DETAILS

RRP £173 (£147.23 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Abit 01438 228 888 www.abit.com.tw

SPECIFICATIONS

Pentium 4 (800/533MHz FSB) • Intel 875P/ICH5-R Canterwood chipset • Four DDR-Ram Dimm slots (up to 4GB) • AGP 4x/8x • Six-channel audio • Five PCI slots • Two ATA100 parallel slots • Four Serial ATA (Raid-supported) slots • Six USB2 ports • Two PS/2, two S/PDIF, Firewire, Gigabit Lan

PROS Good range of features; Raid support

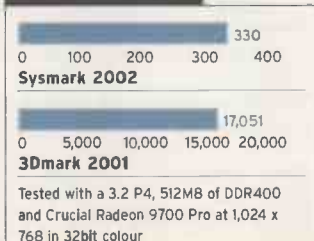
CONS Is the OTES necessary?

VERDICT

A great board packed with features. Abit does it again

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

PERFORMANCE



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talk about the future.
I want to live it now.

AMD
me.



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UNFAIR



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*Refers to 8200B configuration **Dependent on model

ENCYCLOPAEDIA

Microsoft Encarta 2004 Premium Suite

Engaging, authoritative and extensive – still the top choice



Left: Encarta offers 3D visual tours of the Colosseum

Below: You can search for information on a topic in a variety of ways

This is the top-notch edition of the world's best-selling encyclopaedia. It contains, if Microsoft is to be believed, more information than a 60-volume print encyclopaedia, but the point of a DVD-based reference work is that it's so much more than just words and pictures, and it is here that Encarta excels. With a massive archive from *The Times*, school-oriented homework and project tools, live weather and radio from the net and videos from the likes of the BBC, ABC and Discovery Channel, it can keep you amused for hours. You can already tell we're impressed.

Encarta has a long pedigree and comes in three flavours: 'Standard', 'Plus' and 'Premium Suite'. Premium Suite contains an impressive 130,000 articles, 1.8 million atlas locations and over 260 videos and animations. In the standard edition these stats drop to a more conservative 34,800, 36,000 and 100 respectively. With so much data at your fingertips, though, you're going to rely heavily on the indexing system, and we're pleased to report this is something Microsoft has got spot on.

Encarta opens with the Visual Browser, a new feature that mimics the Knowledge Navigator found in Britannica. Microsoft describes it as an innovative way to discover relationships between content and topics, but in reality it's simply a more visual, cut-down edition of the links found in most encyclopaedia entries. We'd rather stick to the integrated search tool, which is very versatile and can be constrained to hunting through only certain media types – text, videos, sound and so forth.

By far the most intriguing way to explore the suite is through the Interactive Timeline, which layers key historical events so that you can see how they interrelate. Crammed with hotspots, it is an innovative way to link together the various parts of the encyclopaedia and an intriguing jump-off point for the more casual browser.

Microsoft makes much of the fact that Encarta now includes videos from the Discovery Channel and, as far as the multimedia entries go, these are, not surprisingly, the most compelling components. They are found only on the DVD edition, but are long enough to teach you something and cover

such diverse subjects as the formation of stars and the evolution of birds.

Sadly the same can't be said for much of the remaining video content, which is often bitty and looks like it was put together using scraps from the cutting-room floor. Footage of the Kennedy assassination is particularly weak, taking you from his arrival in Dallas to his coffin-clad dispatch in less than 30 seconds. There is no narration. The 'bombardment during the Blitz' is equally unimpressive, and does little to convey the scale or horror of the event itself.

This is more than just an encyclopaedia, though; Encarta incorporates dictionaries and thesauruses from Bloomsbury, and a collection of over 20,000 quotes, which should appeal to the budding author struggling for inspiration. Its bilingual dictionaries translate between a range of European languages and, for the visually impaired, the read-aloud function will dictate on-screen articles.

There is no denying the time and money put into Encarta has been well spent. It is a bargain at less than £70 and, with online updates, it promises a shelf life that far exceeds that of the

printed equivalents. If you are after a digital encyclopaedia, this is the one to go for, as past reviews of Britannica, the obvious rival, have shown its conversion from paper to pixel to be an uncomfortable and clumsy undertaking.

Somehow, though, there's an element of flatness to this release. It doesn't excite in the way it used to, even as recently as last year, but that might be because we all know what to expect now, and it may also be because of the Visual Browser that dominates the home page. Online updates were once an innovation. Now they are merely something we accept as part of the deal. The 3D visual tours that allow you to walk the corridors of the Colosseum were a novelty last year. This year they feel a bit tired, and if your games ran this slow you'd upgrade your PC. Encarta remains one of the most engaging, authoritative apps on the market, but we'd hate to see it become worthy at the expense of its sense of fun.

Nik Rawlinson

DETAILS

RRP £69.99 (£59.57 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Microsoft 0870 601 0100

www.microsoft.com/uk

SPECIFICATIONS

Windows 98/ME/2000/XP • 333MHz or faster processor • 64MB of Ram (128MB for Windows 2000 and XP) • Colour monitor with 800 x 600 or higher resolution • 16MB graphics card • 260MB hard drive space • DVD-Rom drive

PROS Online updates; affordable; extensive scope of entries

CONS The Discovery videos show the weaknesses of much of the remaining multimedia content

VERDICT

An attractive, engaging, keenly priced product; our top choice of electronic encyclopaedia

EASE OF USE ★★★★★

FEATURES ★★★★★

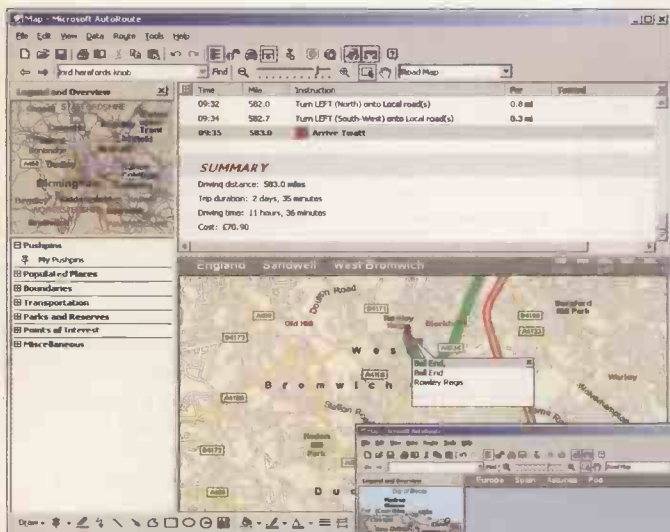
VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

ROUTE-PLANNING TOOL

Microsoft Autoroute 2004

A valuable piece of software, but little that's new in this upgrade



Even if you don't own a copy of Autoroute, you've probably seen what it does, either on someone's screen, or as exported or printed maps and routes from a friend. Arguably the premier route-planning tool, it makes mapping your travels and finding everything from beauty spots to cash machines a doddle. Its maps are sharp and accurate, its directions concise and easy to follow, and its interface up to the high standard we've come to expect from Microsoft, incorporating the now familiar Office look and feel. It covers 13 European countries down to street level – unfortunately excluding Ireland – and supplements them with city plans of Oslo, Prague, Helsinki and Dublin.

If you only want to plan your travels, it couldn't get much simpler. Mark out your start and end points from the right-click menus and you're just one more click from a swiftly mapped-out route. Repetitive instructions, such as following the signs on five or six roundabouts, are collapsed into expandable sections so there is less to distract you when you're out on the road.

By default, the on-screen results are split so you can see

the directions and map together, and clicking any point on one highlights the same on the other. This layout can be replicated in the printed equivalents, although turn-by-turn maps, or strip maps where the directions run along the side of the road, may be of more use.

The two new features in this release are one-way street arrows – great for city centre maps – and the new driving-time zone. The latter will work out how far you could travel in every direction from a given point in a set timeframe. The results are more accurate than drawing a circle with a compass, but make no allowance for time of day; a 10-minute journey in the rush hour is of a shorter distance than one in the middle of the night, after all. Still, it's handy if you're house hunting and must live within five minutes of the station.

Plotting a route from London to Stockholm, Autoroute points out when you are crossing national borders – useful for anyone trying to keep the kids

Microsoft Autoroute offers a variety of information to travellers, from estimated driving times and costs, to the location of national borders

amused, or avoiding an international arrest warrant – and although it doesn't have access to updated ferry times, it does plot their routes and remind you to check the timetable. A web link would be welcome here.

We were particularly impressed by what Microsoft calls snap rerouting, which takes a lot of the work out of correcting your mistakes or avoiding known trouble spots. Put simply, it allows you to double-click on the route map and drag its path to another point on the screen. Autoroute will snap it to the local roads that most closely match the path you have defined, then update the directions as appropriate. We tried it on several obscure journeys and it worked perfectly, with each snapped point being added as a 'via' point to the journey.

As you'd expect, Autoroute 2004 knows all about fuel consumption, and if you tell it the capacity of your tank it will even mark out petrol stops in your journey. This, combined with the option to specify petrol prices, gives a more accurate overview of just how costly it is to visit a relative you'd rather forget.

GPS support has been beefed up, with Microsoft promising that on-screen positions will update once a second. This is fine for car use and, if you stick to the speed limit, should be near enough real time.

Maps can be exported to a handheld device using Pocket Streets, but only if you use Pocket PC. Palm devices have been frozen out, which is a shame, although not entirely

unexpected. On a more positive note, the PDA versions of each map will work with a GPS add-on, and there is a discount voucher in the box should you feel the need to splash out.

More widely accessible than the Pocket PC maps are exported web pages, which can include not only maps and directions but also any annotations or illustrations you have added to your files. This would be of particular use if you were planning a party and wanted to build an info site for your guests.

Taken as a whole, there is not a lot here to warrant an upgrade from last year's edition. Roads change, of course, but if you've been driving around with the 1998 edition of your printed atlas in the boot since its pages were pristine you'll know that they don't change that much. The one-way street pointers are a boon, but should only be an inducement to upgrade for city-centre couriers or getaway drivers, not casual cruisers.

Nik Rawlinson

DETAILS

RRP Price £49.99 (£42.55 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Microsoft 0870 601 0100

www.microsoft.com/uk

SPECIFICATIONS

Windows 98/ME/NT4 SP6/2000/XP • Pentium II or higher processor • 64MB of Ram (128MB for Windows 2000 and XP) • Colour monitor capable of 800 x 600 or higher resolution • 1GB hard drive space • Quad-speed or faster CD-Rom drive • Mouse

PROS Snap-routing; speedy mapping

CONS Ireland all but ignored

VERDICT

Versatile and useful, it's a great piece of software if you don't have last year's edition. If you do, save your money for Christmas

EASE OF USE ★★★★★
FEATURES ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★

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www.samsung.com

TRAVEL PLANNER

M&T Top Cities Europe

A useful idea with some valuable content



Top Cities contains some useful local information from the *Lonely Planet* guides, but is let down by poor route planning

If you're taking a PDA on holiday, why not load your guidebook onto it and ditch the paper volume? It's a good idea, but poorly executed – at least in the case of Map and Travel Top Cities. For a start, you must install each of its 16 cities individually, which is tedious if you're on a European tour. Once inside the package, the planning tools are also decidedly shaky.

Mapping a simple route from PCW's offices in London's Soho to Liverpool Street station took us almost as far south as the Thames, before curving around and heading north-east to our destination. The station is directly east, and there are far more direct routes for both driving and walking that go more or less as the crow flies. In Florence, meanwhile, even picking start and finish points on the same road threw up an error. 'There is no routing information about startpoint,' it said. Our only option was to click OK.

However, the vector-based maps are pin-sharp and the local information, from the excellent *Lonely Planet* guides, is comprehensive and enough to see you through a weekend away. We'd have liked the camera icons to be linked to pictures rather than just pointing out good

photo stops, but that would have gobbled up our PDA's memory.

In all, it's a great idea, but we'll be sticking with the paper alternatives for the time being. Perhaps version two will give us reason to reconsider, but until the whole of a *Lonely Planet* guide can be crammed into a PDA, this product will always fail to rival its less technical inspiration.

Nik Rawlinson

DETAILS

RRP £39.99 (£34.03 ex VAT) or £12.50 (£10.64 ex VAT) for individual cities

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Mediagold 020 7221 4600

www.mapandguide.com/topcities

SYSTEM REQUIREMENTS

Pocket PC using ARM, MIPS or SH3 processor • 32MB Ram plus 2MB-8MB for each map installed • Pocket PC 2002, Windows CE 3.0 or above

PROS *Lonely Planet* content; maps

CONS Poor route planning

VERDICT

If your expectations are not high, this is an impressive addition to the Pocket PC library. If your primary need is for mapping, the paper alternative may be better

EASE OF USE ★★★★★
FEATURES ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★

DVD COPYING SOFTWARE

DVD X Copy Gold

Decent software but with limited legal uses

Straight away, DVD X Copy presents us with a problem – copying commercial DVD movies for any reason is illegal. 321 Studios attempts to get around this by suggesting users only employ the product to create 'backup' copies of their own discs. A brief disclaimer on the packaging and a pop-up dialogue box are the only other discouragements to would-be pirates.

The package is made up of two programs – DVD X Copy and DVD X Copy Xpress. Both do the same job but have unique features. The main program can make 1:1 copies of DVD movies on DVD-R/RW or DVD+R/RW discs. Commentaries, Dolby soundtracks, multiple languages and any special features can also be included, spanning the movie over several discs if necessary. Xpress is capable of compressing longer movies so that they fit onto a single 4.3GB DVD.

The programs can work around any copy protection, region coding and NTSC/PAL video standards. We tested out DVD X Copy on a number of machines with various different titles, playing back the results on several set-top DVD players, and not all of them worked. This could be for a few reasons,

mainly compatibility with the range of DVD recordable standards. Our conclusion is that DVD copying in general is still a hit and miss affair, so be prepared for the occasional coaster.

The UK copyright laws could do with a shake-up, but when it will occur and whether it will help or hinder products like DVD X Copy remains to be seen.

Jonathan Parkyn

DETAILS

RRP £74.99 (£63.82 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Koch Media 01256 707 767

www.321studios.com

SYSTEM REQUIREMENTS

Windows 98, ME, 2000 or XP • Pentium III 500MHz processor • 128MB Ram • 10GB free hard disk space • Recordable DVD drive (DVD-RW or DVD+RW)

PROS Relatively fast; easy to use

CONS Copying copyrighted DVDs is against the law

VERDICT

In light of the whole legal angle, we find it hard to recommend DVD X Copy for anything other than copying discs you've made yourself from your home movies

EASE OF USE ★★★★★
FEATURES ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★



Attack of the clones – DVD X Copy enables you to duplicate movies within a couple of clicks

DVD Rewriter



Versatile Multitool

LG's all-format DVD Rewriter



With so many DVD and CD formats in the marketplace it is comforting to know that with the Super Multi Write Plus Drive* from LG you can now read and write DVD-RW, DVD+RW, DVD-RAM and CD-RW all with a single drive.

By combining all DVD formats in a single drive LG ensures that you get the ultimate in compatibility and recording features. This ground breaking drive is designed to suit all applications from editing and recording home movies to backing up and storing large quantities of PC data.

This is just one of the many drives available from LG, the world's number one optical storage manufacturer. To find out more visit our website or call us on 0870 607 5566



*Model: GSA-4040B

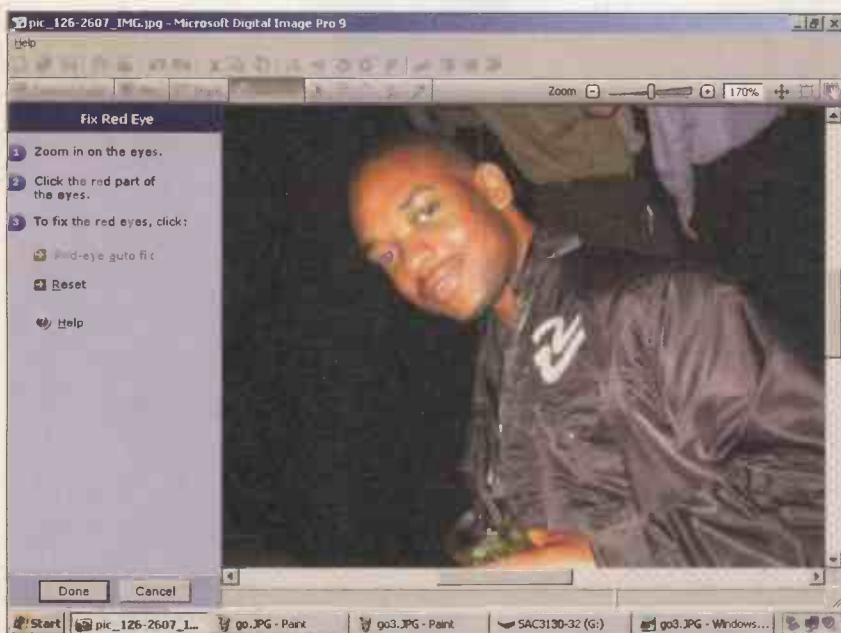
www.lge.co.uk/allformatdvdrewriter

Digitally yours

IMAGE-EDITING

Microsoft Digital Image Suite 9

Manage your photos and create compelling slideshows on the cheap!



Not only can you get rid of red eye, but you can also remove wrinkles, spots and other blemishes

and highlights. Also, a new Unsharp mask filter allows users to improve the quality of their pictures by increasing the contrast along the edge of details in a photo. These features, along

be saved in a variety of popular formats, but Microsoft has also included a means of saving images for email by specifying maximum file and picture sizes. This is particularly handy bearing in mind the space limitations imposed by many email service providers.

Elsewhere, by including Photo Story Lite, Microsoft has provided the facility to create photo presentations in wmv or Video CD format. Not only can you create dynamic photo albums consisting of pictures, voice audio and a soundtrack, but you can also highlight interesting areas within each photo as it is displayed – allowing for a far richer and varied presentation.

While Digital Image Suite doesn't purport to be as versatile and powerful as dedicated packages such as Photoshop, it does provide the kind of features normally associated with programs costing hundreds of pounds more. Additionally, the image archiving capabilities are arguably worth the price of the software alone.

Rory Reid

With the growing popularity of digital photography there's never been a wider choice of imaging software to make more of your pictures. Digital Image Suite 9 is the latest edition of Microsoft's premium photo manipulation package. As well as offering new tools and filters, the program is easier to use than its predecessor and includes image management as well as improved editing facilities.

The installation process is about as painless as we've come to expect from Microsoft – a simple, self-explanatory procedure eventually leads to the program's friendly interface.

Instead of traditional toolbars, as seen in packages like Photoshop, Digital Image Suite offers a task pane with context-sensitive menus and icon-driven commands. While this system is certainly logical, it may ultimately prove to be as irritating to experienced users as it is helpful to the novice.

Where Digital Image Suite really excels is in providing easy auto-correction at the click of a few buttons, simplifying what can be complex procedures in

rival packages. Where Photoshop users may have to rely on substantial training or an extensive manual, Digital Image Suite allows even novice users to quickly retouch and rearrange images. Standard fare such as red-eye correction sits alongside more advanced tools to aid in areas such as the removal of wrinkles, spots and other skin blemishes.

Also noteworthy is the new Smart Erase function. This provides the ability to quickly remove any unwanted elements from photos. Strangers, foreground and background objects and other distractions can be erased without leaving an unsightly piece of blank canvas. Instead, Digital Image Suite automatically fills in the gaps using a surprisingly accurate method of pixel blending and selection, which, for the most part, removes all traces of the deleted object.

Alongside these tools there is also an assortment of manual photo correction features. These include the ability to adjust the levels of colour using a histogram – with separate controls for shadows, midtones

with batch file operations that enable repetitive manipulation of multiple images, make common photo-editing tasks quick and easy.

One of the most interesting additions provided by Digital Image Suite 9 is the software's image archiving capability. Microsoft claims users will be able to locate any image in a collection of thousands in around 10 seconds. Although this is ambitious, we found the package performed well in this respect. The Digital Image Library boasts some of the most useful organising and archiving functions we've seen.

The package will record information to help with photo browsing, including the date a picture was taken, its file and image size, and the folder (or external media) where the image is stored. Also, custom picture information can be attached to each photo – including keywords, captions, and a five-star rating. In practice, this proved extremely useful and avid photographers will find it indispensable.

There's also a range of output options. Naturally, images can

DETAILS

RRP £69.99 (€57.74 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Microsoft 0870 601 0100

www.microsoft.com/uk

SPECIFICATIONS

700MHz processor • Windows 98, ME, 2000 or XP • 256MB of Ram (512MB or higher recommended) • 400MB hard disk space • 4x CD-Rom drive or higher • SVGA monitor (800 x 600, 16bit colour or better) • 1MB video Ram

PROS Easy to get great results

CONS May frustrate advanced users

VERDICT

At £70, Digital Image Suite provides an inexpensive way to manage those Kodak moments

EASE OF USE

★★★★★

FEATURES

★★★★★

VALUE FOR MONEY

★★★★★

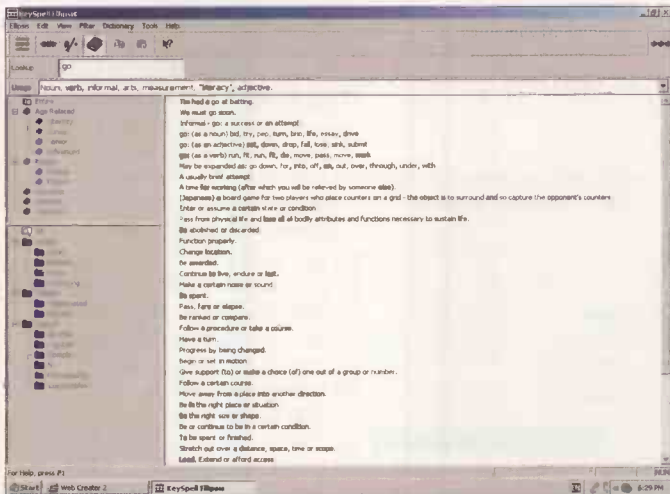
OVERALL

★★★★★

SPELL CHECKER

KeySpell Ellipsis

A useful literary aid for dyslexia sufferers



KeySpell Ellipsis will search through its dictionary to include and filter words associated with a specific group

More than just another spell checker, KeySpell Ellipsis has been developed as a literacy aid for dyslexia sufferers. While spelling tools such as those in Microsoft Word proactively scan text for errors as you type, KeySpell is a passive system allowing you to search for a correct spelling using a database of over 350,000 words.

To make it easier to find what you want, the program features three search modes. The first two are the most useful, as they allow you to make a guess at the correct spelling, and then offers a list of matches. You can make a stab at the entire word or enter the first or last part and do a search. If you're fairly sure of the spelling of either the beginning or ending of the word, you can split it in two and click one of the 'lock' icons to hold that part of the word and then guess the rest.

The search engine also checks for words on the basis of phonetic similarity, although this was a bit hit and miss when we tested the software.

Another search is a simple trawl through the dictionary, which can be tailored to include only words associated with a certain thematic group or filtered to include just the words

a child might look up. That said, the unengaging interface is likely to put off younger users.

This program will provide some degree of assistance to those with literacy problems, but it lacks certain features. On the plus side, KeySpell Ellipsis is available VAT-free to anyone who has an exemption certificate as a result of disability such as dyslexia.

Emilie Martin

DETAILS

RIP £52.88 (£45 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Words Worldwide 0800 587 4408

www.keyspell.com

SPECIFICATIONS

Windows 95/98/ME/2000/XP • 75MHz Pentium processor or faster (166MHz recommended) • 32MB of Ram memory (64MB recommended) • 100MB hard disk drive space • CD-Rom drive • 16bit sound card

PROS Extensive database of words

CONS Unintuitive and unengaging interface

VERDICT

A useful tool, but one that doesn't quite live up to its potential

EASE OF USE ★★★★★
FEATURES ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★

GARDEN & LANDSCAPE DESIGNER

3D Landscape Deluxe 5

Design your own horticultural creation

While the box says Mindscape 3D Landscape Deluxe 5, the software inside is actually Broderbund's Landscape Design 5, which is a partner program to Home Architect 5. If you own both programs you can design a new house or model an existing property in Home Architect and then switch to 3D Landscape Deluxe to create a garden. If you don't own Home Architect, you're stuck with a limited choice of American-style dwellings, none of which are anything like what you'll find in this country. You can, of course, design a garden without a house, but only if it fits one of three predefined plot shapes. With a plot chosen and a house placed on it, your next job is to contour the land and add garden features. Finally you populate it with flowers, trees and vegetables, and you are then able to place virtual cameras and render pictures to see how it develops through the seasons.

It would be a great idea if it worked, but it doesn't. The program doesn't so much run as stagger, even on a powerful PC, and when you change camera views in 3D mode things often change location. When viewed from above, objects take on the

two-dimensional appearance of cardboard cutouts and may vanish.

One of the program's many idiosyncrasies is the plant encyclopaedia, which works counter-intuitively and whose pop-up help labels are wrong. The help system is even worse, being a hybrid also covering Home Architect 5 so it references features not available.

Paul Wardley

DETAILS

RRP £30 (£25.53 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Mindscape 01293 651 300,

www.mindscape.co.uk

SPECIFICATIONS

Windows 98 or later • Pentium III 500MHz • 256MB of memory • 750MB of free hard disk space • 16MB graphics card capable of at least 1,024 x 768 resolution

PROS A good idea for a program

CONS Badly conceived and executed

VERDICT

Avoid this product unless you want to relive the joys of running buggy Windows 95 software on an underpowered 386 PC

EASE OF USE ★★★★★
FEATURES ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★



Now you see them, now you don't – when viewed from above objects can vanish from 3D Landscape Deluxe 5

INTEGRATED APPLICATION SUITE

Corel Wordperfect Family Pack 5

A selection of good programs at a bargain price



Left: There's not enough detail and no zooming in on this map of the US

Below: McAfee Anti-virus includes a licence for online updates



clean-as-you-surf utility for those who haven't got to grips with the tools in Internet Explorer and Windows itself, and it contains a simple pop-up killer that works well without a lot of configuration.

It is unlikely that anybody would need all seven programs, but Corel has very cleverly made it easy to install only those you need without going through a laborious selection process. To this end there are three CD-Roms – the first one containing Wordperfect and Quattro Pro. When you install either or both of these you also get a front end for the entire suite called Task Manager. You then install the other programs individually and launch them from Task Manager or from their own program groups.

So is Wordperfect Family Pack better than Works Suite? The answer depends on whether you need a professional spreadsheet. Quattro Pro knocks spots of the one in Works, but to our mind Works has the better set of supporting programs.

Paul Wardley

With each new release of Corel Wordperfect Family Pack, one or more components is dropped and new ones are drafted in, so of the seven programs in version 5, only two were present in the original: Wordperfect and Quattro Pro. These two are still the stars of the show, and both of them are dressed in their best clothes, coming as they do straight from version 11 of Wordperfect Office.

There are five supporting acts which, in no particular order, are McAfee Anti-virus, Corel Photobook, Encyclopaedia Britannica Ready Reference, Family Tree Maker and a utility program called Iclean. This selection puts Family Pack 5 in direct competition with Microsoft Works Suite, and it's interesting to compare the two because Family Pack 5 is around £20 cheaper than Works at mail-order prices.

First we'll look at what you get, starting with Wordperfect itself. It offers all the features you'd expect to find in a top-flight word processing system: spelling and grammar checking, mail-merging, watermarking, auto-correction, smart formatting and a useful

thesaurus incorporating a defining dictionary. New in version 11 is document mapping, which works very like the system in Word, and an excellent Publish as pdf function which can turn any document into an Acrobat file.

Quattro Pro is a spreadsheet rivaling Excel in almost every department. It offers multiple tabbed worksheets, sophisticated charting, flexible reporting options and an instant filter feature on the lines of Excel's Autofilter. It can read and save any Excel format up to and including Office XP and, when we pumped in some complicated multi-sheet Excel workbooks, they were handled perfectly complete with formulas, notes, named ranges and formatting. There is, however, a short list of Excel functions with no direct equivalents that need to be rewritten for Quattro Pro.

Corel Photobook (previously known as Micrografix Picture Publisher) is a basic red-eye-removing, image-enhancing photo editor. It's not bad, but neither is it much of an improvement on the software you get free with most digital cameras – see review in PCW November for more information.

McAfee Anti-virus 7 is a valuable tool for anybody currently operating without protection, and for users of pre-XP versions of Windows the inclusion of McAfee Firewall 4 is a bonus. It is easy to install too, unlike Encyclopaedia Britannica Ready Reference, which insisted on the installation of Java 2 runtimes and plug-ins before it would run. When we did get it going we were disappointed to discover it is based not on the full Britannica but on a single-volume print version. The difference shows, and this program is not in the same league as Encarta (see page 79). Its best feature is an easy-to-use study centre where younger users can cut and paste text and pictures into homework projects.

We don't know how Family Tree Maker, a genealogical research tool, found its way into this package, as the number of people who might use it is minuscule. Genealogy is a popular but hardly mainstream activity and, unless you take tracing your family history seriously, the program is no use to you.

A tool with much wider appeal is Iclean from Aladdin systems. This is a simple

DETAILS

RRP £63.45 (E54 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION Corel

0870 774 0202 www.corel.co.uk

SPECIFICATIONS

Pentium 166MHz processor • Windows 98SE or above • 64MB of Ram • 1GB of free hard disk space • 800 x 600 colour display • CD-Rom drive • Internet Explorer 5.5 or later

PROS A good mix of programs, neatly integrated

CONS Seven programs but only two with star quality

VERDICT

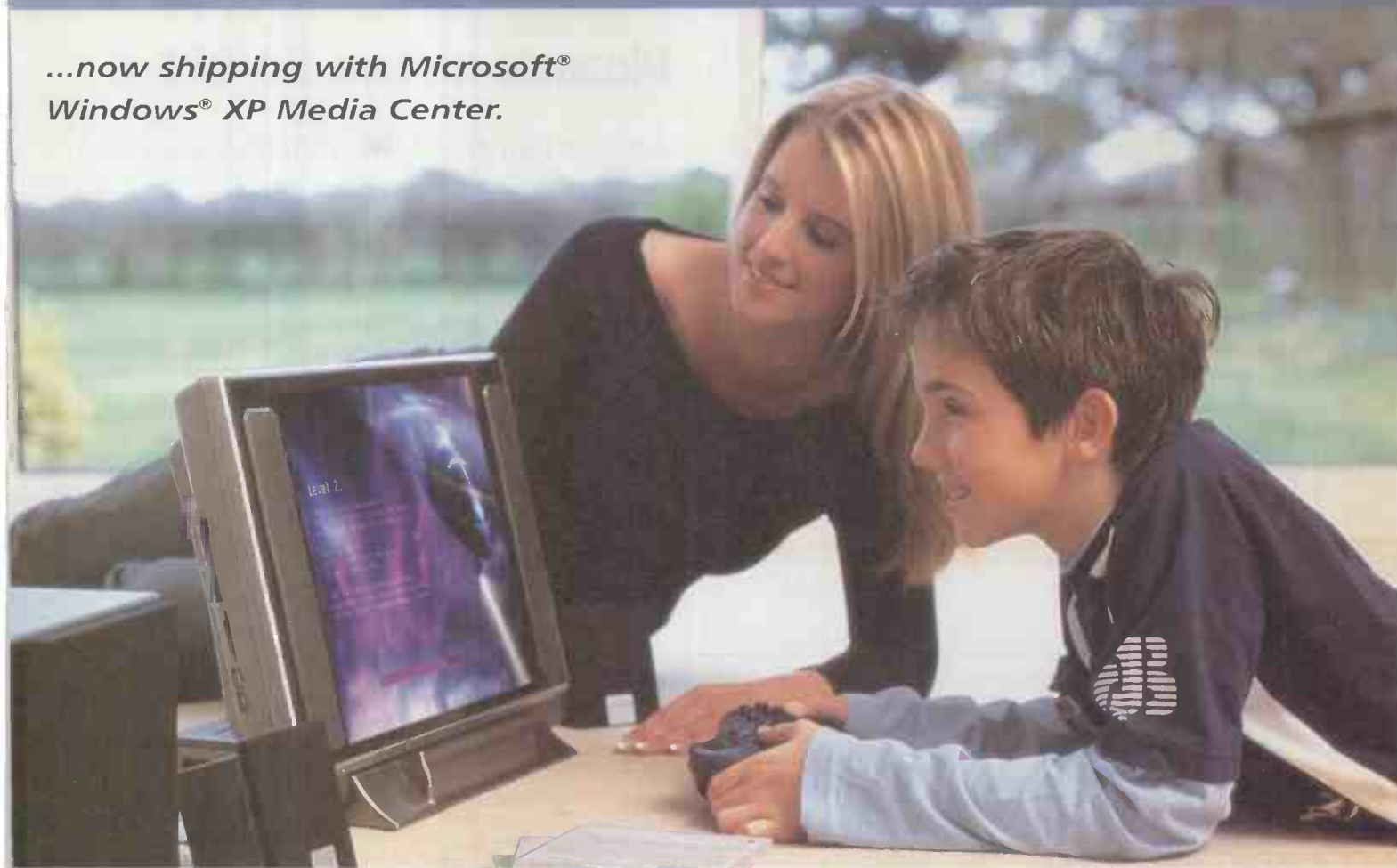
A bargain price for Wordperfect and Quattro Pro – if you want or need any of the other programs you're onto a winner

EASE OF USE ★★★★★
FEATURES ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★

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Computer Shopper, September 2003

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PC Pro, July 2003

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Stuff, July 2003

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every penny of its price"

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Performance: ★★★★★

Personal Computer World, August 2003

"With a vision of PC/entertainment
convergence that's way ahead of
its rivals"
Boys Toys, August 2003

"Hi-Grade's Xperian is an excellent
system and scoops the Best Buy
award with five stars."
Computer Shopper, September 2003

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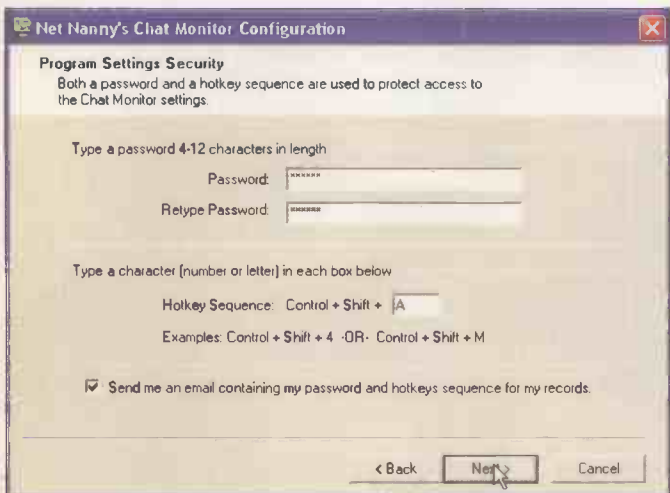
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INTERNET CHAT FILTERING

Netnanny Chat Monitor

Protect children from online predators



During installation, you can opt for stealth mode, and define a password and hotkey to access the control centre

Chat rooms that target children are a concern to many parents, but now kids can talk online more safely with Netnanny Chat Monitor. The program is like an electronic grown-up standing over their shoulder, ready to step in if anyone uses improper language.

It runs in the background and controls access to the main chat systems, including AOL, MSN and Yahoo Messenger, although it doesn't block the Java chat rooms found on many websites. You can set it to log all chats and filter out certain words/phrases. It even offers a comprehensive list of things to watch for, plus you can add your own, such as addresses and phone numbers.

During installation, you can opt for stealth mode, where the program is invisible and called up by a hotkey, or visible, where there's a system tray icon. Normal access to chat programs isn't affected unless you've blocked them completely, in which case they won't connect. You can put in a warning or set a timetable for chatting; you can even set a block to take effect when keywords are spotted a certain number of times.

We found that this actually made MSN Messenger pop up an offer to send error information

to Microsoft. At times, the program didn't seem to filter messages sent using Trillian, a multiplatform messenger. It also failed to log ICQ messages sent via Trillian, but behaved fine with AOL Instant Messenger.

If you stick with official software and keep the kids from using Java chat or installing anything else, it's a helpful tool. As it stands, it's too clunky for wholehearted recommendation.

Nigel Whitfield

DETAILS

RRP £29.95 (£25.49 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Netnanny 0118 934 7429

www.netnanny.com

SPECIFICATIONS

Windows 98SE or later • 32MB

memory • 10MB disk space for

software and chat logs

PROS Can easily restrict access to common chat systems

CONS Doesn't block some third-party chat programs or Java chat

VERDICT

A useful tool for controlling chat on your computer, but a bit clunky and it doesn't cover all the bases

EASE OF USE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

CD/DVD BURNING

Pinnacle Instant CD/DVD 8

A mixed bag of utilities, though great value

Pinnacle's Instant CD/DVD is a bit of a mixed bag. It's actually a collection of separate utilities wrapped up in a tidy interface. The program presents you with a simple list of tasks that you can perform, and then launches the utility you need for that operation.

The options on offer break down into four main areas – the preparation of audio and video content, then the creation and copying of CDs and DVDs. Some of this is throwaway stuff, such as the DVD player and the basic disc burning tools. If you've got a CD or DVD burner then you'll already have software that does this.

More useful is the Instantwrite option, which allows you to drag and drop files onto a CD or DVD and treat it just like a big floppy disk. Instantcopy provides a handy way to duplicate discs, and is very useful if you distribute a lot of your own material.

The Instantaudio MP3 player provides fairly standard MP3 ripping and encoding options, but is beefed up by a mixing desk and some fun audio effects such as 'fuzzbox' and 'grungelizer'. There's also a more powerful 16-track mixer

called Instantmusic, allowing you to record and arrange your own original compositions. Finally, Pinnacle throws in Expression, an easy-to-use – though rather basic – DVD authoring program.

That rather motley assortment of features may not appeal to everyone, but at this price, Instant CD/DVD 8 is good value for audio buffs and anyone who does a lot of disc burning.

Cliff Joseph

DETAILS

RRP £44.99 (38.28 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Pinnacle Systems 01895 424 228

www.pinnaclesys.com

SPECIFICATIONS

500MHz processor • Windows 98SE

or later • 64MB Ram • 40MB hard disk

space • CD or DVD burner

PROS Jack of all trades

CONS Master of none

VERDICT

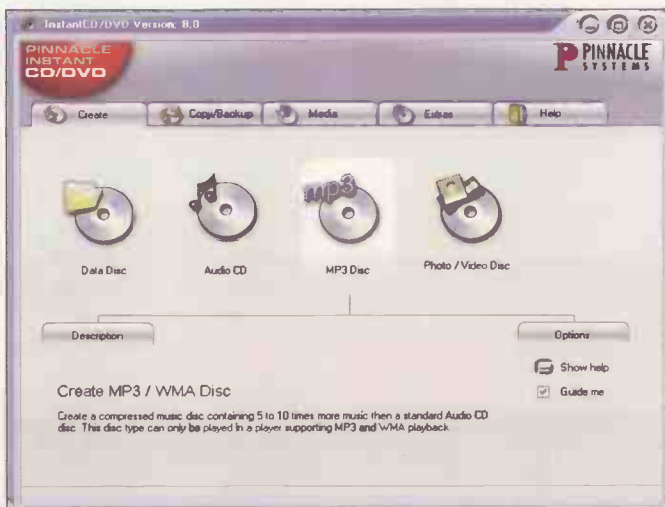
A pick and mix collection of utilities, redeemed by strong audio and disc duplication features

EASE OF USE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★



Instant CD/DVD contains more than half a dozen different utilities, wrapped inside this candy-coloured interface

Desirable.

"Probably the most stylish notebook in the world" *PC Pro*, April 2003

Hi-Grade recommends Microsoft® Windows® XP.



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SPDIF), mic-in, line-in; Dimensions: 352 x 260 x
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April 2003

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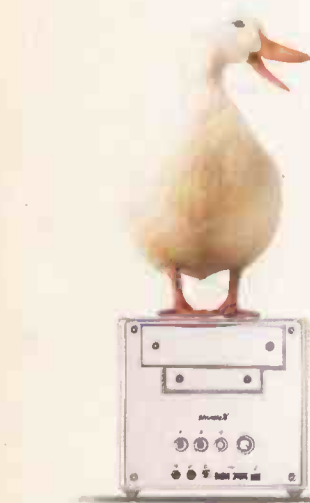


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Small form factor platform



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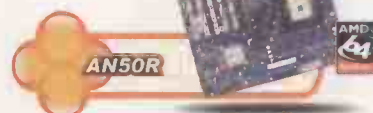
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- HyperTransport Technology
- DDR 400 memory, 8X AGP
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- FireWire 400, USB 2.0, 6-channel audio
- Integrated Cooling Engine (ICE) Technology

nVIDIA nForce3 150 Chipset



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- nVIDIA nForce 3 150 North Bridge chipset
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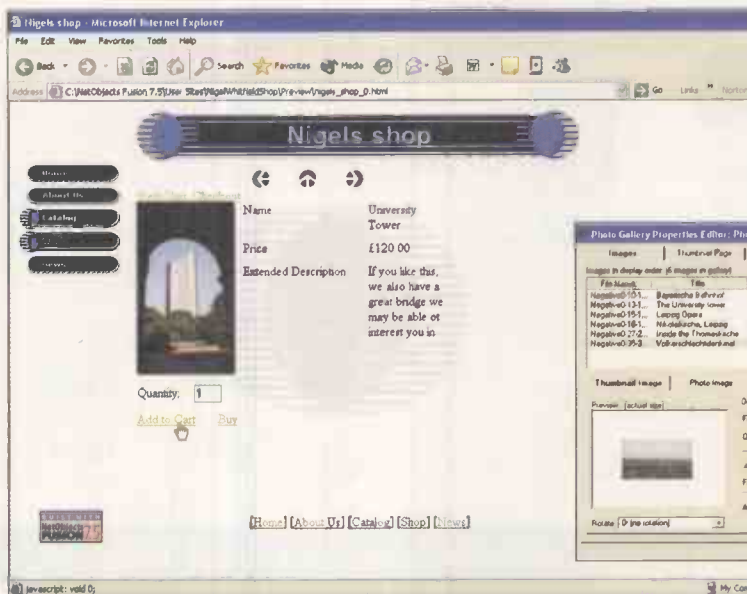


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WEBSITE EDITOR

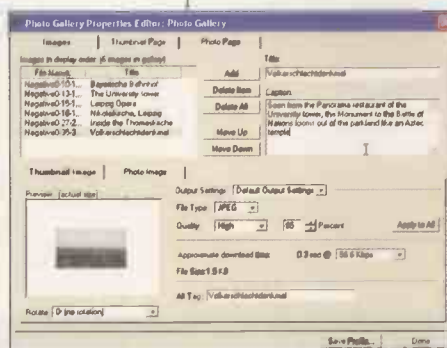
Netobjects Fusion 7.5

More structured than other packages, its ease of use is appealing



Left: With just a few clicks, you can have a Paypal-based store up and running

Below: Fusion's photo gallery editor makes it simple to add pictures to your site



Netobjects Fusion is a long-established website-creation package. The new release, version 7.5, adds some useful features that will be appreciated by both newcomers and experienced users alike.

Compared with, say, Dreamweaver, Fusion takes a different approach to constructing websites. With a traditional web editor, you can pop in your links willy nilly. And while there's some automatic updating if you move pages around, the general outline of the site is up to you.

Fusion has always taken a more structured approach. It's based on a sort of family tree, which is initially set up by a simple wizard, depending on whether you want a personal or business website. You can add or remove pages at will, and drag them around to a different branch of the tree.

Fusion has always created all the buttons and banners you need, based on page titles, automatically. Just pick a style from an extensive gallery, which offers instant downloads from elsewhere on the net, and your site's look and feel changes

almost instantly. It's a neat trick that Frontpage now offers too, but not as well, in our opinion. Click to publish or preview and you'll see a site with professional-looking graphics, which can be a boon for anyone who isn't naturally creative.

As well as the improved styles gallery, the new version has a better photo gallery editor that lets you add images to your site easily – though fine-tuning the positioning of individual images is a bit fiddly. Drag an image on one sub page and you'll find you've moved the ones on other pages too. Nevertheless, it's a quick and easy way to add large numbers of photos and thumbnails to your website.

You can also add objects such as Quicktime, Windows Media and Flash to your site easily by drawing a container for them and picking the object to be included. Additional script can also be inserted and it's best to do that in the graphical view. While there is an HTML view of your page, it shows a hierarchical tree that novices will find confusing, and the Netobjects tags, which are part of the automatic page generation, make it hard to see what should

go where. It's simple enough to add, for instance, PHP code fragments, but Fusion lacks the full integration with such systems that's offered by Dreamweaver or Go Live. If you want to do a hardcore coding task, you'd be better off with one of those solutions.

For small businesses, Fusion integrates options such as signing up with web hosting, but one of the most important new features is the integration with ecommerce solutions. There have, in the past, been add-ins that allow some shopping carts to be used easily with Fusion, but now there's a choice of four different ones built right in.

To create a shop, just click on the shopping cart icon at the left of the screen and draw a box with the cursor. You're then walked through a choice of systems, including an email forms-based shop, one using Paypal and options with online credit card processing.

When you've chosen your shop and filled in the necessary details for payment, you simply enter product details into a catalogue properties editor, which allows you to add

pictures, specify weight and packing information, along with titles, brief and long descriptions. Click done and your shop pages are generated automatically – no programming, no fuss. You'll need to upload them to a server to test them, but setting up a publishing option for a site is simple. It took us just a few minutes to create a simple shop with two products using Paypal for a basket system. Although it's not the slickest look around – a visitor's basket will pop up in a new window from Paypal – it does show how incredibly easy Fusion makes it to sell online. It's one of the easiest ways we've seen this done.

If, like many businesses, your website is fairly well structured, and you want to sell online with minimum effort, and without spending hours creating buttons and banners, Netobjects Fusion will give you a professional-looking, ecommerce-enabled site in a very short time. It is well worth a look.

Nigel Whitfield

DETAILS

RRP £135.95 (£119.10 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Website Pros www.netobjects.co.uk

SPECIFICATIONS

Windows 98 or higher • Pentium 133MHz • 32MB memory • 50MB disk space for compact install • 60MB virtual memory on disk • Internet Explorer 6

PROS Integrated shopping system builds stores rapidly

CONS Overly structured design approach may not appeal to everyone

VERDICT

Great for structured sites. The ecommerce options make it amazingly simple to sell online. The rigid approach, however, may put off hardcore web coders and creative minds

EASE OF USE	★★★★★
FEATURES	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



Best PC Manufacturer 2002

OFFER OF THE MONTH

Power PC, 15" TFT, DVD writer & Home/Office software for only £999 inc VAT



Olympus C150 DIGITAL CAMERA
2 Megapixel, 2.5x digital zoom
1.8" LCD screen



NEW Microsoft Works Suite 2004 (OEM)
Works 7.0, Word 2002, Money 2004, Picture It! Photo 9.0, Encarta 2004, Autoroute 2004.

NEW PowerSuite XP (OEM) - An essential learning platform from pre-school to GCSE level. Oxford GCSE English, Maths, Business Studies, Science & Geography. Readers Rabbits Preschool, Readers Rabbits Toddler, Maths Rabbit, Treasure Mathstorm, Operation Neptune, Outnumbered, Looney Tunes Bugs Bunny goes wild in the west, Looney Tunes Taz and Tweety's funny farm, DK brain buster quiz, DK become a world explorer.

Axis 2600+ Special

e-CODE: AX1137-07

- AMD Athlon XP 2600+ processor
- Microsoft® Windows® XP Home
- NVIDIA nForce2 motherboard with dual channel DDR, USB2.0 and Firewire
- 512MB DDR RAM (2x256MB)
- 80GB UDMA100 hard drive with buffer
- 64MB unified NVIDIA GeForce4 graphics
- 15" Philips 150S4FG flat panel monitor
- Sony 16x DVD-ROM drive
- NEW Philips 4x+RW DVD writer
- Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)
- v92 56k Internet ready modem
- NVIDIA SoundStorm™ audio supporting Dolby Digital 5.1 digital surround sound and 6 speaker connectivity (on-board)
- Creative Inspire 4.1 4400 speakers
- Microsoft Works Suite 2004 software (OEM)
- PowerSuite XP software (OEM)
- Mid-tower case (420x198x465), 4x USB2.0 (2x front mounted)
- Olympus C150 digital camera
- 3 year warranty (2 years on-site, 1 year RTB)

	with Microsoft Works Suite 2004	with Microsoft Office XP SBE
Axis 2600+ Special	£999 inc VAT (£850.21 ex VAT)	£1149 inc VAT (£977.87 ex VAT)
without camera & Works Suite	£869 inc VAT (£739.57 ex VAT)	£1019 inc VAT (£867.23 ex VAT)

Evesham Technology recommends Microsoft® Windows® XP

Axis 2400+KD

e-CODE: AX1120-07

- AMD Athlon XP 2400+ processor
- Microsoft® Windows® XP Home
- 512MB DDR RAM (PC2100) (2x256MB)
- 80GB 7200rpm UDMA100 hard drive with 2MB buffer
- 128MB DDR ATI Radeon 9200 graphics with TV-out and DVI
- 17" (16" visible) Philips 107E FST (CRT) monitor
- 16x DVD-ROM drive
- CD-RW drive (52x24x52) with BURN-proof technology
- Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)
- v92 56k Internet ready modem
- Sound Blaster compatible 6 channel audio
- Creative Inspire 4.1 4400 speakers
- Microsoft Works 7.0 software (OEM)
- Mid-tower case (420x198x465), 6 x USB2.0 ports
- 3 year warranty (2 years on-site, 1 year RTB)



Axis 2400+KD with 15" Philips 150S4FG monitor

	Standard	with Microsoft Works Suite 2004	with Microsoft Office XP SBE
Axis 2400+KD	£699 inc VAT (£594.59 ex VAT)	£729 inc VAT (£620.45 ex VAT)	£849 inc VAT (£722.55 ex VAT)
with upgrade to 15" TFT monitor	£839 inc VAT (£714.05 ex VAT)	£869 inc VAT (£739.57 ex VAT)	£989 inc VAT (£841.70 ex VAT)

Evolution 2600Si

e-CODE: EV1079-07

- Intel Pentium 4 2.6GHz processor (800MHz FSB) with Hyper-Threading Technology
- Microsoft® Windows® XP Home
- Intel 865PE chipset motherboard with dual channel DDR and Hyper Threading support
- 512MB DDR RAM (PC2700) (2x256MB)
- 120GB ultra fast 7200rpm hard drive with 8MB buffer
- 256MB DDR ATI Radeon 9600 graphics with TV-out & DVI
- 17" Philips 170B4BS Pure Digital DVI TFT monitor
- Sony 16x DVD-ROM drive
- Sony CD-RW drive (52x24x52) with BURN-Proof technology
- Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)
- 10/100 network connection (on-board)
- v92 56k Internet ready modem
- Sound Blaster compatible 6 channel audio
- Creative Inspire P580 5.1 speakers
- Microsoft® cordless keyboard and cordless optical mouse
- NEW Xpider ultra stylish tool free case (435x222x495)
- 6x USB2.0 (2x front mounted)
- 3 year warranty (2 years on-site, 1 year RTB)



Evolution 2600Si

	Standard	with Microsoft Works Suite 2004	with Microsoft Office XP SBE
Evolution 2600 Si	£1219 inc VAT (£1037.42 ex VAT)	£1249 inc VAT (£1062.06 ex VAT)	£1369 inc VAT (£1165.11 ex VAT)
with upgrade to 19" TFT monitor	£1469 inc VAT (£1250.21 ex VAT)	£1499 inc VAT (£1275.74 ex VAT)	£1619 inc VAT (£1377.87 ex VAT)



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www.evesham.com

"Great looking system..."

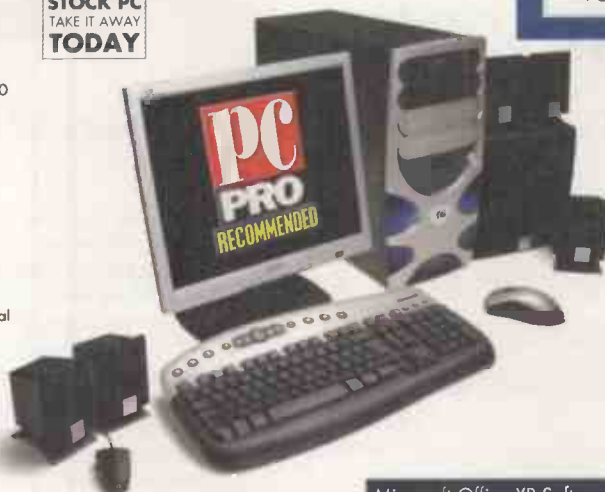
...with **excellent** LCD panel and DVD writer"

Computer Shopper, Sep 2003

Axis 2600+ MKR

e-CODE: AX1127-07

- AMD Athlon XP 2600+ processor
- Microsoft® Windows® XP Home
- NVIDIA nForce2 motherboard with dual channel DDR & USB2.0
- 512MB DDR RAM (PC2700) (2x256MB)
- 120GB 7200rpm UDMA100 hard drive with 8MB buffer
- 128MB DDR ATI Radeon 9600 graphics with TV-out & DVI
- 17" Philips 170B4BS Pure Digital DVI TFT monitor
- Sony latest model DW-U14A Multi Format 4x +R/+RW DVD writer
- Sony CD-RW drive (52x24x52) with BURN-Proof technology
- Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)
- 10/100 network connection (on-board)
- v92 56k Internet ready modem
- NVIDIA SoundStorm™ audio supporting Dolby Digital 5.1 digital surround sound and 6 speaker connectivity (on-board)
- Creative Inspire P580 5.1 speakers
- Microsoft Works 7.0 software (OEM)
- Microsoft® cordless keyboard and cordless optical mouse
- NEW Xpider ultra stylish case with blue lighting (435x222x495)
- 6x USB2.0 (2x front mounted)
- 3 year warranty (2 years on-site, 1 year RTB)



	Standard	with Microsoft Works Suite 2004	with Microsoft Office XP SBE
Axis 2600+MKR	£1174 <small>(£999.00 ex VAT)</small>	£1204 <small>(£1029.00 ex VAT)</small>	£1324 <small>(£1126.66 ex VAT)</small>
with upgrade to 19" TFT monitor	£1424 <small>(£1211.91 ex VAT)</small>	£1454 <small>(£1237.45 ex VAT)</small>	£1574 <small>(£1339.57 ex VAT)</small>

Microsoft Office XP Software

Microsoft® Office XP SBE (OEM) includes:
Word, Excel, Outlook & Publisher

Microsoft® Office XP Pro (OEM) includes:
as Office XP SBE plus: Access & Powerpoint

Upgrade from SBE to Professional (OEM) for only £89.99 inc VAT



Pinnacle Instant CD/DVD

- Burn audio CDs and DVDs with incredible ease, at incredible speeds.
- Edit and share digital photos and home movies.
- Store and protect important data files.



Pinnacle Studio8

- Capture video footage from nearly any digital or analog source.
- Add transitions, title effects, and fast/slow motion.
- Add an audio soundtrack.
- Publish to an array of media.

Evesham Technology recommends Microsoft® Windows® XP Professional for Mobile Computing

"..head-and-shoulders above the rest"

What Laptop & Handheld PC, Gold Award, May 2003

Voyager 5800 series

- Intel processor - see table below
- Microsoft® Windows® XP Home
- Memory up to 1GB
- 64MB VGA NVIDIA GeForce4 graphics
- 12 cell Li-Ion battery (life up to 3 hrs approx.)
- v90 56k Internet ready modem
- Built-in aerial for wireless
- 10/100 network card
- Built-in smart card reader (See feature)
- Built-in audio & speakers
- Pinnacle Instant CD/DVD, Studio8 and DVD player (OEM)
- Microsoft Works 7.0 software (OEM)
- Ports - up to 4xUSB2.0, Firewire, VGA, PCMCIA 1xType II
- Weight - 3.8kg
- Dimensions - 332mmx285mmx30.5mm (39.5mm max)
- 3 year warranty (1 year on-site, 2 years RTB)

STOP PRESS Buy now pay later available on all systems!



	5815+ C2.4	5815+ 2.6	5815+ 2.8	5815+ 3.0
Processor	Intel Celeron 2.4GHz	Intel Pentium 4 2.66GHz	Intel Pentium 4 2.8GHz	Intel Pentium 4 3GHz with Hyper-Threading
DDR RAM	256MB	512MB	512MB	512MB
Hard Drive	30GB	40GB	60GB	80GB
Screen Size	15" TFT	15" TFT	15" TFT	15" TFT
Drive	DVD/CD-RW Combo	DVD/CD-RW Combo	DVD/CD-RW Combo	DVD/CD-RW Combo
Price	£969 <small>(£824.68 ex VAT)</small>	£1099 <small>(£935.32 ex VAT)</small>	£1199 <small>(£1020.43 ex VAT)</small>	£1399 <small>(£1190.64 ex VAT)</small>
Price with Microsoft® Works Suite 2004	£999 <small>(£850.21 ex VAT)</small>	£1129 <small>(£960.85 ex VAT)</small>	£1229 <small>(£1045.96 ex VAT)</small>	£1429 <small>(£1216.17 ex VAT)</small>
Price with Microsoft® Office® XP SBE (OEM)	£1119 <small>(£952.34 ex VAT)</small>	£1249 <small>(£1062.98 ex VAT)</small>	£1349 <small>(£1148.09 ex VAT)</small>	£1549 <small>(£1318.30 ex VAT)</small>



Built-in smart card reader
Supports MMC/SD/SM/MS

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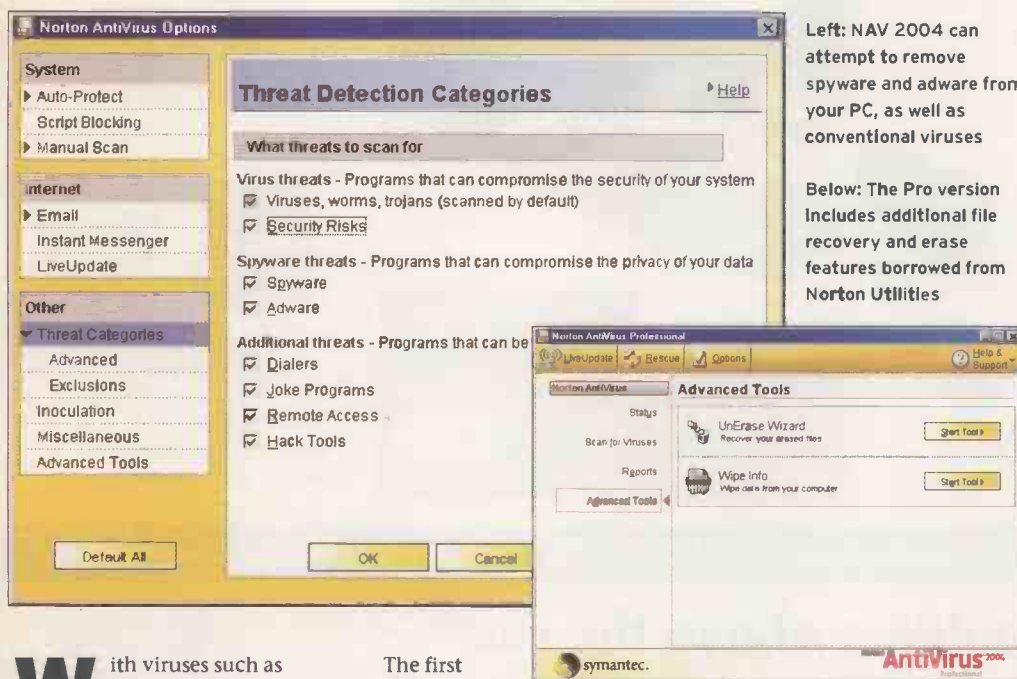
0870 160 9530



ANTI-VIRUS SOFTWARE

Norton Antivirus 2004

Good first line of defence against virus attacks on your home PC



Left: NAV 2004 can attempt to remove spyware and adware from your PC, as well as conventional viruses

Below: The Pro version includes additional file recovery and erase features borrowed from Norton Utilities

With viruses such as Sobig and Blaster making headlines around the world, it is more important than ever to install effective anti-virus software to protect your PC.

Packages such as Norton Antivirus (NAV) are able to cope with these new threats. And, like most anti-virus programs, NAV can be updated by downloading new virus 'definitions' that allow it to combat nasties the moment they appear.

This is good news for anyone who already uses NAV to protect their computer, but it presents a problem for developers such as Symantec when they decide to upgrade their anti-virus products. Simply protecting you against viruses is no longer enough, so Symantec is forced to seek additional features that expand the scope of the software.

This latest version, Norton Antivirus 2004, is still a worthwhile investment, but it suggests that Symantec is fresh out of ideas. The program is available in both Standard and Professional versions, but the main virus and security features are the same in both versions.

The first new feature isn't going to win the package any new fans. When you install NAV, you need to activate the software by going to Symantec's website and entering the product's serial number. You're given 15 days to do this. If you don't activate it in time, however, the application will stop working altogether. If you fail to hit the deadline, you could find yourself attacked by a virus and then unable to use a product for which you've legitimately paid.

We were also disappointed with the other main addition to this upgrade, which is the ability to locate adware or spyware. Adware refers to programs, such as the pestilent Gator, which can be downloaded and installed on your PC without your knowledge. File-sharing programs such as Kazaa are key offenders here, often including adware programs as part of their installation process. These adware programs can then feed an endless number of annoying and intrusive pop-up adverts to your web browser.

To test this feature we installed Kazaa, along with its

annoying Cydoor adware. Although NAV was able to locate the various Cydoor files, it wasn't able to delete them. This is because the Kazaa software has been designed not to run without Cydoor. That's not Symantec's fault, but it does mean this aspect of NAV doesn't live up to its claims.

A more effective feature is the new ability to scan compressed file archives, downloaded from peer-to-peer networks or sent via instant messaging software. However, there's still a hole in the security here. The program has had the ability to scan incoming emails for some time, but it can only scan those sent via well-known applications such as Outlook Express or Eudora. It doesn't work with AOL's email software, Lotus Notes or Hotmail, all of which must account for several million users around the world, so it would seem Symantec needs to close a pretty big loophole.

The new protection features discussed here are available in both versions of NAV 2004. However, the Professional edition boasts a few extra

features as well. There's the UnErase Wizard, which can help you recover deleted files, and a utility called Wipe Info, which can permanently erase files you don't want anyone else to see. These are fairly minor additions, and they've both been borrowed from Symantec's stablemate – Norton Utilities – which again suggests that Symantec was lacking in inspiration for this upgrade. However, the fact that Professional gives you a two-user licence for only £10 more than the single-user version, which costs £39.99, is probably the one feature that will help Symantec sell copies.

Norton Antivirus 2004 does work well as your PC's first line of defence against viruses and is worth buying if you don't already own some sort of anti-virus software. The low cost of the two-user Professional version also makes it good value for small-business users. However, the new adware feature isn't a roaring success and doesn't make this a must-have upgrade for existing NAV owners.

Cliff Joseph

DETAILS

RRP Standard version £39.95 (£34 ex VAT); Professional version £49.99 (£42.55 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Symantec 01628 592 222

www.symantec.co.uk

SPECIFICATIONS

Windows 98 or higher • 300MHz processor • 125MB disk space • Ram dependent upon operating system

PROS Cheap; good virus protection

CONS Horrible activation system; unimpressive adware protection

VERDICT

Good protection against viruses, but the new adware protection features don't work well

EASE OF USE	★★★★★
FEATURES	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

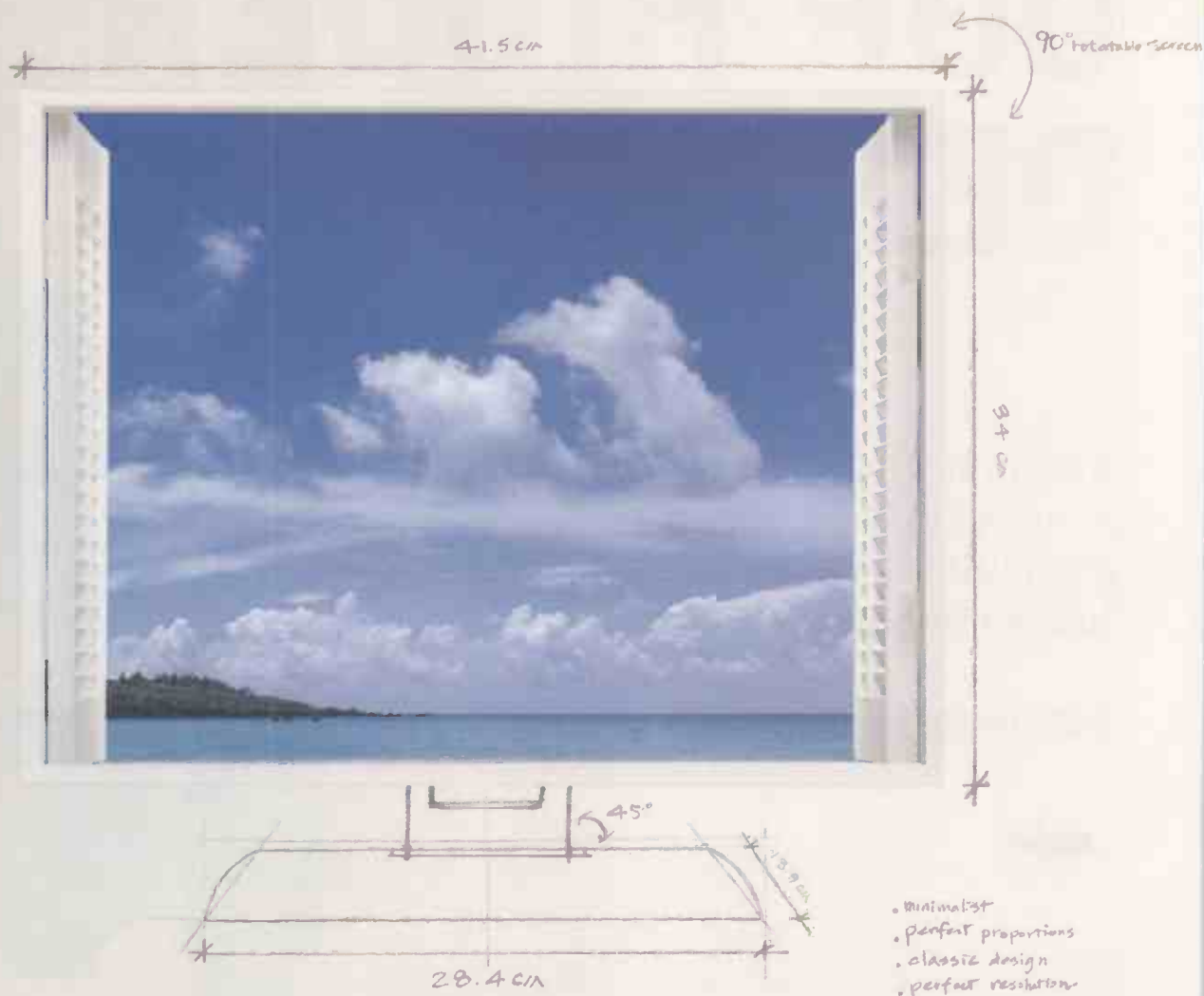
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No clutter, no restrictions – The FP991 takes your view to new angles.

Specifications:

19" screen, 1280 x 1024 resolution, 170° wide viewing angle, 300 nits brightness, 700:1 contrast ratio, 25ms response time, D-sub/DVI-D dual input

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ENTRY-LEVEL PC

Mesh Matrix 2400+ Powerpro

REVIEW November 2003, p123 RRP £568

(£499 ex VAT) **PRODUCT INFORMATION**

Mesh 0870 046 4747 www.meshcomputers.com



The 2400+ Powerpro is based around an Nforce2 motherboard with an Athlon 2400+ and a Sharp TFT monitor. Extras including games and a joystick make this an excellent value system.

MID-RANGE PC

New

Nethighstreet Net Evo 799

REVIEW December 2003, p156 RRP £938.82

(£799 ex VAT) **PRODUCT INFORMATION**

Nethighstreet 0870 777 5252 www.nethighstreet.com



This system offers great performance, with a 2.8GHz Hyperthreading-enabled Pentium 4 and 512MB of Ram. There's a generous 120GB hard drive and a Lexmark 5150 multifunction device is included to boot.

HIGH-END PC

New

Systemax Inspire 3167

REVIEW October 2003, p54 RRP £1,526.33

(£1,299 ex VAT) **PRODUCT INFORMATION**

Systemax 0870 729 7366 www.systemax.com



An Athlon 3000+ with 1GB of Ram provides excellent performance. Extras include a 19in TFT monitor and an All-in-Wonder Radeon 9800 graphics card. A dual-format DVD writer offers good future proofing.

FULLY FEATURED NOTEBOOK

Hi-Grade C6700

REVIEW September 2003, p48 RRP £1,643

(£1,399 ex VAT) **PRODUCT INFORMATION**

Hi-Grade 020 8532 6123 www.higrade.com



Widescreen notebooks are good for work and leisure. The C6700 features a Pentium M processor supported by 512MB of Ram and an Nvidia 5200 Go graphics chip, giving great performance.

ULTRA-PORTABLE NOTEBOOK

Sony PEG-TR1MP

REVIEW August 2003, p52 RRP £1,799

(£1,531.06 ex VAT) **PRODUCT INFORMATION**

Sony www.vaio.sony-europe.com



The TR1 brings great style to the Centrino platform. It might not be fast, but its battery lasts just under three hours and you get a brilliant screen. It also has an internal CD-RW/DVD drive, as well as USB2 and Firewire ports.

BUDGET NOTEBOOK

Rock Quaddra XT

REVIEW September 2003, p116 RRP £1,173

(£999 ex VAT) **PRODUCT INFORMATION**

Rock 0870 990 9090 www.rockdirect.com



It might be heavy, but this notebook combines excellent battery life with all the trimmings you need. The three-year collect and return warranty offers peace of mind and there's even a built-in webcam.

15IN FLAT-PANEL MONITOR **New**

LG Flatron L1510P

REVIEW December 2003, p128 RRP £257.33

(£219 ex VAT) **PRODUCT INFORMATION**

LG Electronics 0870 607 5544 www.lge.co.uk



The image quality of this monitor is excellent but that's only the tip of the iceberg. There's an auto-setup feature, colour calibration software and a two-port USB hub. Connection is by either DVI or D-Sub.

17IN FLAT-PANEL MONITOR **New**

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.

PROJECTOR

IBM ILM300

REVIEW September 2003, p60 RRP £1,828.63

(£1,556.28 ex VAT) **PRODUCT INFORMATION**

IBM www.ibm.com/pc/europe



The ILM300 projector offers quality without compromising on noise or size. The remote control can take mouse control and includes an integral laser pointer. Picture quality is very high.

PDA

Palm Tungsten C

REVIEW November 2003, p141 RRP £399

(£339.57 ex VAT) **PRODUCT INFORMATION**

Palm 0118 974 2700 www.palm.com/uk



The Tungsten C makes wireless networking simple, and it is backed up with lots of useful software. The keyboard may be fiddly but the stylus and screen are excellent.

POCKET PC

HP Ipaq 1940

REVIEW November 2003, p140 RRP £304.33

(£259 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 new low power Samsung processor.

MULTIFUNCTION DEVICE

New

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 photo and transparencies. It also comes with Canoscan software and gives OCR support.

LASER PRINTER

Kyocera Mita FS-1010

REVIEW April 2003, p180 RRP £250.27 (£213 ex VAT)

PRODUCT INFORMATION Kyocera Mita

0845 710 3104 www.kyoceramita.co.uk



The FS-1010 offers high-quality printing at a good speed. Many of its parts can also be recycled making this a very environmentally friendly printer.

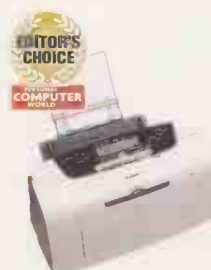
INKJET PRINTER

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.

LOW-END SPEAKERS

Creative Inspire T7700 7.1 speakers

REVIEW October 2003, p59 RRP £119.99

(£102.12 ex VAT) **PRODUCT INFORMATION**

Creative <http://europe.creative.com>



These 7.1 speakers are great sounding, and not too bad to look at either. They are also capable of 'upmixing' a 5.1 signal to a 7.1 one, as well as having one of the lowest signal-to-noise ratios around.

SPEAKERS

Acoustic Energy Aego2

REVIEW April 2002, p138 RRP £199.95

PCW SPECIAL OFFER PRICE £79.95 + £7.50 P&P

(£68.07 ex VAT) **CONTACT** www.offersdirect.pcw.co.uk



Dressed in stylish plastic, the Aego2s are the best-looking 2.1 speakers we've seen. Sound quality is almost infallible too but, as you'd expect, a setup of this quality comes with a high price.

SOUND CARD

Creative Audigy 2 Platinum EX

REVIEW May 2003, p76 RRP £197.99

(£168.50 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

Aopen AK79G Max

REVIEW August 2003, p114 RRP £105

(£89.37 ex VAT) **PRODUCT INFORMATION**

Aopen www.aopen.com



Based around the Nforce 2 chipset, this well-designed board has lots of features. There are extra Parallel and Serial IDE connectors, onboard graphics and plenty of sound options.

PENTIUM 4 MOTHERBOARD

Abit IC7-G

REVIEW August 2003, p118 RRP £145

(£123.40 ex VAT) **PRODUCT INFORMATION**

Abit 01438 228 888 www.abit.com.tw



Bringing a host of features to primarily a workstation board, the IC7-G offers Firewire and six-channel integrated sound. Serial ATA is also included, with a Serial adapter for parallel hard drives.

GRAPHICS CARD

Sapphire Atlantis 9600 256MB

REVIEW November 2003, p62 RRP £119

(£101 ex VAT) **PRODUCT INFORMATION**

Sapphire www.saphiretech.com



The Atlantis is an excellent value DX9 card with 256MB of Ram. There may not be many extras but it offers good performance without the need for an extra power connector.

DIGITAL VIDEO CAMERA

Sony TRV33E

REVIEW July 2003, p142 RRP £799 (£680 ex VAT)

PRODUCT INFORMATION Sony 0870 511 999

www.sony.co.uk



This slimmed-down model uses a touchscreen menu. The Super Steady Shot Image stabiliser is also included, as well as still image options and anamorphic 16:9 recording.

DIGITAL CAMERA

Canon Power Shot A70

REVIEW June 2003, p128 RRP £299

(£254.47 ex VAT) PRODUCT INFORMATION

Canon 0870 514 3723 www.canon.co.uk



Excellent picture quality combined with a great range of features makes this camera stand out. Although a little heavy, the A70 offers a 5cm macro and 3x optical zoom with its 3.3megapixel CCD.

HIGH-END DIGITAL CAMERA **New**

Sony Cybershot DSC-V1

REVIEW December 2003, p71 RRP £549.99

(£468.08 ex VAT) PRODUCT INFORMATION

Sony 08705 111 999 www.sony.co.uk



The Cybershot DSC-V1 may be small but there is no compromise on quality or features. This 5megapixel camera boasts a 4x optical zoom as well as a hotshoe for an external flash.

VIDEO-EDITING CARD

Hercules All-in-Wonder 9000 Pro

REVIEW March 2003, p74 RRP £183.30

(£156 ex VAT) PRODUCT INFORMATION

Hercules 020 8665 1881 www.hercules-uk.com



The latest edition of the All-in-Wonder series offers the 9000 chip running at full speed. There's a breakout box and radio remote control, although it is lacking a Firewire port.

DVD-RW

NEC Multispin ND-1100

REVIEW July 2003, p71 RRP £149

(£126.80 ex VAT) PRODUCT INFORMATION

NEC 020 8752 3665 www.nec.co.uk



Lending support to the DVD+ format, the NEC also delivers good CD writing performance. The software bundle is comprehensive, including Nero V5 and Sonic MyDVD.

CD-RW

Cyberdrive C099D

REVIEW October 2003, p65 RRP £39.99

(£34.03 ex VAT) PRODUCT INFORMATION

Cyberdrive www.cyberdrive.de



Running at a blistering 52-speed, this is one of the fastest drives on the market, although its CD-RW formatting times leave a little to be desired. It comes bundled with Nero 5.5 burning software.

OFFICE SOFTWARE

Ability Office

REVIEW April 2003, p194 RRP £49.95 (£42.51 ex VAT)

PRODUCT INFORMATION Ability 020 7231 1004

www.uk.ability.com



Costing a fraction of Microsoft Office's price, Ability Office still manages to offer a similar look and features. There isn't a presentation package, although it does include a macro language.

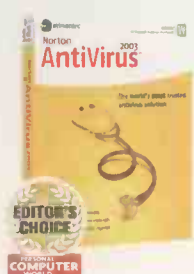
ANTI-VIRUS SOFTWARE

Symantec Norton Anti-virus 2003

REVIEW August 2003, p140 RRP £44.99

(£38.30 ex VAT) PRODUCT INFORMATION

Symantec 020 7616 5600 www.symantec.com



Norton is everything a good anti-virus package should be. It does its job well and is easy to use with automatic updates and intelligent colour coding. Instant messaging is also protected.

WEB-EDITING SOFTWARE

Macromedia Dreamweaver MX2004

REVIEW November 2003, p84 RRP £821.33

(£699 ex VAT) PRODUCT INFORMATION

Macromedia 0800 169 8216 www.macromedia.com/uk



The latest upgrade brings even greater integration within the suite and better support for cascading style sheets (CSS). Imaging editing is now possible and the Help system is very comprehensive.

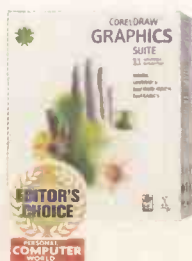
IMAGE-EDITING SOFTWARE

Corel Draw Graphics Suite 11

REVIEW July 2003, p128 RRP £457.08

(£389 ex VAT) PRODUCT INFORMATION

Corel www.corel.co.uk



Corel Draw Graphics Suite is easy to use, with a great selection of filters, fonts and clip art. An invaluable error-catching feature gives you a chance to save files before a crash.

VIDEO-EDITING SOFTWARE

Ulead Video Studio 7

REVIEW July 2003, p149 RRP £42.24

(£35.95 ex VAT) PRODUCT INFORMATION

Ulead 01327 844 880 www.ulead.co.uk



With a simple interface and lots of tools, this is a great choice for the amateur. Realtime preview could be better, but other tools such as automatic scene detection are valuable.

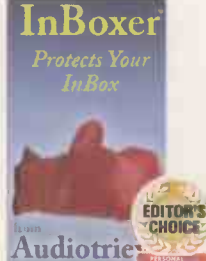
UTILITY SOFTWARE **New**

Audiotrieve Inboxer

REVIEW December 2003, p169 PRICE £15.60

(download) PRODUCT INFORMATION

Audiotrieve www.inboxer.com



The interface to this anti-spam software may be basic but Inboxer worked extremely well in our tests, blocking spam without interfering with genuine mail. It is easy to use and needs little maintenance.

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Canoscan 5000F Versatile flatbed scanner • Scans 3 x 35mm negatives/2 slides • 2400 x 4800 dpi

Canoscan LiDE 80 Ultra-slim flatbed scanner • Scans 1 x 35mm negative • 2400 x 4800 dpi

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Unwired Mobility



Acer recommends Microsoft® Windows® XP Tablet PC Edition for Mobile Computing.

TravelMate C111TCi

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Intel® Pentium® M Processor at 1.00GHz ULV CPU,
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40GB, 512MB (2*256), Ext. CD-RW / DVD, 10.4" TFT with Digitised overlay,
Modem, Wired/Wireless LAN, Bluetooth, EMR Stylus Pen

Acer TravelMate C110

- Intel® Centrino™ Mobile Technology
 - Intel® Pentium® M ULV Processor at 1GHz
 - Intel® PRO/Wireless Network Connection 802.11b
 - Intel® 855GM Chipset
- Microsoft® Windows® XP Tablet PC Edition
- 10.4 XGA TFT LCD 1024 x 768 pixels, 16.7 million colours
- integrated 3D VGA with DVM technology, DualView™ support
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- audio system with built-in speaker and microphone
- from 40GB ATA/100 HDD with Disc Anti-Shock Protection (DASP)
- External USB FDD
- External CD-RW/DVD combo drive
- 2 x USB 2.0 ports, IEEE1394 port, ethernet port, modem port, external VGA port, microphone jack, headphone jack, infrared port, type II PCMCIA CardBus slot, 100-pin port replicator connector, DC-in jack for AC adaptor
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- approx. 3 hours battery life, 1.5 hours rapid charge, 2.5 hours charge-in-use
- approx. 1.45kg
- built-in touchpad pointing device with ergonomic buttons and 4-way integrated scroll key
- Wired and Wireless 802.11b LAN
- 1 year Collect and Return warranty including International Travellers Warranty



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The n10-Series colour handheld digital assistant provides more than enough processing power, versatility, and convenient USB connectivity to provide comprehensive organization and blistering entertainment while on the move.

Acer n10
£222 INC VAT

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Acer n10 Intel® PXA255 Processor at 300Mhz,
Microsoft® Windows® Pocket PC 2003,
64MB SD RAM, 32MB Flash, 3.5" TFT



Acer Aspire 1600 **Work at Home**



Standard specifications include:

- Intel® Pentium® 4 Processor up to 3.00GHz
- Microsoft® Windows® XP Home Edition
- 15" TFT display
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- Audio DJ (CD playback) functions
- 512MB DDR (upgradeable to 1024MB)
- 30GB or 40GB Hard Disk drive Options
- Integrated 1.44MB, 3.5" Floppy Disk drive options
- 8/4/24/8x DVD-ROM/CD-RW Combo drive*
- Li-Ion battery
- 4x USB ports; 1x S-Video output port
- 1 year Collect and Return warranty including International Travellers Warranty



Acer recommends Microsoft® Windows® XP.

Acer Aspire 1603LC

£1069 INC VAT

£910 EX VAT

Intel® Pentium® 4 Processor at 2.40GHz CPU,
Microsoft® Windows® XP Home Edition,
512MB DDR (2*256MB), 30GB,
8/4/24/8x CD-RW+DVD Combo, 15.0" TFT, Modem/Lan

Acer Aspire 1604LC

£1175 INC VAT

£1000 EX VAT

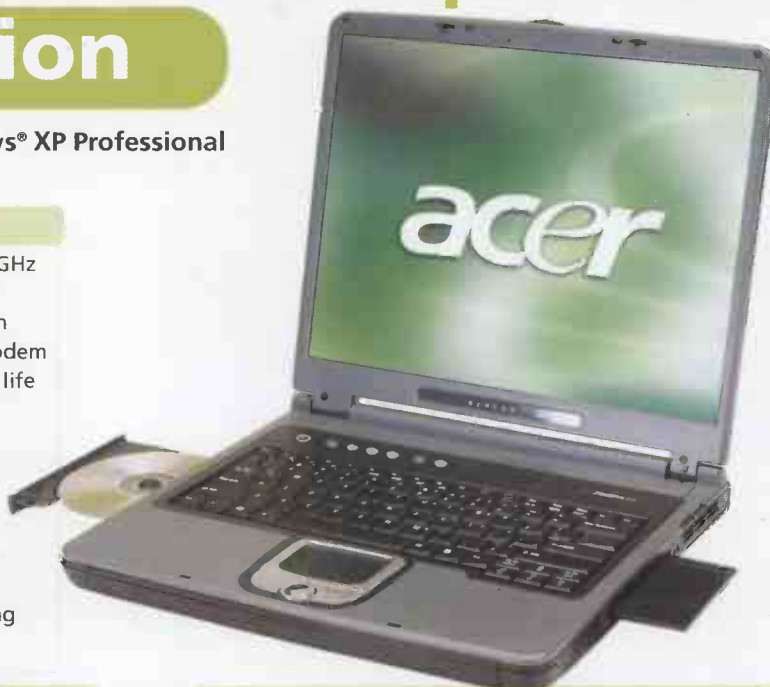
Intel® Pentium® 4 Processor at 2.80GHz CPU,
Microsoft® Windows® XP Home Edition,
512MB DDR (2*256MB), 40GB,
8/4/24/8x CD-RW+DVD Combo, 15.0" TFT, Modem/Lan

Acer TravelMate 240 series **Complete Mobile connection**

Acer recommends Microsoft® Windows® XP Professional for Mobile Computing.

Standard specifications include:

- Mobile Intel® Celeron® Processor up to 2.60GHz
- Microsoft® Windows® XP Home Edition or
- Microsoft® Windows® XP Professional Edition
- Built-in 10/100 ethernet and 56kb/s V.90 modem
- Li-Ion battery with average 3 hours battery life
- 14" or 15" display options.*
- 256MB DDR RAM (upgradeable to 1024MB)
- 20 GB/ 30GB Hard Disk drive
- Integrated 1.44MB, 3.5" Floppy Disk drive on selected models
- 24x CD-ROM or 8/4/24/8x DVD-ROM/CD-RW Combo drive
- 1 year Collect and Return warranty including International Travellers Warranty



Acer TravelMate 242X

£705 INC VAT

£600 EX VAT

Mobile Intel® Celeron® Processor at 2.40GHz CPU,
Microsoft® Windows® XP Home Edition,
20GB, 256MB DDR,
24x CD-ROM, 14" TFT, Modem/LAN

TravelMate 244XC

£823 INC VAT

£700 EX VAT

Mobile Intel® Celeron® Processor at 2.60GHz CPU,
Microsoft® Windows® XP Professional,
30GB, 256MB DDR,
8/4/24/8x CD-RW+DVD Combo, 14" TFT, Modem/LAN

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Acer Aspire 1700

Business

Panorama



Acer recommends Microsoft® Windows® XP.

Standard specifications include:

- Intel® Pentium® 4 Processor upto 3.06GHz
- Microsoft® Windows® XP Home Edition
- 56kb/s V.90 modem
- Built-in 10/100 ethernet LAN or Wired & wireless LAN.*
- 17" SXGA Display
- 512MB DDR RAM (upgradeable to 1GB)
- 80GB or 120GB Ultra ATA-100 Hard Disk drive
- Integrated 1.44MB, 3.5" Floppy Disk drive,
- 8/24/10/24x DVD/CD-RW Combo Drive or 8x DVD-RW*
- Li-Ion battery with average 2 hours battery life
- 1 year Collect and Return warranty including International Travellers Warranty

Acer Aspire 1703ESC

£1115 INC VAT

£949 EX VAT

Intel® Pentium® 4 Processor at 2.60GHz CPU,
Microsoft® Windows® XP Home Edition,
512MB DDR, 80GB,
CD-RW+DVD Combo, 17" SXGA, Modem/LAN

Acer Aspire 1705SMi

£1657 INC VAT

£1410 EX VAT

Intel® Pentium® 4 Processor 3.06GHz CPU,
Microsoft® Windows® XP Home Edition,
512MB DDR, 120GB,
DVD-RW, 17" SXGA, 128MB nVidia GeForce FX Go5600,
Modem, Wired & wireless LAN



Acer Projectors The Future of Digital Imaging

PD110



Acer PD110

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DLP, SVGA (800*600) resolution, 1100 Ansi lumen,
1500:1 contrast, 32db noise, 2Kg, 2000 hrs lamp life,
Keystone correction

Acer PD321

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£1399 EX VAT

DLP, XGA (1024*768) resolution, 1100 Ansi lumen,
2000:1 contrast, 34db noise, 0.99Kg,
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PD321



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- Resolution 1280 x 1024
- Brightness 250 cd/m²
- Contrast Ratio 700:1
- Viewing Angle 170°
- Response time 25ms
- Digital and Analogue
- 5 Video & Composite
- Silver metallic Sleek design
- Warranty 3 years
- ISO 13406-2 certified
- TCO '99

£564 INC VAT
£480 EX VAT

AL1751WM - 17" Wide Multimedia TFT LCD



- Wide 17" TFT LCD
- Resolution 1280 x 768
- Brightness 450 cd/m²
- Contrast Ratio 600:1
- Viewing Angle 170°
- Response rate 25ms
- Digital and Analogue

- S Video & Composite
- Silver & Black metallic Sleek design
- ISO 13406-2 compliant
- 3 year warranty
- TCO '99

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AL1721M - 17" Multimedia LCD - A Vision for Performance



- Resolution 1280 x 1024
- Brightness 260 cd/m²
- Contrast Ratio 450:1
- Viewing angle 140°
- Response time 16ms
- Digital and Analogue
- Multimedia Speaker 1W x2
- VESA Wall Mounting Supported
- Warranty 3 years
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£329 INC VAT
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Office Line

AL1521M - 15" Multimedia LCD - A Digital Performer



- Resolution 1024 x 768
- Brightness 250 cd/m²
- Contrast Ratio 400:1
- Viewing angle 120°
- Response time 25ms
- Digital and Analogue
- Multimedia Speaker 1W x2
- Warranty 3 years
- ISO 13406-2 certified
- TCO '03

£241 INC VAT
£205 EX VAT

Value Line

AL1713 - 17" TFT LCD, TCO '99



- Resolution 1280 x 1024
- Brightness 300 cd/m²
- Contrast Ratio 450:1
- Viewing angle 140°
- Response time 25ms
- Internal Power Supply
- Warranty 3 years
- ISO 13406-2 certified
- TCO '99

£300 INC VAT
£255 EX VAT

AL1511 - 15" TFT LCD



- Resolution 1024 x 768
- Brightness 250 cd/m²
- Contrast Ratio 350:1
- Viewing angle 140°
- Response time 25ms
- Internal Power Supply
- Super Slim Format
- Warranty 3 years
- ISO 13406-2 certified
- TCO '99

£223 INC VAT
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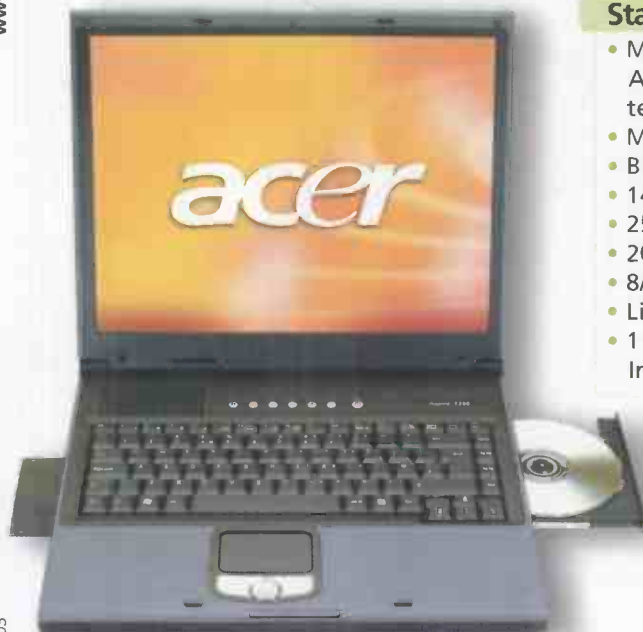


Acer Aspire 1350 Your Business

Enhancer

www.pleasing.it - I.P.

The Acer Aspire 1350 has been designed specifically to meet the needs of small business and SOHO professionals looking for a fully functional work device that offers solid reliability and stable performance in a small yet durable package. Perfect for space-conscious users, the easily transportable Acer Aspire 1350 also provides relief for today's business-intensive professionals with impressive home entertainment capabilities.



Standard specifications include:

- Mobile AMD Athlon™ XP processor up to 2800+ AMD PowerNow!™ technology - A Power saving technology for extended battery life!
- Microsoft® Windows® XP Home Edition
- Built-in 10/100 ethernet and 56kb/s V.90 modem
- 14" or 15" TFT Display Options
- 256MB or 512MB RAM (upgradeable to 1GB)*
- 20GB or 40GB Ultra DMA-100 Hard Disk Drive*
- 8/4/24/8x DVD-ROM/CD-RW Combo drive or 2x DVD-RW*
- Li-Ion battery with average 2.5 hours battery life
- 1 year Collect and Return warranty including International Travellers Warranty

Acer recommends Microsoft® Windows® XP.

Acer Aspire 1352XC

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Mobile AMD Athlon™ XP Processor at 2200+,
Microsoft® Windows® XP Home Edition,
256MB DDR, 30GB, DVD/CD-RW Combo,
Modem/LAN, 14.0" TFT, Li-Ion

acer ADVANTAGE

Acer Advantage

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£99 EX VAT

Extend your notebook warranty to 3 years cover to include accidental damage. Please contact your reseller for details.

Acer Aspire 1356LMi

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Mobile AMD Athlon™ XP Processor at 2800+,
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512MB (2*256) DDR, 40GB, DVD-RW,
Modem, Wired & Wireless LAN, 15.0" TFT, Li-Ion

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Acer Aspire 8200

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INC VAT

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AMD Athlon™ XP Processor 2000+,
Microsoft® Windows® XP Home Edition,
40GB 5400rpm, 256MB/266DDR, Combo DVD-CRW,
VGA O/B, Speakers, Modem, firewire

Don't forget your Acer monitor. See page 5

Standard specifications include:

- AMD Athlon™ XP Processor 2200+
- Microsoft® Windows® XP Home
- 256MB DDR SDRAM
- 40GB ATA-100 HDD
- VGA & LAN O/B
- CD-RW & DVD-ROM Combo Drive
- 56K Modem
- Audio O/B
- 1 years warranty

Acer recommends Microsoft® Windows® XP.

Acer Aspire RC500 Experience Digital Enjoyment



Standard specifications include:

- Intel® Pentium® 4 Processor at 2.60GHz
- CPU with Hyper-Threading technology
- Microsoft® Windows® XP Home
- 512MB DDR SDRAM
- 120GB ATA-100 HDD
- NVIDIA GeForce FX5200
- 128MB Graphics Card
- TV Tuner
- DVD-RW +
- MS Works Suite 2003
- 56K Modem
- Speakers & Sub Woofer
- 7 in 1 Memory Card Reader
- 1 years warranty

Acer Aspire RC500

£939

INC VAT

£799 EX VAT

AMD Athlon™ XP Processor 2600+, Microsoft® Windows® XP Home Edition,
80GB, 512MB DDR-RAM, DVDRW+ & DVD, Audio O/B,
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* Denotes dependant upon configuration

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WORDS: NIGEL WHITFIELD ILLUSTRATION: VINCENT FRASER

Safe house

Keeping your house secure with a burglar alarm is fine, but if you're away from home, using your PC and the Internet can give you control from afar

Home security is something people are taking a lot more seriously than they used to, with better locks, outdoor floodlights and various other devices becoming more and more common in British homes. Even so, while many people might consider installing a DIY burglar alarm, a system that's linked to a remote control centre, alerting people whenever something untoward happens, is usually considered over the top for all but the very wealthy or the excessively worried.

That needn't be the case. While alarms with central monitoring can still be expensive, there are alternatives. As an increasing number of homes install an always-on Internet connection, they open up the possibility of using the net to alert them when something has happened at home – by sending a message to a mobile phone, for example, or you can sign in to a secret web page to check what's happening live on the net. From a simple webcam that spots movement, to complete remote control, it's easier than you think to give your home added security.





Keeping your home safe is important to everyone, but using your PC isn't necessarily the first thing you'll think of when it comes to home security. However, it can be a very useful tool in letting you keep abreast of what's been going on in your home – and with an Internet connection costing about the same as the monthly fees for a monitored burglar alarm, why not save money and keep an eye on things yourself, or let the computer do it for you?

Many people have a webcam on their computer, and there's long been software that will spot when things have changed, and save a picture; you can use it to find out things such as whether your kid brother has been near the PC while you're away. But it hasn't been top of the list when it comes to making your home secure.

The situation is changing now, as many people have broadband connections that are always on. That makes it more feasible to use a PC for security, without worrying about tying up phone lines, or the time taken to update a picture on a remote web server. Depending on the details of your net connection, it also means it may be possible to connect to your computer from elsewhere, and see what's happening in your home.

In fact, the Internet is slowly edging into the security market in various ways – we'll look at some of them here – but there are other methods. You could, for instance, use a remote control application like VNC (Virtual Network Computing) to connect to your PC and view webcam pictures.

Home monitoring

Burglar alarms that have a monitoring facility are nothing new – they've been around for years, and often involve fairly expensive response centres, staffed by people who try to contact you when the alarm goes off and alert the authorities when necessary.

It's no surprise that the Internet and mobile phones are being used to try and cut down on the number of people needed to provide such services, so that they can be made more affordable. One such system

is BT's home monitoring service, the Home Monitor VP1000 (www.bt.com/homemonitoring), which is based around a DIY installable alarm, similar to the cordless systems you can buy at most DIY warehouses.

At £250 for a control unit, one door or window contact, two motion sensors, a dummy alarm box and a keychain remote, it doesn't look like great value, but it has some tricks up its sleeve. Besides making a lot of noise when the alarm goes off, the control unit plugs into the phone line.

As part of the installation, you create an account on the BT Home Monitoring website; you can specify up to three contacts with mobile phone numbers, email addresses or ordinary phone numbers. When an alarm is triggered, the system calls your home, then alerts the contacts if the alarm hasn't been reset. You can also sign in to the web page from anywhere and check to see the status – Including whether batteries in sensors need replacing, or which sensors have been triggered.

Many people may choose to add other detectors, such as a smoke alarm or extra door contacts, putting up the price – and after the first three



BT's Home Monitor system may look like an ordinary DIY alarm, but you can receive alerts via text message and check the system's status via a web page

months, you'll have to pay an additional £5 per month for the monitoring service. Nevertheless, for those who would like a little extra peace of mind without the expense of a typical call-centre-based system, it may be worth looking at. Just remember that the only people who'll be alerted are the ones on your contact list; BT's system won't call the emergency services for you.

BT's system, clever though it is, probably doesn't make quite enough use of the Internet to satisfy the hard core technophile. Who's going to be satisfied just knowing that something's happening at home when there's technology out there that will let you see every detail?

Network webcams

Webcams are the obvious way of letting you keep an eye on what's going on at home, and with broadband connections, it's simple to set up a window on your living room using one of the many camera-sharing websites. If you have a web page of your own, you can always arrange for pictures to be uploaded there every few minutes – and many webcams come with software that can be used to detect motion. However, much of this software is pretty basic; it will simply compare images to see if there's been much of a change since the last shot, and then save the image, or start to record a video stream, if it spots motion.

That might sound like all you need, but such simple motion detection has its drawbacks, as you'll find out on a windy day when you come home to a hard drive filled with pictures of gently billowing net curtains. To avoid this problem, choose a camera position carefully, or pick software that can be programmed to avoid small changes in the scene. Alternatively, you can use a passive infra-red (PIR) motion detector like the ones used in burglar alarms;

'Some network cameras even offer the possibility of panning or zooming via remote control over the web'

modern ones are even clever enough to avoid being triggered by small animals.

There are other solutions – if you can access your network remotely. Veo Products (www.veoproducts.com) has a range of cameras that connect directly to a network, either via an ordinary wired connection or via 802.11b wireless. They have built-in web servers, so you can connect to them over the Internet and see what's happening, or even listen to it.

While the cameras themselves can be bought for around £120, a motion sensor is an optional extra – and you'll want to add one if avoiding the net curtain problem is important to you. For around £150 you can have the wireless version, which will ensure you can add security to your home without running cables everywhere.

Since you have to connect to these cameras from outside, rather than letting them upload pictures to a web server as you would with a typical webcam, you may have problems with some types of domestic broadband connection. That's because many of these are not designed to run servers, which is essentially what these cameras are; they rely on a Java or ActiveX applet downloaded to a web browser which can be used to view the images.

If a firewall or service restrictions prevent you from connecting to your

Veo's cameras are relatively low cost and connect directly to your network



computer, you won't be able to use this type of camera. Some types of broadband may allow you to connect, but if you have multiple cameras, you might need to do some complicated configuration of routers or firewalls.

While this type of camera is relatively new, we can probably expect to see similar things become more widely available over the next few years, and hopefully at more attractive prices.

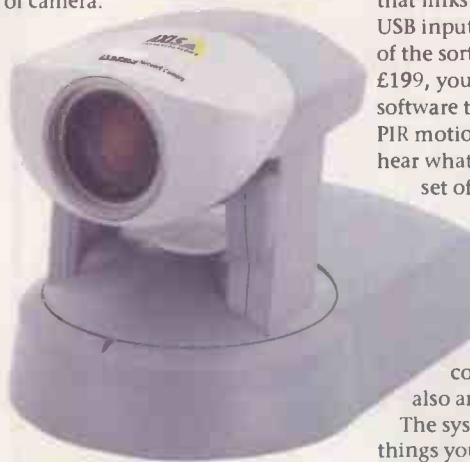
Beyond a single camera

There are some situations in which a single camera may be all you need – if there really is only one way in and out of your home, for example – but in many cases, that's not enough. And that's where things start to become more complicated for the PC home security enthusiast – not to mention more expensive. Observation cameras that you can connect to over the network – or better still, a wireless Lan such as the Veo Observer – may be a great idea, but when each one costs £120, fitting one at the front and back of your home, one indoors, and one covering the garage, for example, is going to be pretty expensive. This sort of system is best suited to businesses that can more easily justify the expense.

If you already have a conventional monitoring system with cameras that produce Pal video output then you don't even have to rip those out; instead you can add a video server, such as the ones from Axis Communications (www.axis.com), which can connect either a single camera or four at a time to the web. If you want to capture images, the company also produces digital video recorders so you can record clips and then access them over the web later.

More interestingly, Axis also produces its own network cameras, which are based on an embedded version of Linux and even offer the possibility of panning or zooming the camera via remote control over the web – but this costs around £300 for a camera, and considerably more for the video servers to use with existing CCTV systems. In other words, definitely a business product.

But that doesn't mean home users should be denied the opportunity of multiple-camera systems to keep an eye on what's going on at home. Step forward the Incontrol Quadcam system (www.digital-cybermasters.co.uk), which provides up to four cameras and a controller box



Sophisticated network cameras like the Axis 2130PTZ can even be remotely controlled over the net, panning and zooming to catch the action

that links them together and combines them into a single USB input for your PC. Essentially it's a domestic version of the sort of systems that Axis provides for businesses. For £199, you'll receive the controller, a single camera and the software to control the system; the cameras also include a PIR motion sensor and microphone, so you'll be able to hear what's happening and ensure only real live objects set off the system.

It also takes care of the problem we outlined earlier, where many users may be unable to remotely access their computer when away from home. The Quadcam is a service as well as a product; you connect to their servers on the Internet to access the cameras on your computer, paying £5 for 20 connections. You can also arrange for SMS alerts to your mobile phone.

The system can be programmed to do all the usual things you'd expect – record video when movement is spotted, or take time-lapse recordings at intervals. And with the optional Mobile Receiver software, you can even connect to your cameras from a Pocket PC and see what's happening at home.

There's one other trick up the sleeve of the Incontrol system – with the addition of an X10 interface, it can turn the PC into the centre of a complete home automation system. You'll be able to access it via the web. As well as the usual automation tasks, you can automate security functions – for example, turning on lights when movement is detected, which not only makes your home look occupied, but will also ensure there's enough light for the cameras to capture pictures of any intruders.

Beyond cameras

Home security is, of course, about much more than just cameras. You could combine a system of remote cameras with a monitored alarm such as the BT system, and you'd have just about everything you need – but you'd also have two different systems to check when something happens.

You could always build your own system – PCs can be kitted out with cards that can accept input from standard



The Incontrol Quadcam system lets you monitor up to four cameras over the Internet, and can be expanded into a complete X10 home control system

Safe as houses

While using the web for home security in one of the ways we've described may make you feel more secure and in control, it's equally important to remember more basic considerations, including fitting decent locks to your doors and windows. Your local crime prevention officer will be able to give you more information – but it's worth remembering that a little extra money spent securing your home in the first place is just as important as spending hundreds of pounds on a sophisticated PC security system.

You should also be aware that while any security system is better than none at all, if you use one of the essentially DIY systems that we've described here, you're unlikely to see any benefit in the form of reduced home insurance premiums.

And, unlike a professionally monitored system, none of the systems here will automatically alert the emergency services – so while they may have a deterrent value, the police aren't going to turn up on the doorstep and catch someone red-handed. It's up to you to alert them – and to remember to program the system to alert a neighbour or nearby friend if you're going away on holiday; contacting your local police at home from a nightclub in Spain isn't very easy! Don't forget, too, that if your PC is an essential part of your home security, it will need a good UPS (uninterruptible power supply) – preferably one that's going to keep it running for a long time, not just enough time to shut down Windows safely.

For the time being, if a quick official response is your main concern, then you really need to consider using a professionally monitored alarm service in addition to whatever web systems you choose to let you keep an eye on things yourself.

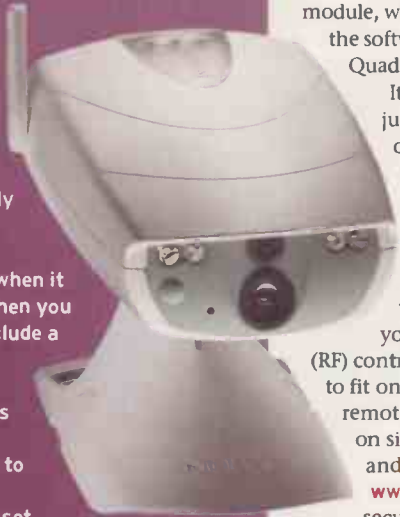
Mobile security

The web isn't the only high-tech way that you can keep an eye on things. Your mobile phone can be a vital security tool – and not just receiving SMS messages sent from services like BT's Home Monitor system.

If network video cameras don't appeal, Nokia's Observation Camera (www.nokia.com) is effectively a picture mobile with a different sort of case and some clever software. It can be programmed to automatically take a picture and send it via MMS when it detects movement, or to respond with a picture when you send a text message command. Other features include a thermometer and the ability to dial in and hear what's happening around the camera.

If it's your car that you want to protect, systems like the Trak M8 (www.trakm8.com) combine GPS and mobile phone technology; you can configure it to send a text message, each time the car is started, giving the location, or report it if it moves outside set boundaries or exceeds a certain speed limit. If you phone it and hang up, it will respond with the current location of your car. A similar, smaller device called the Followit Locator (www.followit.se) is small enough to put in your pocket or briefcase.

And finally, if you're worried about losing your mobile, an increasing number of services on the net can now let you find out where it is. They use triangulation technology that's available in the phone networks, which will provide better information in areas with lots of cells, such as a city, than in locations where transmitters are more widely spaced. You can't just track anyone's phone though – you have to register and respond to a text message that will be sent to the number you want to track. You'll find the service on sites such as www.trackaphone.com, www.verilocation.com and www.followus.co.uk – though only the first caters for home users.



fuse box installation. And with the addition of a PC control module, which links the PC's serial port to the powerline, the software supplied with packages such as the Incontrol Quadcam can manage all your X10 devices.

It's security we're concerned about, though – not just turning lights on and off. But X10 has that sort of thing covered, too; you can buy X10 sirens, for example, or flashing lights that can be triggered by the software running on your PC. And you don't have to rely on the motion sensors built into cameras, either – there are standalone X10 PIRs and smoke detectors, for instance. And for those areas where there isn't electrical power, you can link your X10 system to a radio frequency (RF) controller, which offers things like glass break sensors to fit on your windows, door switches or cordless remote controls. You'll find plenty of X10 equipment on sites such as www.automatedhome.co.uk and www.homecontrol.co.uk, while at www.intellihome.be you can find a range of X10 security products, as well as the company's own Superweb system that allows monitoring via the web and control via text message.

Future securities

There's little doubt that security via the Internet is going to become much more popular; just as companies are realising that they can use the same links for network traffic and telephone calls with Voice over IP (VoIP), so they're using techniques such as mpeg to send images and other security information over the same network – and even taking advantage of technologies such as power over Ethernet (PoE) to ensure that you can plug in a camera anywhere in an office, and need nothing more than a network socket to connect it to. As PoE (see this month's Hands on Mobile computing column) becomes more widespread, we can expect to see more devices designed to take advantage of the cabling infrastructure in offices. For the home, though – unless you're starting from scratch and designing a house with custom wiring – X10 is likely to remain the dominant way of controlling things for the time being.

The good news, though, is that it is likely to become cheaper as more people realise how useful it is, and more products are made for the European market. Even so, if you want a comprehensive system, you may have to spend a bit above the odds to incorporate all the required elements – home security on the web may be a neat idea, but it's certainly not a cut-price solution.

burglar alarm switches, and switch on alarms. You could even hook it all up with a web page, but there'd be a lot of programming work involved in doing something like that, and why re-invent the wheel?

One of the easiest solutions is to use X10, which started out in the US as a home automation tool and is now popular in Europe. X10 is a power line signalling system – it transmits and receives messages over the electrical cabling in your home. The basic messages are pretty simple – on, off, dim and bright, which is what you need for home automation.

With X10, each device you want to manage has a control module, which could provide a simple on/off function for something like a radio or a water heater, or could provide extra functions such as dimming a lamp. Each device has a unique address, allowing it to respond only to the commands sent to it. Those commands can come from an X10 controller, or from switches designed to send messages.

At its simplest, you can add X10 control to your home with plug-in modules, which look a little like the circuit-breaking RCD plug you might run your lawn mower from. If you're more serious about it, you can have modules designed to be wired behind plug sockets, wall-mounted switches including modules, or units specially designed for



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Online suppliers such as IntelliHome sell a wide range of security and control products using the X10 system

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PC Advisor - Oct 2003



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Memory	256 MB DDR PC2100	256 MB DDR PC2100	256 MB DDR PC2100	512 MB (2 x 256MB) DDR PC2700	
Hard Drive	40 GB UDMA 100 7200 RPM	40 GB UDMA 100 7200 RPM	40 GB UDMA 100 7200 RPM	80 GB UDMA 100 7200 RPM	
Graphics	GeForce2 Graphics (nForce Chipset)	64MB GeForce4 MX440, TV-OUT	64MB GeForce4 MX440, TV-OUT	128MB GeForceFX 5600, 8x, TV-OUT, DVI	
Multimedia	16x DVD-ROM Drive	16x DVD-ROM Drive	16x DVD-ROM Drive	16x DVD-ROM Drive	
CD-RW	Option Available	52x24x52 CD-ReWriter (BurnProof)	52x24x52 CD-ReWriter (BurnProof)	52x24x52 CD-ReWriter (BurnProof)	
Sound	Dolby Digital Sound O/B	6 Channel Sound	6 Channel Sound	6 Channel Sound	
Modem	56K v.92 Modem & 10/100 Network Card	56K v.92 Modem	56K v.92 Modem	56K v.92 Modem & 10/100 Network Card	
Monitor	17" SVGA Colour Monitor	17" SVGA Colour Monitor	17" SVGA Colour Monitor	17" SVGA Colour Monitor	
Speakers	Desktop Speakers Keyboard & Mouse	Subwoofer & 2 Satellites Keyboard & Mouse	Subwoofer & 2 Satellites Keyboard & Mouse	Creative 5.1 Inspire 5300 Keyboard & Mouse	
Extras	4 USB Ports 3.5" Floppy Disk Drive	4 USB2.0 Ports 3.5" Floppy Disk Drive	4 USB2.0 Ports 3.5" Floppy Disk Drive	4 USB2.0 Ports, 3.5" Floppy Disk Drive	
Warranty	3 Years Warranty	3 Years Warranty	3 Years Warranty	3 Years Warranty	
	AMD Athlon 2000+XP £350 inc VAT	AMD Athlon 2400+XP £450 inc VAT AMD Athlon 2600+XP £470 inc VAT	Pentium 4 2.66GHz £545 inc VAT Pentium 4 2.8GHz £605 inc VAT	AMD Athlon 2600+XP £635 inc VAT AMD Athlon 2800+XP £680 inc VAT	Aluminium CUBE Chassis 256MB PC2100 DDR 40GB 7200RPM HDD 3D Graphics 6 Channel Sound 16x DVD-ROM and 48x CD-RW COMBO Drive 3.5" Floppy Drive 10/100 Network Card 4 USB2.0 Ports 2 1394 Firewire Ports AMD Athlon 2400+XP £380 inc VAT Pentium 4 2.66GHz £500 inc VAT

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1MN5W	AMD OEM Athlon XP 2800 333 FSB	£102.00	£119.85
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1JW4W	AMD Retail Athlon XP 2200 266 FSB	£47.00	£55.23
1KV7W	AMD Retail Athlon XP 2400 266 FSB	£59.00	£69.33
1MN4W	AMD Retail Athlon XP 2500 266 FSB	£60.00	£70.50
1MN5W	AMD Retail Athlon XP 2800 266 FSB	£119.00	£139.83

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1LB4W	Pentium 4 OEM 2.8GHz 478Pin 512k 533 FSB	£139.00	£163.33
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1MV9W	P4S333-X Socket 478 556/45 4xAGP 333DDR DDR & SDR ATA133	£36.00	£42.30

Motherboards Abit

2KX4W	IC7 MAX 3 Socket 478 875P 8xAGP Pro 400DDR Giga LAN & CHN Serial RAID	£144.69	£170.01
2HR9W	IC7G Socket 478 875P 8xAGP Pro 400DDR Giga LAN Dual Serial RAID	£119.00	£139.83
2HS2W	IS7G Socket 478 865 8xAGP 400DDR Giga LAN Dual Serial RAID	£106.00	£124.55
2HS3W	IS7 Socket 478 865 8xAGP 400DDR Dual Serial RAID	£79.00	£92.83
1JW6W	IT7 MAX 2 Socket 478 645 8xAGP Pro 400DDR Serial RAID Firewire Legacy free	£73.00	£85.78
1JWSW	A77 MAX 1 Socket A VIA KT400 AGP8x 400DDR Firewire & ATA Serial	£61.00	£71.68

Motherboards MSI

2MU6W	KT6 Delta FSR Socket A KT600 8xAGP DDR400 Firewire Serial ATA RAID	£65.00	£76.38
2MU7W	KT6 Delta LSR Socket A KT600 8xAGP DDR400 Serial ATA	£56.00	£65.80
1VW9W	KT7J Delta LSR Socket A nForce2 8xAGP DDR400 Firewire Serial ATA RAID	£75.00	£88.13
2KY2W	KT4V Socket A Socket A KT400 DDR400 8xAGP ATX	£48.00	£56.40
1MU7W	865P NEO 2 R20A Socket 478 875P 8xAGP DDR400 Firewire Serial ATA RAID	£99.00	£116.33

Computer Cases

1NV8W	Thermaltake XaserIII V1000A With Window Kit Black Aluminium Case No PSU	£87.00	£102.23
1NV6W	Thermaltake XaserIII V1000C Blue Aluminium Case No PSU	£85.00	£99.88
1NV9W	Thermaltake XaserIII V1000 With Window Kit Blue Aluminium Case No PSU	£85.00	£99.88
1NV5W	Thermaltake XaserIII V1000A Black Aluminium Case No PSU	£85.00	£99.88
2LV8W	Beantech Igloo8A With Windows Kit Black Aluminium	£82.00	£96.35
2LV5W	Beantech Igloo5 With Windows Kit Silver Aluminium	£74.00	£86.95
2MU1W	Beantech Igloo5 With Windows Kit Clear Acrylic	£69.00	£81.08
1MD5W	Novatech Athlon/Pentium4 MidATX Tower Case 350W PSU 4 Bay	£23.00	£27.03
1LU1W	Novatech Athlon/Pentium4 MidATX Tower Case 300W PSU 3 Bay	£17.00	£19.98
2JD2W	Novatech ATX 350W Mid Aluminium Case With Window Panel & Blue Neon	£49.00	£57.58

PSU VGA DVD Media

Quick Code Ex Vat Inc Vat

Power Supply Units

1GZ6W	450W ATX Power Supply for AMD, P3 and P4 mainboards	£19.00	£22.33
1HU3W	400W ATX Power Supply for AMD, P3 and P4 mainboards	£17.00	£19.98
1LA6W	300W ATX Power Supply for AMD, P3 and P4 mainboards	£10.00	£11.75
1GZ7W	550W ATX Power Supply for AMD, P3 and P4 mainboards	£28.00	£32.90
2MU8W	Emax EG45 AX-VE 350W Power Supply for AMD and P4 With Active PFC & PMA	£42.00	£49.35
2MU9W	Emax EG45 AX-VE 400W Power Supply for AMD and P4 With Active PFC & PMA	£58.00	£68.15
2MV1W	Emax EG45 P-VE 550W Power Supply for AMD and P4 With Active PFC & PMA	£89.00	£104.58

Graphics Cards

1CZ7W	Nvidia TNT2 M64 32MB AGP Graphics Card	£18.00	£21.15
1FC9W	Nvidia GeForce MX 440 8xAGP 64MB DDR AGP Graphics Card TV Out	£33.00	£38.78
1MM1W	Nvidia GeForce MX 440 128MB DDR AGP Graphics Card TV Out	£40.00	£47.00
1SX2W	Nvidia GeForce FX5200 128MB 8xAGP Graphics Card TV Out	£47.00	£55.23
2DD3W	Nvidia GeForce FX5600 128MB 8xAGP Graphics Card TV In & Out	£94.00	£110.45
1LR7W	Nvidia GeForce4 T4000 128MB DDR AGP Graphics Card TV Out	£96.00	£112.80
1LM4W	Leadtek TV2000 XP Deluxe PCI TV Card	£34.83	£39.99
2FZ1W	Leadtek Win GeForce FX5600 256MB 8xAGP Graphics Card TV In & Out	£109.00	£128.08
2H15W	Leadtek Win GeForce FX5900 128MB DDR 8xAGP Graphics Card TV In & Out	£219.00	£257.33

DVD Burners/ Writers

2FZ5W	NEC ND1300A Black DVD-R Dual Format Recorder 4800x & RW OEM with Software	£99.00	£116.33
2KA2W	NEC ND1300A Beige DVD-R Dual Format Recorder 4800x & RW OEM with Software	£89.00	£104.58
2HV2W	Qualcomm Full Speed 8x DVD-R Dual Format Recorder 4800x & RW OEM with Software	£110.00	£129.25
2HS7W	Pioneer DVR-106 Dual Format DVD-R & DVD-RW and RW DVD Burner with Software	£119.00	£139.83

Epson Stylus Colour C44UX



Quick Code

2HT7W

£36.00

£42.30

- Pages per minute black: 11
- Pages per minute colour: 5.5
- 2880 x 720dpi with Variable-Sized Droplet Technology
- Compatible with Windows 98/2000/ME/XP/Mac
- USB interface
- 1 year Return-To-Base warranty

2K57W	Sony DRU-HA Black Dual Standard DVD-R & DVD-RW and RW DVD Burner with Software	£119.00	£139.83
2H56W	Sony DRU-HA Beige Dual Standard DVD-R & DVD-RW and RW DVD Burner with Software	£119.00	£139.83
2LX5W	Sony DRU-HA Beige Dual Standard DVD-R & DVD-RW and RW DVD Burner with Software	£119.00	£139.83

CD & DVD Media

1RN8W	Novatech 80min 52 Speed CDR 50 Spindle	£9.99	£11.74
1JG6W	Novatech 80 Minute 52 Speed CDR 100 Spindle	£16.99	£19.96
1BX4W	Novatech 74min 4 Speed CD-RW 10 Spindle	£8.00	£9.40
1EZ9W	Novatech 99min CDR 25 Spindle	£9.00	£10.58
2FX2W	10 Pack 2 Speed DVD-R 4.7GB Media	£8.00	£9.40
2FX4W	10 Pack 4 Speed DVD-R 4.7GB Media	£8.50	£9.99
2LG5W	25 Pack 4 Speed 4.7GB DVD-R Media	£18.75	£22.03
2KA1W	25 Pack 4 Speed DVD-R 4.7GB Media	£23.00	£27.03
2FX3W	50 Pack 2 Speed DVD-R 4.7GB Media	£30.00	£35.25
2FX5W	50 Pack 4 Speed DVD-R 4.7GB Media	£35.00	£41.13
1LA4W	10 Pack 2 Speed DVD-RW 4.7GB Media	£8.00	£9.40
2BR8W	100 Pack Of Plastic Wallets For DVD & CD Media	£4.00	£4.70



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Printers Imaging USB

Quick Code		Ex Vat	Inc Vat
Inkjet Printers			
2HT7W	Epson Stylus C44 A4 11ppm Inkjet Printer	£36.00	£41.30
1KA7W	Epson Stylus Photo 830 A4 14ppm Inkjet Printer	£61.00	£71.68
2HE1W	HP Deskjet 3650 A4 17ppm Inkjet Printer	£47.00	£55.23
1KY7W	HP Deskjet 6122 A4 20ppm Inkjet Printer	£113.00	£132.78
2HE2W	HP Deskjet S150 A4 19ppm Inkjet Printer	£68.00	£79.90
1CT1W	HP Deskjet 1220 A3 11ppm Inkjet Printer	£100.00	£119.58

Laser Printers			
1DZ2W	Brother HL1230 12ppm 24x36 Mono Laser Printer	£99.00	£116.33
1MW1W	Brother HL5050 16ppm 16x16 Mono Laser Printer	£175.00	£205.63
1MW2W	Brother HL5070 16ppm 16x16 Network Mono Laser Printer	£269.00	£316.08
1SM7W	HP Laserjet 1300 19ppm Mono Laser Printer	£108.00	£124.40
1NR3W	HP Laserjet 1000W 10ppm Mono Laser Printer	£89.00	£104.58

Inkjet Consumables			
1HV9W	Hewlett Packard No.23 Tri-Colour Inkjet Print Cartridge (30ml)	£21.88	£25.71
1K66W	Hewlett Packard No.56 Black Inkjet Print Cartridge (19ml)	£13.87	£16.30
1HV6W	Hewlett Packard No.45 Black Inkjet Print Cartridge (42ml)	£20.97	£23.58
1HV7W	Hewlett Packard No.78 Tri-Colour Inkjet Print Cartridge (19ml)	£21.94	£25.78
1HV8W	Hewlett Packard No.78 Tri-Colour Inkjet Print Cartridge (38ml)	£37.81	£44.43
1HW1W	Hewlett Packard No.15 Black Inkjet Print Cartridge (25ml)	£18.78	£22.07
1HT3W	Epson T027 5 Colour Ink Cartridge	£15.49	£18.44
1HT1W	Epson T008 5 Colour Ink Cartridge	£12.62	£14.83
1JS3W	Epson T0361 Black Ink Cartridge	£11.44	£13.44
1JUSW	Epson T040 Black Ink Cartridge	£22.39	£26.31
1HT2W	Epson T026 Black Ink Cartridge	£19.14	£22.49
1JU6W	Epson T041 3 Colour Ink Cartridge	£18.96	£22.28
1HS4W	Epson T007 Black Ink Cartridge	£15.88	£18.66

Scanners			
1MN9W	HP Scanjet 3570C 1200x1200dpi 48Bit	£70.00	£82.25
1LF3W	HP Scanjet 4550C 2400x2400dpi 48Bit	£100.00	£117.50
1SB3W	HP Scanjet 5550C 2400x2400dpi 48Bit	£225.10	£264.49
2KZ7W	Epson Perfection 1670 1600x1200dpi 48Bit	£65.00	£76.38
2KZ3W	Epson Perfection 1670 Photo 1600x1200dpi 48Bit With Slide Scan	£80.00	£94.00
1KA4W	Epson Perfection 2400 2400x4800dpi 48Bit With Slide Scan	£149.00	£175.08
1KH8W	Canon CanoScan LIDE 20 600x1200 A4 USB 48Bit	£39.00	£45.83
1KH9W	Canon CanoScan LIDE 30 1200x2400 A4 USB 48Bit	£46.00	£54.05
1KH8W	Canon CanoScan LIDE 50 1200x2400 A4 USB 48Bit	£55.00	£64.63
1ME2W	Mustek UB 600x1200 36bit USB Flatbed Scanner	£27.00	£31.73
1KD1W	Acer 4300 600x1200 36bit USB Flatbed Scanner	£35.00	£41.13

Novatech 4.1MP Digital Camera



- 4.1MP
- Compact Flash
- 32MB
- 12@HiRes
- 2x Digital, 3x Optical
- 15 frames per second

Quick Code
2J55W

~~£170.00~~
Ex VAT
~~£199.99~~
Inc VAT

Digital Cameras			
1KE9W	Kodak CX6340 2.1Mp 16Mb MMC & SD 3x Optical & 2x Digital Zoom	£121.51	£142.77
2HY8W	Kodak CX6200 2.1Mp 8Mb MMC & SD 3x Digital Zoom	£75.00	£88.13
2GA2W	Kodak CX6340 3.1Mp 16Mb MMC & SD 4x Optical & 3.5x Digital Zoom	£182.00	£213.85
1KM9W	Fuji Fine Pix A202 2.0Mp 16Mb XD Card 2.5x Digital Zoom	£107.00	£125.73
1KL9W	Fuji Fine Pix A104 2.0Mp 16Mb XD Card 3x Optical & 2.5x Digital Zoom	£140.00	£164.50
1SU5W	Fuji Fine Pix 2800 2.0Mp 16Mb Smart Media 6x Optical & 2.5x Digital Zoom	£165.61	£194.59
1KN1W	Fuji Fine Pix S104 3.2Mp 16Mb XD Card 6x Optical & 3.2x Digital Zoom	£255.00	£299.63
2KA5W	Novatech 3.3 Mega Pixel 1.6Mb 4x Digital Zoom Digital Camera	£85.00	£99.88
2J55W	Novatech 4.1 Mega Pixel 32Mb 3x Optical & 2x Digital Zoom Digital Camera	£170.20	£199.99

USB Hubs & Devices			
1DK6W	4 Port USB Hub Powered	£10.00	£11.75
1LF2W	4 Port Mini USB Hub Non Powered	£8.00	£9.40
1WD6W	Novatech 4 Port USB2 Hub Powered	£13.00	£15.28
1WDSW	Novatech 4 Port USB2 Hub Non Powered	£12.00	£14.10
2FW6W	Bluetooth Dongle Class 1 100 Meter Range	£19.00	£22.33
2FW7W	Bluetooth Dongle Class 2 10 Meter Range	£15.00	£17.63

Flash Memory Monitors

Quick Code		Ex Vat	Inc Vat
Flash Memory & USB Memory Bars			
1CX4W	64MB Compact Flash RAM Card	£16.00	£18.80
1CX5W	128MB Compact Flash RAM Card	£22.00	£25.85
1DM7W	256MB Compact Flash RAM Card	£36.00	£42.30
1KV2W	64MB Smart Media XD Memory Card	£19.00	£22.33
1KV3W	128MB Smart Media XD Memory Card	£37.00	£43.48
1CX6W	64MB SmartMedia RAM Card	£11.00	£12.93
1DU4W	128MB Smart Media RAM Card	£24.00	£28.20
1LM5W	128MB MMC Media RAM Card	£24.00	£28.20
1JG1W	64MB Secure Digital Media Memory Card	£21.00	£24.68
1JG2W	128MB Secure Digital Media Memory Card	£31.00	£36.43
1LS6W	256MB Secure Digital Media Memory Card	£49.00	£57.58
1ME3W	128MB USB Flash Memory Stick	£25.00	£29.38
1ME4W	256MB USB Flash Memory Stick	£39.00	£45.83
1ME5W	512MB USB Flash Memory Stick	£73.00	£85.78
2LX6W	128MB USB2 Flash Memory Stick	£29.00	£34.08
2LX7W	256MB USB2 Flash Memory Stick	£44.00	£51.70
2LX8W	512MB USB2 Flash Memory Stick	£76.00	£89.30

Novatech 3.3MP Digital Camera



- 3.3 Mega Pixel
- Multimedia, Secure Digital
- 16MB Internal
- 9@HiRes
- 4x Digital
- 26 frames per second

Quick Code
2KASW

~~£85.00~~
Ex VAT
~~£99.88~~
Inc VAT

CRT Monitors Iiyama			
1TM7W	Vision Master 1403 17" (16"viewable) 0.27 Dot Pitch Black	£85.00	£99.88
1EH3W	Vision Master Pro 413 17" (15.9"viewable) 0.25Dot Pitch	£149.87	£176.10
1JE1W	Vision Master Pro 413 17" (15.9"viewable) 0.25Dot Pitch	£105.00	£123.38
1EW1W	Vision Master 1451 19" (18"viewable) 0.26Dot Pitch	£109.00	£128.08
1EX7W	Vision Master Pro 454 19" (18"viewable) 0.25Dot Pitch	£138.00	£159.65
2MT2W	Vision Master Pro 455 19" (18"viewable) 0.25Dot Pitch	£190.00	£223.25
2MT1W	Vision Master 506 21" (20"viewable) 0.25Dot Pitch	£349.00	£410.08

CRT Monitors NEC			
1LM1W	19" Monitor Pro 9308B/19 DTR-NF 0.24 110KHz TCO99 Ivory	£239.00	£280.83
1LM2W	19" Monitor Pro 9308B/19 DTR-NF 0.25 110KHz TCO99 Black	£239.00	£280.83
2KC6W	Novatech 17" Standard (16" Viewable) 0.27 Dot Pitch	£69.00	£81.08
1DX1W	Novatech 17" Pure Flat (16" Viewable) 0.25 Dot Pitch	£79.00	£92.83
2MT6W	Novatech 19" Pure Flat (18" Viewable) 0.25 Dot Pitch	£109.00	£128.08

TFT Monitors Iiyama			
1SP7W	17" Monitor ProLite E4305 TFT 0.26 80KHz Black	£302.22	£355.11
1SP6W	17" Monitor ProLite E4305 TFT 0.26 Ivory	£302.22	£355.11
1EX9W	18.1" Monitor AS4637BK TFT Black	£500.00	£587.50

TFT Monitors NEC			
1LN3W	15" Monitor LCD1560NX TFT 0.29 60KHz TCO99 Black	£253.81	£298.23
1LS8W	17" Monitor LCD1760NX TFT 0.264 80KHz TCO99 Black	£361.25	£424.47
1LT1W	17" Monitor LCD1760VM TFT 0.264 80KHz TCO99 Ivory Multimedia	£345.51	£405.97
1LN2W	18" Monitor LCD1860NX TFT 0.28 82KHz TCO99 Black	£432.20	£507.84

TFT Monitors Sony			
1MB8W	15" SSI-TFT TCO99	£228.39	£268.36
1JK8W	15" SDM-XS2 TFT TCO99 Audio	£235.28	£276.45
1MB9W	17" S17A TFT TCO99	£381.98	£448.83
1GL4W	18" SDM-S81 TFT TCO99	£440.00	£527.58
1LZ4W	19" S91 TFT 0.294 92KHz TCO99	£440.00	£527.58
1LZ5W	20" X2028 TFT TCO99 Audio in Black	£1,390.51	£1,563.35

TFT Monitors Novatech			
2KC3W	LCD 15" TFT Flat Screen Multimedia Monitor	£169.00	£198.58
1SX4W	Novatech 15" Designer TFT Flat Screen Monitor In Black & Silver	£179.00	£210.33
1MF1W	Novatech 17" TFT Flat Screen Monitor In Black & Silver	£239.00	£280.83
2FZ4W	Novatech 17" 1780 Multimedia TFT Monitor (280 x 1024 @ 60Hz) 0.26 Dot Pitch	£229.00	£269.08
2KR6W	Novatech 17" TFT Multimedia Flat Screen Monitor In White With Solid Steel Base	£239.00	£280.83
2GC3W	Novatech 19" Black & Silver Deluxe TFT Multimedia Monitor	£379.00	£445.33

Input Devices Networking

Quick Code		Ex Vat	Inc Vat
Mice & Keyboards			
1DC2W	Logitech Pilot Wheel Mouse - Ambidextrous	£7.32	£8.60
1DN7W	Logitech Cordless MouseMan Optical with scroll	£35.00	£41.13
1EW5W	Logitech Cordless Optical Mouse - 2 Button	£29.00	£34.08
1KA9W	Logitech Cordless TrackMan Wheel Optical	£29.00	£34.08
1KBSW	Logitech Cordless Desktop Comfort Keyboard & Mouse	£65.00	£76.38
1WD1W	Logitech Cordless Desktop Optical MX- Optical Mouse Black Finish	£67.00	£78.73
1KD2W	Logitech Cordless Desktop Navigator - Multimedia Keyboard & MouseMan Wheel	£53.00	£62.28
1JU2W	Microsoft Notebook Silver Optical Mouse	£18.82	£22.11
1JT9W	Microsoft Natural Multimedia Keyboard	£39.83	£46.90
1JU1W	Microsoft Wireless Optical Desktop	£25.00	£29.61
1KN5W	Microsoft Bluetooth Optical Desktop	£83.00	£97.53
1V56W	Microsoft Wheel Mouse Keyboard	£12.31	£14.46
1VK2W	Microsoft Wheel Mouse Optical	£15.68	£18.42
1CN6W	Microsoft IntelliMouse Explorer	£25.00	£29.38
1DC6W	Microsoft Internet Multifunction Keyboard	£14.44	£16.97
1MP3W	Microsoft Super Deluxe Multimedia Keyboard	£11.91	£13.99
2LF3W	Thermaltake Xaser III Black Keyboard and Mouse Set	£29.00	£34.08
2LF2W	Thermaltake Xaser III Silver Keyboard and Mouse Set	£29.00	£34.08
1BD9W	Novatech PS/2 Keyboard	£6.00	£7.05
1DB9W	Novatech PS/2 Cordless IR Scroll Mouse	£9.00	£10.58
1DA7W	Novatech PS/2 Optical Mouse (No Ball)	£8.50	£9.99

ADSL Connectivity & Networking			
1LF7W	Netgear DG834MLK ADSL Wireless Gateway Router 4x 10/100Mbps	£106.72	£125.40
1HB5W	Netgear RP614 Broadband Router + 4 ports 10/100 Switch Platinum Range	£34.00	£39.95
1JA7W	Netgear DG814ADS Modem Router with built in 4x 10/100 Mbps Switch	£79.00	£92.83
1XK7W	Netgear DM602 ADSL/DSL External Modem USB / Ethernet	£62.00	£72.85
2MS9W	Netgear MB31 Cable DSL 802.11b Wireless NAT router with 4 ports switch	£64.00	£75.20
1LD8W	D-Link DWL-805+ Wireless LAN Kit (1 x DWL-805AP+ 2 x DWL-850)	£117.56	£138.13
1FA7W	DSL-500 ADSL Router with 10M Ethernet LAN Interface	£68.74	£80.77
1FH7W	Wireless IEEE 802.11b Multi Protocol Print Server (3 Parallel Ports)	£153.78	£180.69
1GMSW	Wireless Network 11Mbps Access Point with 1 x 10m LAN Port capable of Bridging	£79.33	£93.10
1KC1W	Wireless Cable DSL Router with 4 Ports 10/100 Switch 22MB Wireless	£68.76	£80.79

Portable DVD Player



Quick Code
2LM6W

~~£229.76~~
Ex VAT
~~£269.97~~
Inc VAT

- 7" 16:9 TFT LCD Screen
- 2x Built-in Stereo Speakers
- Progressive Scan Capable
- Can Be Connected to Your TV
- Measures only 186 x 140 x 26 (mm)
- Includes Remote Control

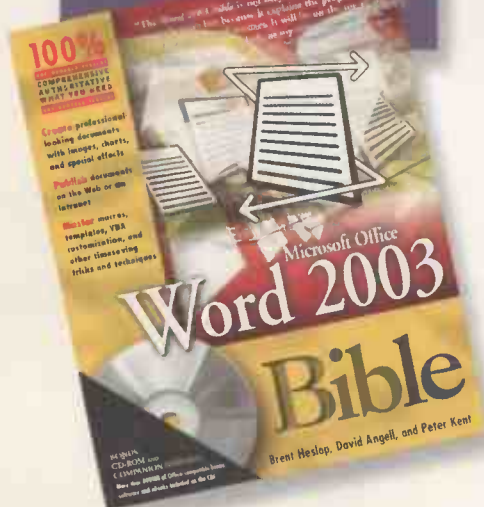
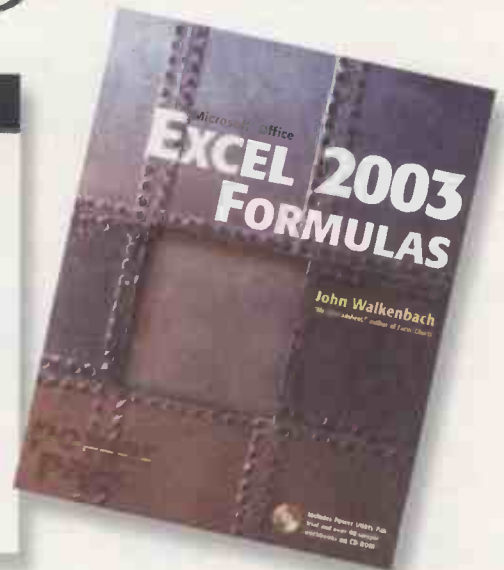
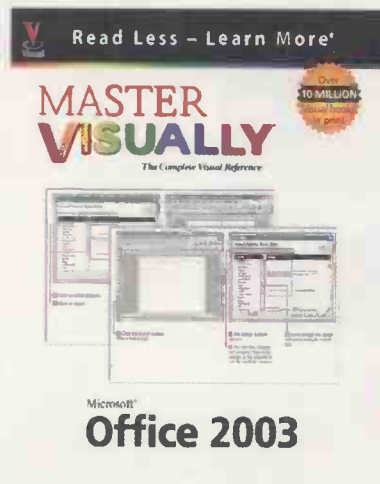
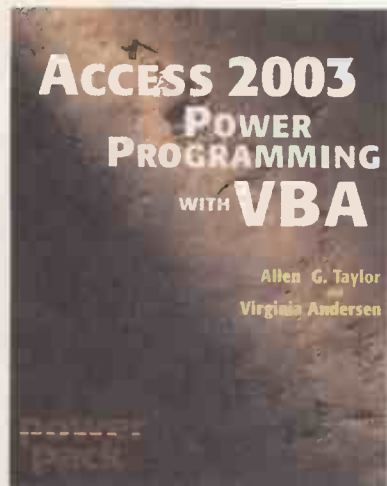
2FW9W	Scm ADSL PCI Internal Modem	£19.00	£22.33
2FW5W	Scm ADSL/DSL External Modem USB	£19.00	£22.33
2FW8W	Scm ADSL/DSL Modem Router 1 Port	£26.00	£30.55
2FX1W	Scm ADSL/DSL Wireless Modem Router 802.11B	£52.00	£61.10
1DL2W	Scm Scm 10/100 Mini Switch	£20.00	£23.50
1DL1W	Scm Scm 32Bit 10/100M PCI Fast Ethernet Adapter	£5.00	£5.88
1ET3W	Netgear MA401 802.11b Wireless PCMCIA Adapter	£25.00	£29.38
1ET4W	Netgear ME102 802.11b Wireless Access Point	£63.00	£74.03
2MT8W	Netgear MA311GE 802.11b Wireless PCI Adapter	£34.11	£40.08
1WT4W	Netgear DG824 ADSL Wireless Router + PCMCIA Wireless	£149.00	£175.08
2MT9W	Netgear MA521 802.11b PCMCIA Card 11Mbps Wireless	£31.00	£36.43
2MT4W	Netgear WG511 802.11g 54Mbps PCCARD 128MB Wireless	£44.00	£51.70
1MM6W	Belkin 54g Wireless Access Point	£79.00	£92.83
1MM7W	Belkin 54g Wireless Cable/DSL Internet Gateway Router	£79.00	£92.83
1MM5W	Belkin 54g Wireless Notebook Adapter	£42.00	£49.35
1MM4W	Belkin 54g Wireless PCI Adapter	£42.00	£49.35
1JY6W	Belkin 802.11b Wireless USB Network Adapter	£35.00	£41.13
1JX4W	Belkin Notebook 10/100 Network Card	£19.00	£22.33
1FARW	DSL-504 ADSL Router with 4 ports 10/100M Ethernet Switch LAN Interface	£77.00	£90.48
1LD3W	D-Link ADSL DSL-464G+ Router with Wireless LAN AP & 4 ports switch	£99.00	£116.33

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How we got here

People first started to wonder whether they could persuade computers to respond to their voices around 55 years ago. An American Department of Defense project, designed to automatically translate intercepted Russian radio messages, was one of the first major attempts to recognise speech. While a dismal failure in itself – famously translating ‘the spirit is willing but the flesh is weak’ into the Russian for ‘the vodka is strong but the meat is disgusting’ – it at least showed how difficult the task was.

Further US Government-funded research yielded the Harpy system, which could recognise complete sentences as long as they only consisted of a limited range of grammatical constructions. Given that it was only the early 1970s, this was some feat, but it did take something like 50 computers to handle the computation.

The gap between the processing power needed for speech recognition and that available from general-

Popularised by the listening computers in *Star Trek* and its sequels, speech recognition is still a long way from speech understanding

purpose computers gradually narrowed until the early 1990s, when companies such as Dragon and Speechworks introduced commercial speech recognition on personal computers.

At this stage, speech recognition involved waiting for the software to analyse and translate individually spoken words. To use one of these packages, you needed to speak in a very staccato fashion, with a noticeable pause between each word. It wasn't until 1997 that Dragon introduced Naturally Speaking (DNS), the first commercial speech-recognition program which claimed natural language recognition.

This program and its current rivals are more likely to make correct translations if you speak in complete sentences rather than breaking your speech up into individual words. This is because it analyses the sentence structure as part of the process of recognition. The latest versions of Dragon Naturally Speaking and its main rival, IBM's ViaVoice, use highly sophisticated analysis, yielding percentage recognition rates well into the high nineties.

The American catch

At the US launch of Office XP, there was quite a fanfare about the integrated speech recognition within the application and its underlying operating system. The speech recognition engine is supplied with the UK version of Office XP, but isn't installed by default.

This is because the engine is geared to US voices and has trouble with typical UK speech (see screenshots 1 and 2). While you can install it from the Office XP setup program, you'll have to adopt mid-Atlantic DJ speak if you want it to understand you. However, it does work, and you can use it for Windows and Office commands as well as dictation within Word and Excel, but unless you have a southern twang or a New York brogue, you'll hit too high an error rate to use it sensibly.

At the time of writing, Microsoft wouldn't confirm whether a UK version of the speech recognition engine would be included with Office 2003, but this would certainly be a valuable addition to the application suite. Although not as sophisticated as the standalone products, Microsoft's integrated speech recognition may well be enough for light users of Office, assuming a UK or international English version does become available.

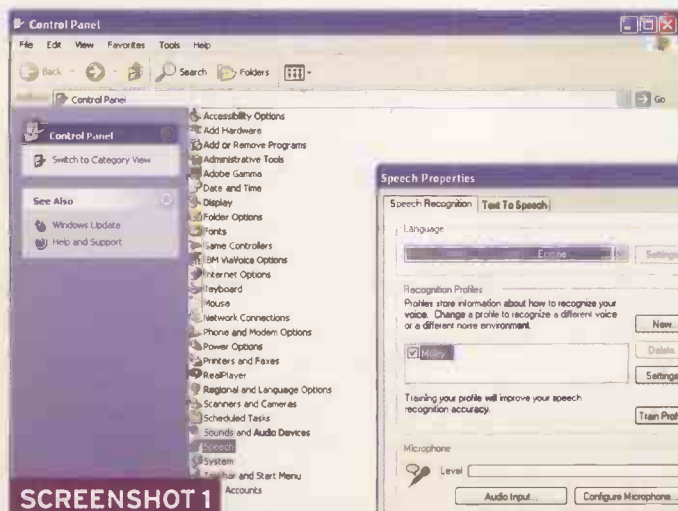
The main players

If you want to try out speech recognition, but are not thinking of investing in Office 2003, there are two main alternatives: DNS and ViaVoice. Both are available in several versions for different needs and at different prices. They work with their own little text editors or directly into major programs such as Word and Outlook, and both can take dictation and commands to operate Windows.

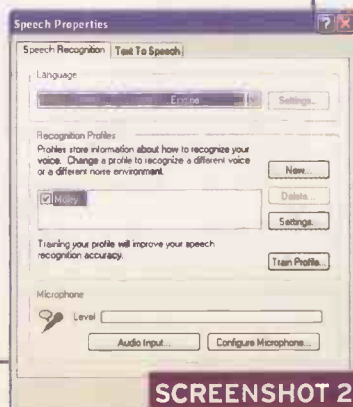
Dragon Naturally Speaking

DNS is probably the best-known speech recognition program currently available. Recently released in version 7,

Left: Install the speech recognition engine from the Office XP CD and you have a new item under the control panel. You'll have to practise your Yankee accent, though



SCREENSHOT 1



SCREENSHOT 2

'The quality of your headset, and particularly the microphone, is a key factor in the accuracy of recognition'

it comes in Essentials, Standard, Preferred and Professional editions, as well as special editions for the medical and legal professions. The cheapest of these, Essentials, costs around £40 at street prices, cheap enough for those who just want to try it out. At the time of writing, Dragon was also in the process of releasing its DNS 7 Mobile edition that comes with digital recorder optimised for performance with the DNS 7 Mobile software.

This edition concentrates on working with Internet browsers, such as Outlook and Outlook Express, but can also handle dictation into most Windows programs, including Word. Further up the ladder, the Standard edition adds in full integration with Word, Wordperfect and AOL.

The Preferred Edition includes support for Excel and for Pocket PCs. With this product you can record dictation into any Microsoft-compatible PDA and transcribe it directly into text when you get back to base. The PDA itself isn't powerful enough to handle speech recognition but, assuming you have the memory, it can record high-quality speech that DNS can translate. This edition typically costs about £120.

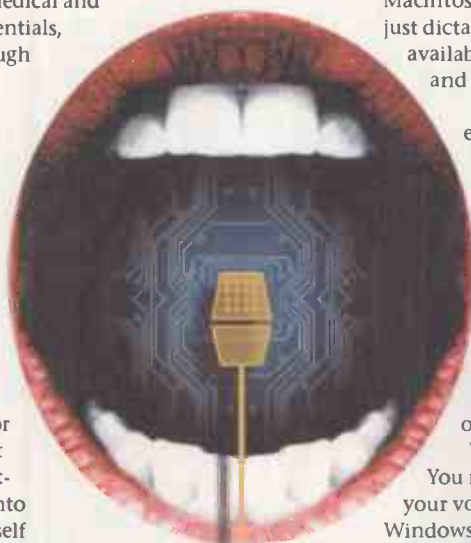
The top-end edition of DNS is Professional. It can do everything the cheaper products can, but also offers a scripting language, so you can create commands of your own to tailor the product to your specific requirements. This is the corporate and enterprise product and comes at a comparatively high price, in the region of £546.

All these editions of DNS require minimal training to get them going. A five to 10-minute session reading extracts from *Alice in Wonderland* or *Dilbert* will attune the software to your voice. You can do further training to improve recognition, but for most purposes the initial session will be enough to get you going.

Once you start the program, the Dragonbar floats on your desktop or attaches itself to the active window. Click into a supported application, such as Word, and everything you say appears as text directly in that program's editing window. In its normal mode, DNS can recognise the difference between dictated text and the simple commands it uses to navigate your document.

Commands such as 'New Paragraph', 'Move Down' and 'Move To End Of Line' enable you to move the cursor around your text, and basic formatting is also supported with commands like 'Bold That' or 'Indent That'.

When the program makes recognition errors, which it does surprisingly infrequently, you can say 'Select <word or phrase>' to call up a small correction window which, like a spellchecker, lists likely alternatives. If what you intended is still not there, you can say 'Spell That' to spell out the content and if necessary add new words to your personal vocabulary (see screenshot 4).



Viavoice

The main rival to DNS is Viavoice from IBM. For many people, this product may have been their first experience of speech recognition, as it used to be bundled with Lotus SmartSuite to add value to the integrated suite.

It's available in a number of different editions: Personal, Standard, Advanced and Pro USB. There is a version for Macintosh users and a simplified Mac version handling just dictation. The PC Personal Edition is not widely available, but the Standard Edition starts at around £25, and even the Pro USB Edition comes in at under £60.

This product includes a high-quality USB headset, especially geared to speech recognition. The quality of your headset, and particularly the microphone, is a key factor in the accuracy of recognition. Most approved headsets include noise-reducing microphones to increase the signal-to-noise ratio in the audio they produce.

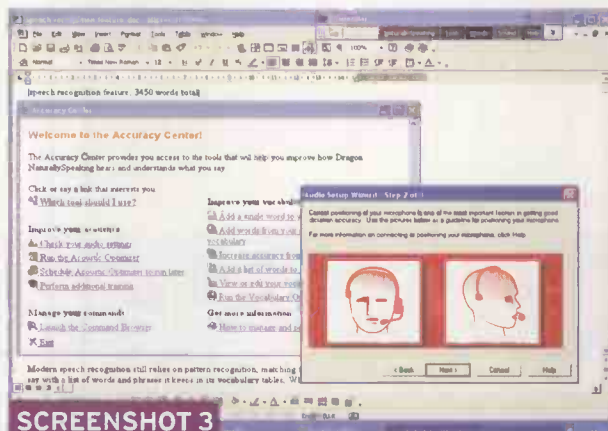
The latest version of Viavoice enables you to adjust for background noise sensitivity, which enables you to work with the program in comparatively noisy environments. This may be important if you're trying to use the program outside a typical office.

Viavoice is used in a very similar way to DNS.

You need to train the program first to get a feel for your voice, but after that you can work with most Windows applications, such as Office, Outlook, AOL and Netscape Messenger (see screenshot 5).

If you have a portable dictation machine, you can record into that while you're away from your office and transcribe your speech into Viavoice when you return. Currently, the program doesn't support transcription from PDAs.

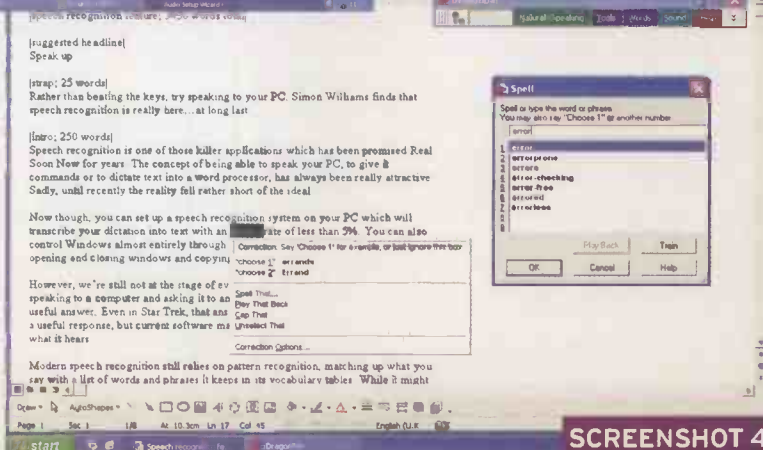
In a slightly bizarre move earlier this year, Scansoft, IBM's main product rival for Viavoice, took over the marketing of the IBM application in the UK.



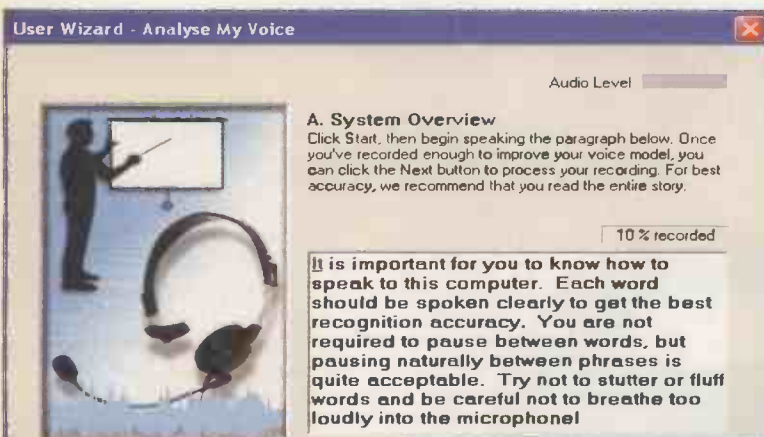
SCREENSHOT 3

Left: Part of the installation process of DNS is to set up your headset. Getting this right makes a big difference to recognition accuracy

Below: When you see an error in DNS, perhaps once in 20 words, you select the word and either replace it from the pop-up list or spell a correction from scratch



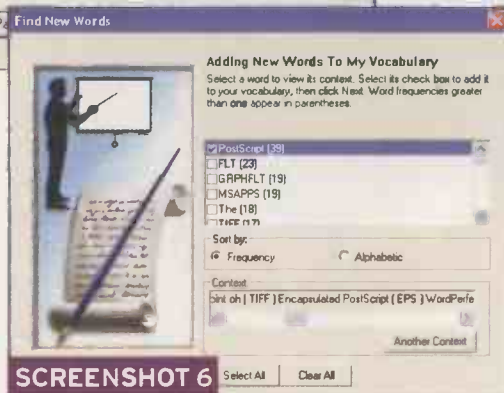
SCREENSHOT 4



SCREENSHOT 5

Above: The initial training of Viavoice takes around 15 minutes and involves nothing more than reading what you see in this little window

Right: Both Viavoice and DNS offer to look through your existing documents automatically to build your personal vocabulary – a very useful extra



SCREENSHOT 6

'The key to speech recognition is not to confuse recognition with understanding'

of us say 'thugh' and 'ugh' for 'the' and 'a' when speaking conversationally and in this form the two words sound more similar.

New intelligence built into the latest versions of these programs can also work against you, by trying to guess what you're saying. Although most of the time the algorithms get it right, some of the time you may get unexpected transcriptions, as the software misunderstands what you're getting at.

Special uses

Speech recognition for the able-bodied can improve productivity several times over, as with practice you can speak at up to 150 words per minute, faster than all but the fastest touch typist. For those with physical impairment, though, speech recognition can have far greater benefit.

There are many reasons access to a computer can be more than a productivity tool – it can be a lifeline to the outside world. For those who are not easily mobile and may not be able to type, speech recognition can hold out the possibility of normal interaction,

through the Internet and email, that would be hard or impossible using other technologies.

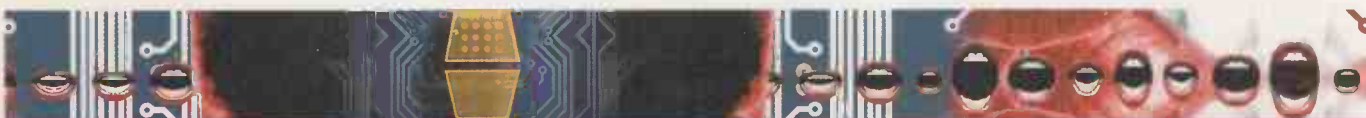
Many people may find it difficult to use a keyboard, but have no impairment in their ability to speak. You don't have to be severely disabled to have good need of speech recognition – for example, dyslexic people who find it difficult to use alphanumeric keyboards can interact easily with a system that requires speech only. Those suffering from repetitive strain injuries (RSI) may also be able to continue work by switching to a voice-input system.

The use of speech recognition can be combined with other technologies, such as text-to-speech, which will read

The tricky words

When you start to use speech recognition, with either one of these major products, you may be surprised where the recognition errors occur. Rather than having problems with big words, or even unusual names of places, people and products, these programs tend to confuse the little words.

You may well have difficulty getting the programs to understand the difference between 'the' and 'a', or 'from' and 'of'. They may sound like very different words when you say them individually, but in fact when spoken as part of a sentence, they can be very similar. For example, most



The Bluetooth connection

Dragon Naturally Speaking (DNS) and Viavoice both come with headsets geared for use with speech recognition. They need to have noise-cancelling microphones to ensure the speech gets through without a lot of extraneous background sounds. These devices are fine, but if you prefer to dictate while pacing up and down or need to refer to other materials, you may find a wire-free solution more convenient.

You have surprisingly few choices if you want to use your speech recognition software wirelessly. While there are several Bluetooth headsets to choose from, these are nearly all geared to working with mobile phones and few come with the necessary protocols to work with a PC, too.

One device that's been introduced recently is from Orange Micro, and is known as the Blue 2



(£95 ex VAT from Channel Dynamics; www.channeldynamics.net). This combines a rechargeable, round-the-ear Bluetooth headset with a USB-to-Bluetooth converter. Although it's a bit of a struggle to get installed and running, it will work with DNS and Viavoice. You can then move around freely within about 10m of your PC and dictate into Word or Outlook. The accuracy level is not as high as with a conventional cabled microphone, though.

By the time you read this, there are likely to be more Bluetooth devices available, as several are scheduled for launch by Christmas. Plantronics, probably the leading supplier of all kinds of headsets in the world, is due to offer a Bluetooth device, with both phone and PC protocols, so you can use it with your mobile as well as your PC.



back what you've dictated to check meaning or grammar. They can then be suitable for the visually impaired, as well as for the fully sighted.

Other uses

Speech recognition doesn't have to be confined to desktop or notebook PCs. Simplified versions, with vocabularies limited to the numbers one to 10 and a few single-word commands, have been used effectively to navigate menu systems over phone lines. BT used such a system to control its message-taking service, BT Answer 1571.

Mobile phone manufacturers have also introduced speech recognition to control functions such as fast calls to people on contact lists. Speaking to your mobile may not always be appropriate – such as in the quiet carriages of trains – but it can be a useful alternative to pushing buttons.

The key to much wider use of speech recognition in mobile devices is, again, computing power and memory. Handling the lookout tables for large vocabularies and being able to run the algorithms in reasonable timeframes are both directly related to these attributes. Speech recognition is already being run with Tablet PCs in specialist applications such as medical diagnosis, but then Tablet PCs are little different in specification terms from notebooks.

For a while, speech recognition was seen as a suitable technology for security uses. The use of voiceprints was going to be a quick and easy way to control access to secure locations. However, problems exist with the ability of one person to mimic the voice of another.

We may not all be members of the *Dead Ringers* team, but the voices of certain impressionists can be close enough to those of their targets to confuse voice print systems. More recent work on security recognition has focused on fingerprints, retinal images and face recognition.

Talking of the future

Speech recognition is already at a level that makes it a usable alternative to typing on a modern PC. As the hardware continues to advance, there's more headroom for increasingly sophisticated speech analysis, in shorter and shorter timeframes.

People want the text to appear in an application as near to instantaneously as possible and yet, at the same time, there are demands for the parsing to be more and more accurate. The only way these two demands can be reconciled is for more computing power to be thrown at the task.

This is less of a problem with current hardware, and we should expect to see speech recognition applications that achieve close to 100 per cent accuracy for general dictation. Most housekeeping tasks in Windows can already be handled through speech and Microsoft is likely to integrate its speech engine ever more closely with the workings of the operating system.

We're still a long way from being able to hold a true conversation with our computers, however, as the software currently knows very little about our world. It can recognise a comparatively small vocabulary of commands and act on them, but it can't work outside this restricted sphere of actions.

The first place we should start to see an expansion of speech recognition is in expert systems, such as medical diagnosis or car repairs. As with computing, the vocabulary is limited and can be controlled by an intelligent



The real hardware spec

For many software applications, the hardware currently available in an entry-level PC is more than enough to do them justice. You won't find any word processor or spreadsheet struggling on a 1.5GHz PC with 128MB of memory. Your speech recognition software may well feel uncomfortable, though.

Speech recognition is one of the few applications, like digital photography and digital video editing, which needs a strong PC specification to avoid problems. A speech recognition application is doing all its analysis in real time, so the clock rate of the processor and the amount of memory it has available for look-up tables are key factors in its accuracy.

Memory is much more important than simple processor power, and this goes for cache memory in the processor as well as main memory. You are likely to see improved performance from your speech recognition application when you run on a PC with a large secondary cache. The Pentium 4 or a newer Barton-based Athlon XP should give you better results than a Celeron or a Duron.

Scansoft recommends a 500MHz Pentium III or above and 128MB of memory as a minimum specification for running Dragon Naturally Speaking 7. However, when you look on any of the support websites for the product, such as www.knowbrainer.com, you see much higher specifications recommended. A 3GHz Pentium 4 or Athlon XP processor with 512MB of memory is a good system to avoid unnecessary recognition errors.

choice of questions. Even here, though, it will be some time before automated systems are consistently able to respond accurately to the words spoken by a variety of users.

The most likely incursion of speech recognition is into small devices, such as PDAs. In the future, these won't just act as recorders of speech, for later transcription on a desktop or notebook, but will be able to handle it themselves. A computer without a keyboard, such as a PDA, is an ideal client for a more convenient form of interaction.



PDAs are an ideal client for speech recognition

Careless talk improves lives

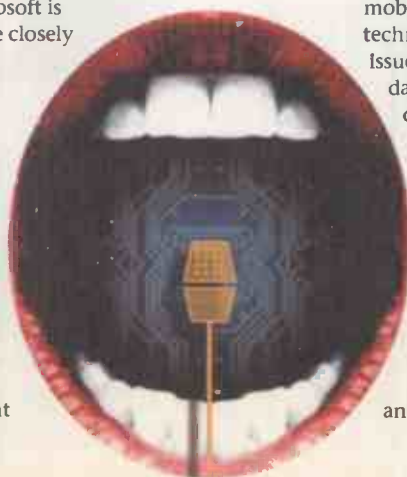
There's a good chance that, for many applications, speech recognition will become a core technology. The standalone applications such as DNS and Viavoice have reached a stage where they make very few mistakes in normal use and where the cost for the basic functions of dictation and Windows commands is acceptable for most people.

There are still issues of ease of use, with cumbersome headsets attached by wires to your desktop or notebook, but even this restriction could well be overcome with better designed Bluetooth wireless connections.

Wearing a miniature headset like those used for many mobiles so you can speak to your PC, will make the technology increasingly appealing. Although there are issues for people working with computers eight hours a day, as most headsets only offer three hours of use on a battery charge, these could be overcome with improved battery technology and second-generation Bluetooth chipsets.

Speech recognition really is coming of age. Although the last years of adolescence haven't yet produced a perfectly rounded individual, there's every sign this near-adult technology will become increasingly mainstream. When working out what it can do for you, the key is not to confuse recognition with understanding.

And, yes, this entire feature was composed, dictated and edited using speech recognition.



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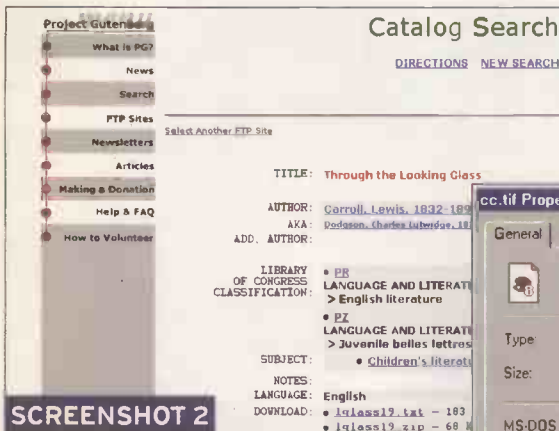
We explain how to protect website content and stay on the right side of the law

With vast volumes of creative content, from blogs and photos to MP3 music and streaming video, pouring onto the web every day, copyright protection has never been more important. Sadly, it's mostly misunderstood and often ignored, but the principles are quite basic. International law gives the creator of a piece of work the commercial rights to that work, and prevents others from using or selling that work without permission from the creator. 'Work' in this case can mean literary, artistic and scientific documents, representations, pieces of music or any other original creation that can be represented in a tangible form. For example, a song can be copyrighted, in both lyrical (printed) and musical (audible) form. A book can be copyrighted and so can a photo, a film and a computer image, but an idea cannot. You can protect some ideas using patents, but copyright only extends to tangible creations.

What you may not know is that copyright law extends to websites, including HTML coding, Javascript functions and graphics. You may find it easy to right-click on an image on a website and hit Save, with the intention of using the same image on your site, but if you do so you are breaking the law, albeit civil rather than criminal law.

And it's not just UK law you're breaking. Copyright law is enshrined in the Berne Union for the Protection of Literary and Artistic Property (see www.wipo.org/treaties/ip/berne), more generally known as the Berne Convention. Signatories to this Convention include all the major 'developed' countries of the world. The law itself will vary from country to country, but usually only in minor ways such as the expiry date for a piece of copyrighted work. Here we'll discuss how copyright law affects people running websites, in terms of what you can and can't copy from other sites and how you can enforce your own copyright.





SCREENSHOT 2

Copyright basics

In most countries, including the UK, there is no need to register the copyright of your work with a central agency. Copyright exists automatically as soon as the work is created and stored in some form. However, to prepare for any possible future disputes, it's a good idea to have some kind of proof that you created the work at a specific time.

One of the most popular methods of doing this is to send a copy of the work to yourself via registered post, in a sealed envelope.

Don't open the envelope when you receive it; keep it in a safe place and the postmarked, signed-for package will be your proof of copyright start date. You can do the same thing via email, if you send or 'cc' the document to yourself, although you should make sure that it actually travels through the Internet and isn't simply kept as a local 'sent' copy on your hard drive (see screenshot 1).

For example, the moment I finish writing this article and save it, my copyright ownership begins.

When I email the finished document to the editor of PCW and 'cc' it to myself, I have date-stamped proof of the start date of my copyright, which is valid until at least 50 years after my death (the length of copyright duration varies for print, graphical, audio and film media). PCW prints this article in the magazine under licence from me and pays me a copyright licensing fee for the privilege of doing so. If anyone infringes my copyright by copying this article for commercial purposes, including publishing it in other forms, I can take legal action against the infringing party for damages and costs. After the copyright time limit expires, the work is in the public domain (see screenshot 2).

Where websites are concerned, proving the creation date is even more straightforward. As long as the system clock on your PC – and, more importantly, on your website's server – is accurate, any file copied to it, directly or via FTP, will be given a time and date stamp. This is proof that the creation date for copyright purposes was no later than the date the file was uploaded. So it's relatively easy to establish when a piece of work was

Date: Mon, 8 Sep 2003 19:22 +0100 (BST)
From: alex@xxxxxxxxxxxxx.co.uk (Alex Cruickshank)
Subject: Confirming my copyright
To: andy@yyyyyyyyyy.co.uk
CC: alex@xxxxxxxxxxxxx.co.uk (Alex C. SCREENSHOT 1

Above: Send a copy of an email to yourself as proof of the copyright start date

Far left: It's more than 50 years since Lewis Carroll's death, so *Through the Looking Glass* is available for free at www.gutenberg.net

Left: Files created in Windows and most other operating systems have creation dates



SCREENSHOT 3

created and who owns the copyright (see screenshot 3).

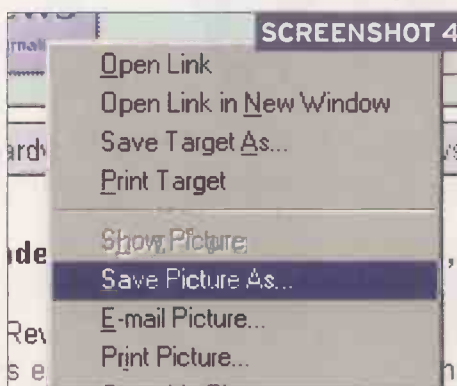
Even so, it's helpful to include the copyright symbol, owner's name and creation date, to reinforce the point and to make people more widely aware of copyright issues. The accepted method of asserting copyright in this way is to use the copyright symbol (©) or the word

'Copyright', followed by the date (usually the year will suffice, but for some fast-moving industries you might want to include the full date), followed by the name of the copyright owner, which can be a person or an organisation. So, either '© 2003 Alex Cruickshank' or 'Copyright 2003 Alex Cruickshank' is acceptable.

What you can't do

With this knowledge in mind, it should be pretty obvious that one thing you absolutely cannot legally do is copy a piece of work from another website and publish it on your own site without permission. This includes copying blocks of text, Javascript or other code, HTML structure (the tags themselves are not copyrighted, but any block of HTML code that produces a unique, 'creative' effect might be)

and, of course, graphical images and photographs. Internet browser software over the years has made it remarkably easy to copy text and images from websites (see screenshot 4). Arguably the developers should have been more thoughtful, because there are really very few situations in which such copying would be legal. Resist the urge



SCREENSHOT 4

Above: Should we thank Microsoft for including anti-copyright features in Internet Explorer?

Right: Amazon's content is republished here with permission, using its own page-ripping tool



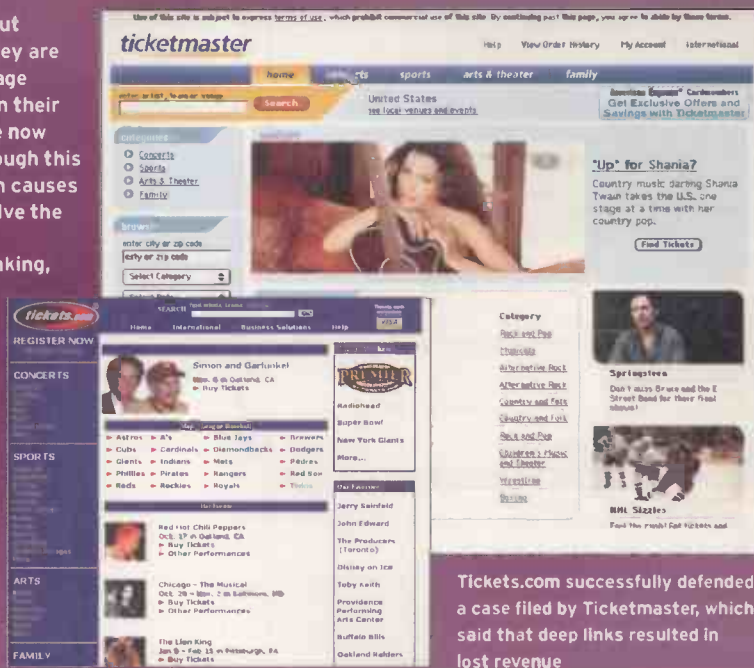
SCREENSHOT 5

Dangers of deep linking

In the past, linking to other websites wasn't a problem, but recently companies and individuals have realised that they are potentially losing advertising revenue through missed page impressions caused by people linking to specific pages on their site rather than simply to the home page. Some sites are now using frames in an attempt to prevent such linking, although this is an ugly and inefficient way of doing things, which often causes navigational problems while simultaneously failing to solve the deep linking issue.

Since there's no easy technical way to prevent deep linking, some companies are taking the legal route. Instead, with mixed results. In the US, Tickets.com won a case filed by Ticketmaster. The latter wanted to prevent the former from deep linking into its site, arguing that this might have presented a misleading impression to visitors as well as losing it advertising revenue by bypassing its home page.

Although Ticketmaster lost this case, there is scope for appeal and the phrasing of the ruling is a little ambiguous. In addition, an earlier case in Denmark ruled that deep linking was illegal, so the matter is far from settled and deep linking remains a grey area. If you are planning to deep-link into another company's site, to be on the safe side you should ask permission first.



to copy anyone else's content. They will have spent a lot of time and/or money creating it in the first place and they deserve to benefit from that process, as do you when you create something of worth.

Another method of copyright theft is so-called 'page grabbing' or 'page ripping', where a server-based CGI script, or similar method, is used to grab some content from another site, surround it with HTML code that looks like your site, and then publish it dynamically. Tempting as this may seem as a way to get cheap (ie free) content for your site, it is illegal without the written permission of the copyright holder (see screenshot 5).

The above two examples are pretty clear cut – you cannot copy or republish other people's work without the copyright holder's permission. Other forms of content management are rather more grey in legal terms. One of these is the practice of linking to other sites' content by showing their full pages within a frame. Ask Jeeves (www.ask.co.uk) still does this (see screenshot 6), but the practice is dying out as the target sites increasingly complain about it.

The usual method of framed republishing involves an HTML header from one site, beneath which is a frame containing the full page of the remote site. Initially this

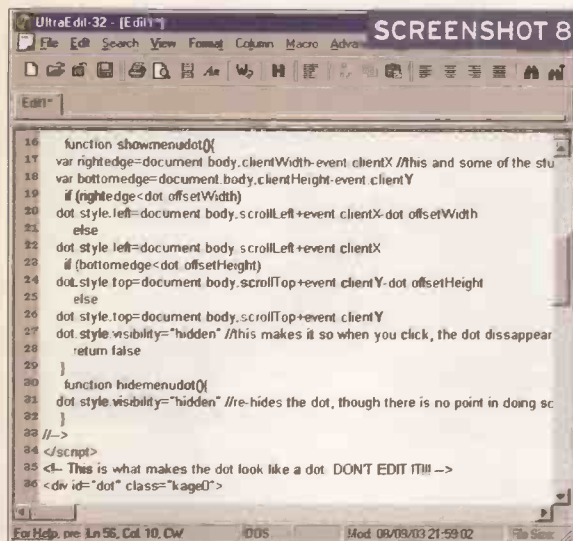
Framing content is still acceptable for search engines, but rarely for other sites

was grudgingly accepted because it at least showed the entire target page – advertisements included – but now it is believed that framing causes problems in two respects. First, there's the loss of revenue due to a reduction in the impact of page advertising, because more advertisements reduce the effectiveness of each individual advertisement. Second, this type of publishing implies that the content is owned by the framing site, which is misleading and the framing site is gaining market respect by doing this.

Another grey area is deep linking. For example, instead of linking to www.weselllotsofstuff.co.uk, you might link to www.weselllotsofstuff.co.uk/products/garden/mole_repellents/gnomes/with_fishing_rods.htm. You might think that the target site would be glad of the extra traffic, and in some cases you would be right. However, disputes are currently making their way through various international courts (see box above) because deep linking could lead to a loss in advertising revenue for the target site. For example, in the above case, we have effectively cut out the 'products', 'garden', 'mole_repellents' and 'gnomes' category pages, not to mention the home page. That could equate to five lost

Your past could come back to haunt you, although Internet Archive doesn't store all images





JavaScript code can prevent right-clicking and protect your images

Usually you will have to pay for a copyright licence. The exact amount is entirely a matter for you and the copyright holder, and will depend on the value of the content to you and the value of uniqueness to the copyright holder; if their work is republished on many sites, they may feel it is commercially devalued, as people won't be so keen to visit their own site. There's plenty of scope for negotiation, though, and you may find that in some cases a link back to the originating site will be enough, particularly if your site has considerably more traffic than that of the copyright holder.

If you are licensed to use the work on your site, you should still – unless the licence explicitly waives this requirement – include the copyright symbol, the date of the copyright and the name of the copyright owner somewhere near it, so that it's clear that you are licensing the work.

Exceptions to the rule

There are some circumstances in which you can use another person's or company's work without a licence without infringing copyright. For example, if you are reviewing, criticising or satirising it, you can include fragments to illustrate your point. Exactly how much you can include isn't set in stone, but the term for this sort of

page impressions per user, with the associated loss in advertising revenue.

As these two methods of linking could place you on legally unsafe ground, your best bet is to make sure you get written permission from the webmaster of the target site before including any deep links on your site.

Perhaps you're thinking that you could infringe someone's copyright and then quickly remove the offending content from your site if anyone complains, claiming it was never there. Think again. Copies of your site's pages are stored in caches held by search engines, users' browsers and non-profit

organisations such as the Internet

Archive (www.archive.org). Try

as you might, you won't be able to delete every copy

from the Internet. Even if

you did, the company

hosting your site will

have monthly, weekly

or even daily backups

archived away. The

much-vaunted

immediacy of the

Internet is a fallacy in

this respect. Just as old

emails can come back to

haunt you, so you can

never completely remove the

traces of something you've

published on a website (see

screenshot 7). If the case went to court, you could be found liable for backdated licensing fees and – what is likely to be more expensive – damages and costs. It's not worth the risk.

What you can do

You can use other people's material on your website as long as you have written permission (an email should suffice) from the copyright holder. When this happens you will become a licensee of that copyrighted work. The terms of the licence will vary depending on what you and the copyright holder have negotiated, but usually you will have a single-use, non-exclusive licence. This means you can republish the work once and that you do not have an exclusive licence, so the copyright holder is free to license the work to other people too. Generally you will not be able to resell the work to other people, since the copyright remains with the owner.

'You can use fragments to illustrate a point, but exactly how much you can include isn't set in stone'

usage is 'fair use', which will give you an idea of what's involved. A few seconds of music from a song, a few lines of a poem or a few paragraphs from a book are unlikely to cause problems, but republishing larger pieces from a work is likely to exceed the limits of 'fair', so you'll have to use your own judgement.

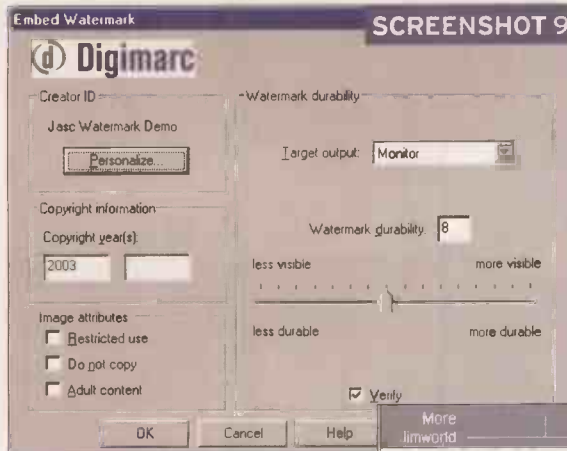
This is an area in which you might like to contact the copyright holder beforehand and let them know your intentions. Often they will be happy to let you use larger sections of their work if they think it will increase its commercial or artistic value. But for fair use, it isn't legally necessary to inform the copyright holder. For example, although we've included screenshots of some

Copyrights and patents

While you can copyright the tangible implementation of a piece of work, you can't copyright the idea behind it. This means you could copyright the actual code behind your snazzy dropdown Javascript selection menu, but not the idea of such dropdown menus. Patents do allow you to protect ideas, but this generally only applies to specific new inventions in their entirety, rather than individual components.

However, things could become more complicated in the near future, as the EU debates whether or not to introduce patenting laws in Europe that would cover software designs. Although it might be stretching the proposals a bit far, it is possible that under the new laws any kind of software idea, such as a dropdown box, could be patented by the first company that used it, leading to massively increased licensing costs for anyone wanting to use a similar system.

At the time of writing, the proposal is being reconsidered in the light of heavy lobbying by scientists, businesses and other interested parties. For the sake of continued competition, especially for smaller businesses, a significant redraft of the original bill would be a desirable outcome. The alternative is a patents system such as that in force in the US, where Amazon.com was able to patent the idea of a one-click ordering system, preventing others from using a similar cookie-based checkout routine without paying a licensing fee.



Left: Adding a watermark to an image in Paint Shop Pro will help prove you own the picture

Below: Some mildly encrypted HTML code may prevent page rippers

and Paint Shop Pro. This won't stop people copying your images but it will help you prove ownership if you find someone else using them (see screenshot 9).

As far as text content is concerned, there are two main methods of protection. The first again uses Javascript, this time to encrypt the HTML page content and the decrypt it 'on the fly'. This is useful for preventing people setting up automated page rippers to steal your content, but any competent programmer will still be able to overcome the protection without too much trouble. A search for 'HTML encrypt' will produce a list of suitable programs, some of which work online and cost nothing. The levels of encryption vary from basic obfuscation to clever routines to prevent offline browsing, inward linking and code viewing (see screenshot 10).

A more effective solution is to serve your text content as a graphical image. Software is available to do this, although it tends to be expensive and usually sold as part of a large-scale content management system. It also raises accessibility questions and, like the Javascript option, prevents search engines from successfully spidering your site, at least without some kind of agent-detection system.

If someone contacts you and asks to license your content, it's up to you to negotiate a price and structure that doesn't reduce the value of your work. Copyright licensing contracts can be pretty

simple affairs, but it might be best to get a lawyer involved to make sure you haven't missed anything out. Keep your licensing costs fair and reasonable to encourage more licensees and reduce the risk of copyright theft. Arguably it's the high licensing costs for published music that has led to such widespread piracy of songs via MP3 and other formats. And remember, licensing only allows the other party to use the content for one purpose. They can't resell it or otherwise profit by it except in accordance with the terms of the licence.

Final word

Copyright law is mostly about common sense and allowing people to benefit financially from work that they have taken the time and effort to create. If you keep that in mind, you won't go far wrong. Make sure you have written permission to use any material that you find on other people's websites and do the same for deep linking, framing, page ripping and other potential causes of copyright infringement. If you're worried about copyright pirates stealing your work, there are some steps you can take to prevent it, but these should be thought through carefully as none is without at least one significant drawback. With a little thought, copyright law can be made to work well for you, allowing you to carry richer content on your own site while simultaneously benefiting from licensing fees charged for your own original work.

And remember that international law is on your side – you have the right to gain commercially from your own work.

websites and products in this feature, we haven't contacted the owners beforehand, because this is fair use (we're effectively reviewing them) and it is also likely to enhance the commercial value of those sites and products by increasing people's awareness of them.

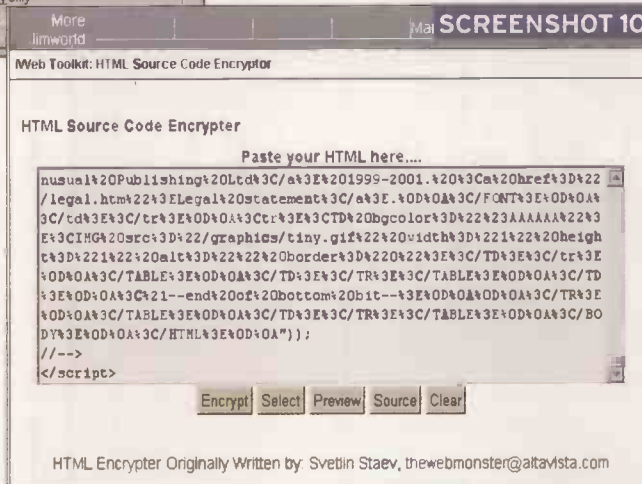
Fair use also extends to education. Teachers can make limited numbers of copies of some copyrighted material for use in lessons and lectures. The terms vary depending on the item being copied; a good resource here is your local library, which should be able to tell you what the individual restrictions are. As a general rule, items with Crown copyright can be more freely copied than private or commercial works, but there are exceptions. Here again you should always credit the source and the copyright holder when quoting from or referring to such works.

Protecting your own copyright

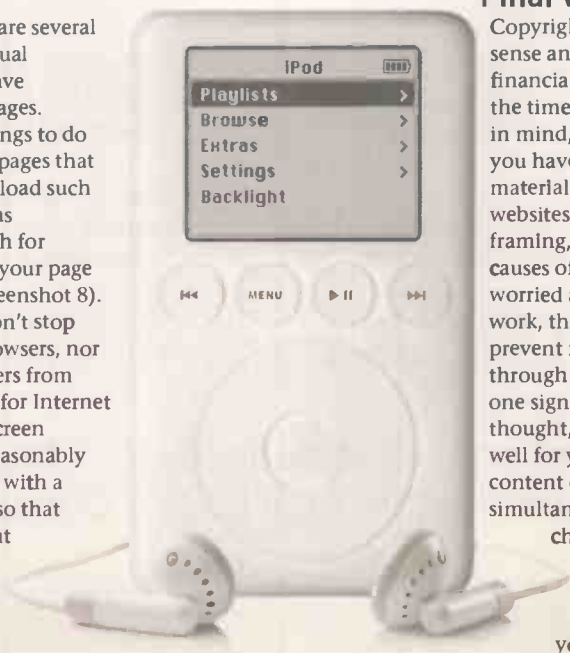
Having gone to all this trouble to ensure that the third-party content of your website is legitimate, it's time to look at the other perspective: how do you protect and license your own original work?

Starting with the protection aspect, there are several steps you can take to reduce the risk that casual copyright thieves will steal your work. All have advantages, but they also all have disadvantages. Starting with images, one of the simplest things to do is include a piece of Javascript code on your pages that disables the right-click menu. You can download such a script from various web repositories, such as Hotscripts.com (www.hotscripts.com – search for 'anti right click'). Embed this somewhere in your page and voilà, your images are protected (see screenshot 8).

Except that they're not, of course. This won't stop people with Javascript turned off in their browsers, nor will it prevent users of non-Microsoft browsers from right-clicking, since the code is usually only for Internet Explorer. And it won't stop people doing a screen capture, either. One other trick, if you're a reasonably capable HTML coder, is to overlay the image with a completely transparent gif of the same size, so that right-clicking only saves the blank image, but again this won't stop the dedicated, only the casual. Perhaps your best option is to embed watermarks in your graphics files, something that can be done by Photoshop



Have you paid for the music you copy onto your MP3 player or iPod?











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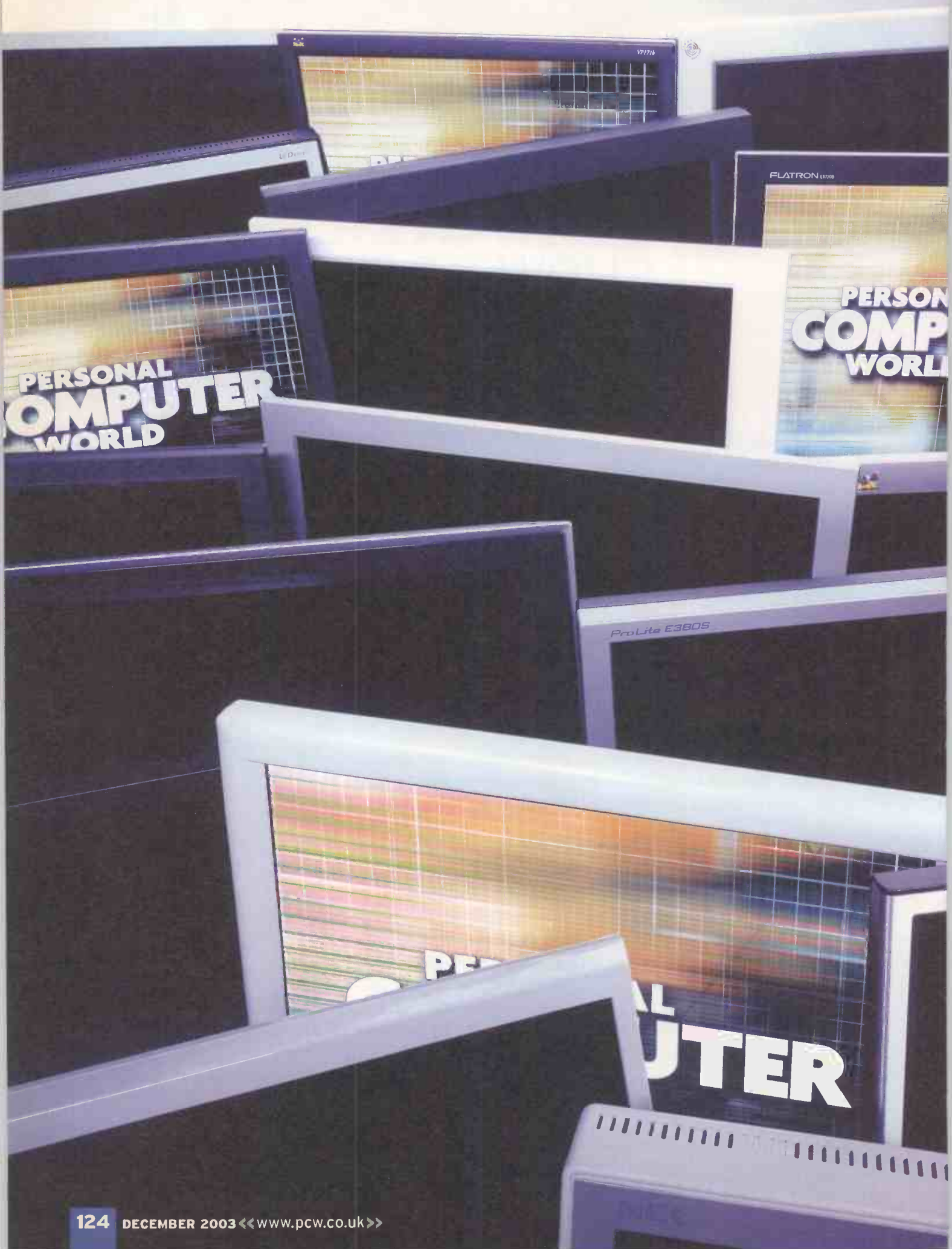


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Saving space with a TFT monitor doesn't cost as much as it used to, so whether you're looking for an entry-level budget model, or an all-singing, all-dancing display, we've tested and reviewed 24 15in and 17in panels to help you choose

24 TFT monitors

WORDS: KEN MCMAHON, JALAL WERFALLI TESTING: VNU LABS PHOTOS: BRUCE MACKIE

It's no secret that TFT flat panels are gaining ground on CRT monitors at a rate that could soon render them obsolete. According to data from market research company Meko, in 2002 TFT panels accounted for 30 per cent of the European monitor market, with 17in flat panels alone making up 10 per cent of the figure.

The arguments for replacing CRTs with TFT flat panels are compelling. LCDs are smaller and lighter, consume less energy, produce less heat and radiation, are truly flat and, in some cases, picture quality is superior to CRTs. Only in the area of desktop publishing, according to purists, can a CRT monitor provide more accurate colour matching.

The final barrier to mass adoption of TFT panels, price, is also fast disappearing. With some 17in TFT displays retailing for as little

as £250 and budget 15in models costing around £150 ex VAT, TFT panels are no longer considered an extravagance. And while it's true that prices of CRT monitors have also dropped, the differential is now much narrower.

For individual consumers, system builders and corporate buyers TFT panels are no longer a luxury, but rather a practical and appealing alternative to the CRT behemoths of the late 20th Century.

In this group test we've evaluated a total of 24 TFT panels in the 15in and 17in category covering every possible requirement from basic entry-level analogue models to top of the range displays with multiple analogue digital and video inputs, USB hubs, speakers and pivot displays. So if you're looking to upgrade and join the space-saving style brigade read on and let us help find the monitor for you.



15IN



ADI Microscan i500

The i500's brushed metal look makes a change from the plastic designs on test elsewhere, and a 'feature' box that clips onto the cone-shaped stand offers a four-port USB2 hub, line-in and headphone jacks, plus a pair of speakers.

Audio quality is the best on test thanks to SRS Labs' Wow and Trubass enhancements, activated by small buttons on the side of the box. Optional feature boxes include a TV-tuner and DVD player version.

A piston-like neck raises the display by 11cm. It can be tilted 90 degrees backwards and swivelled, but the feature box blocks the full swivel range.

Aesthetics have been addressed well, but image quality achieved low scores in colour and greyscale tests. Unrealistic photographic and DVD rendering hampered the i500, while viewing the screen past 50 degrees or so from the side saw a drop in illumination, though banding was kept under control.

The on-screen display (OSD) controls consist of three vertically mounted buttons under the slim bezel, offering easy access to the 10 sub-menus, graphically arranged in a circular fashion. No dedicated auto-adjust button exists, but this function is nested in the OSD along with the ubiquitous position, clock and phase settings.

DETAILS

RRP £269.99 (£229.78 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

0870 444 1895 www.adluk.com

PROS Audio quality; design; USB2 hub; adjustable height, swivel

CONS Image/DVD quality; horizontal viewing angle; no DVI

VERDICT

Excellent features, but ultimately let down by image performance

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

15IN



Belinea 10 15 51

As one of eight analogue-only panels this month, the 10 15 51 is best described as middle of the road. Nothing really stands out, apart from a narrow silver bezel and a pair of speakers that produce relatively punchy sound.

Construction is plasticky and, like its 17in cousin, the stand is too light and won't stay put when you try to move the stiff tilting screen. The screen can't be raised or swivelled, and there is no headphone socket.

After downloading and installing the drivers, the Belinea put in an average performance in our subjective quality tests and only did well in the banding test. Our photo, though bright, looked washed out and lacked the tonal range we saw in other models. Skin tones in the DVD movie appeared unnatural, and you can forget about looking at the screen past 30 degrees from centre, as the horizontal viewing angle is one of the worst we've seen.

The OSD is intuitive and nearly identical to the LG's. The only real differences are the words 'warm' and 'cool' when denoting preset colour temperatures of 9,300K and 6,500K respectively, and the volume controls. A dedicated auto-adjust sits on the fascia and worked well when the picture became a little noisy.

DETAILS

RRP £244.40 (£208 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

01344 788 900 www.belinea.co.uk

PROS Narrow bezel; intuitive OSD; speakers; bright

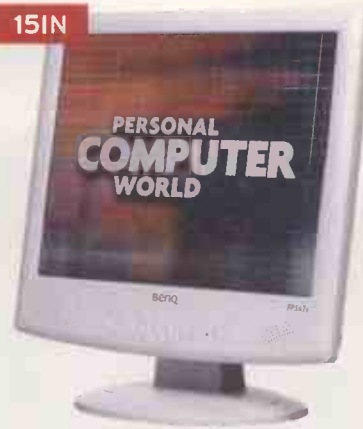
CONS Stiff stand; driver download required; viewing angle

VERDICT

A below average set of results makes this product unremarkable and pricey

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

15IN



Benq FP567s

Benq and Sharp have both hit the same price point this month, but when it comes to looks we know which one we'd choose. The FP567s is not the most attractive unit here and the beige exterior coupled with a rather dated look doesn't do it any favours. It also has a captive D-Sub cable so if this develops a fault you have to give Benq a call.

On the upside, there's a pair of speakers that equal those of the Belinea – reasonably loud but a little bright. That said, you'll have to fiddle around the back to find the line-in jack, and you won't find a hole to plug your headphones into. There's no swivel or height adjustment, but at least there's enough weight in the base to keep the FP567 steady when you tilt it back.

Overall, the FP567 did well in three areas. First, there were minimal signs of banding, second DVD and photographic quality was commendable, and third you won't find a simpler OSD in the test. Shortcut keys to the brightness and contrast double up as selectors and the exit button allows you to do just that from anywhere within the uncomplicated on-screen menus (OSMs). Nevertheless, compression and uneven colour and greyscales held the monitor back.

DETAILS

RRP £219 (£186.38 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Benq 01442 301 000

www.benq.co.uk

PROS Speakers; OSD;

DVD/photo quality

CONS Captive D-Sub cable;

compression in scales

VERDICT

One of the cheapest, but also one of the least desirable

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

15IN



Eizo Flexscan L367

The L367 is the most expensive 15in flat-panel here, but you do get more for your money. Next to the D-Sub port is a DVI-D one that allows you to hook up to a DVI-enabled graphics card for a pure digital signal. But like the NEC and Philips units there's no DVI cable in the box, leaving you to buy one for around £25.

A pair of integrated speakers sound better than those in the Benq and Belinea models, and a front-mounted headphone socket is also included. The L367 can be raised 5cm, but the springloaded neck fires upwards upon the lightest of touches.

The CD contains software for assigning contrast and brightness levels to single applications. If you're watching a movie in one window and working in another, it can brighten just the movie. You can use your keyboard to control OSD settings, but you must connect the upstream USB port with your PC using the provided cable.

While the cream chassis and somewhat flimsy build quality are a bit questionable, colours are rich, scales smoothly graduated and the viewing angle superb. An sRGB setting, contrast modes for photographs and text, plus colour temperature and saturation modes are all there in the easily navigable OSD.

DETAILS

RRP £304.33 (£259 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Eizo 01483 719 500 www.eizo.co.uk

PROS DVI-D and D-Sub; picture quality; height adjustable; software
CONS Expensive; build quality; no DVI cable

VERDICT

Excellent image performance, if money and styling are of no consequence

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

15IN



Hitachi CML154XWB

Hitachi gets off to a bad start by internally connecting the D-Sub cable so, like the Benq, if something goes wrong with it you can't swap it out. However, the CML154XWB's black design is clean and the build quality is solid. The bezel is not the slimmest, but stereo speakers can be found in the lower corners. Sound quality is comparable to that of the Eizo, but begins to distort when the 'old school' volume wheel is turned too much. A headphone socket is also mounted under the lower part of the fascia.

It's not the best performer, with our viewing panel giving low scores for evident banding, and uneven colour and greyscales. However, DVD playback was smooth and warm, and it turned out to be one of the brightest displays here.

On the OSD front, a confusing set of dual-purpose buttons make travelling around the OSMs a chore. With four sets of buttons, all labelled with left and right arrows, it's easy to adjust a setting when all you want to do is select one. Scrolling to the end of each submenu to exit doesn't help matters either. Even so, the usual functions are there, along with a dedicated auto-adjust shortcut, saturation and hue settings, and individual RGB tuning.

DETAILS

RRP £252.63 (£215 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Hitachi 01628 585 000

www.hitachidigitalmedia.com

PROS Bright display; DVD playback; speakers
CONS Captive D-Sub cable; banding; uneven scales; OSD

VERDICT

A bright display, yet offers no more than the cheaper Benq

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

15IN



Iiyama ProLite E380S

The E380S is clad in an attractive silver chassis with a narrow bezel. The panel sits rather low on the desk and has no height adjustment if you want to minimise neck strain. The screen also tilts back past 90 degrees, but as the unit only weighs 2.3kg it will topple over.

The E380S is powered by an external adaptor, which might put off anyone after a clear desk. The speakers are the weakest in the group, but give enough volume to work with. An easily accessible headphone jack is mounted on the underside of the bezel. The brightest display here, it handled the colour and greyscales with finesse. As for the DVD movie and photo, colours were rich. A hint of banding is the only grumble.

Three main menus and no descriptions make finding what you want tricky. To access the submenus you have to press the menu key, then scroll to the setting you want, press the menu key, then adjust. To get out of the OSD you then have to scroll again to an exit icon, then press the menu key twice. That said, you do get a dedicated auto-adjust button together with an sRGB mode, adjustable colour temperatures modes and presets, plus brightness/contrast settings for pictures, text and reduced power consumption.

DETAILS

RRP £233.83 (£199 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Iiyama 01438 745 482

www.iiyama.co.uk

PROS Very vibrant; smooth scales; price

CONS Power adaptor, fiddly OSD

VERDICT

The competitive price and dynamic Image Vibrancy add up to a Highly Commended buy

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



LG Flatron L1510P

The L1510P featured in our group test in March, when it gained one of our Highly Commended awards. However, the price has since dropped to a competitive £257.33 and, considering what it has to offer, this is an excellent buy.

With D-Sub and DVI-I ports, a press of a button selects the active signal source, and thumbs up to LG for the DVI cable.

You can pivot the LG to a portrait orientation and rotate the desktop using the Pivot Pro software. It can be raised 7cm with the stand's hinged neck. A side-mounted two-port USB hub is a bonus.

Image quality results reveal a sharp display with minimal signs of banding and smoothly transitioned colour and greyscales, only bettered by the more expensive NEC and Eizo units. Watching the DVD movie is quite acceptable, and the photo looked realistically saturated. Viewing angles come close to LG's figures.

A dedicated auto-adjust button efficiently resets the screen, while the clear menu layout holds all the typical adjustments such as phase, clock, brightness, contrast and colour temperature. There's even a timer that records the number of usage hours, and colour calibration is helped along with the bundled Colorific software.

DETAILS

RRP £257.33 (£219 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

LG Electronics 0870 607 5544

www.lge.co.uk

PROS D-Sub and DVI-I; pivot; USB; height adjustable; DVI cable

CONS No speakers

VERDICT

Everything you want from a 15in TFT, and more. This monitor deservedly wins Editor's Choice

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



NEC Multisync LCD 1560VM

Many will find the 1560VM's chassis a bit too bulky, but it is height adjustable through 10cm and, although spring-assisted, it's not as smooth as the ADI. It stands at an impressive 42cm from the desk to the top of the screen, giving the user a comfortable eye-level view. Part of the bulk derives from the integrated power supply, but the majority of panels here also have those, yet still have sleeker profiles.

Looks aside, the 1560VM is D-Sub and DVI-D enabled so, for a crisper digital image, simply sit back and let it auto-detect the signal (providing you've forked out for a DVI cable). The stereo speakers sound tinny, like most panels, but the quality is in fact second only to the ADI. There's no USB hub, but you do get a front-facing headphone socket.

All the buttons are discretely placed along the bezel's periphery and navigating the OSD is intuitive. You'll find an sRGB mode, plus four fully adjustable colour presets. You can also opt to download Naviset if you want mouse-controllable screen settings.

No signs of banding, excellent colour reproduction and a vibrant image give the 1560VM a high overall score, but it's one of the more expensive units on test.

DETAILS

RRP £280.83 (£239 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

NEC-Mitsubishi 08701 201160

www.nec-mitsubishi.com

PROS Height adjustable; DVI-D and D-Sub; excellent picture; speakers

CONS No DVI cable; bulky; price

VERDICT

A competent display, but the LG's looks and price steal the show

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



Philips Brilliance 150P4CB

The 150P4CB is a compact unit with a rather stiff double-hinged neck that allows the panel to be raised through 7cm. There's no swivel, pivot function, or speakers, but there is a DVI-D and D-Sub port. Disappointingly, Philips has left out the DVI cable and only includes a VGA one, despite the fairly high price.

Finding your way around the menus is helped by the instinctive layout, an 'OK' button for quick exiting, and a useful manual found on the CD. Here you'll also find the Lightframe software that's typically used with Philips CRTs. Once installed, this version of Lightframe is designed to boost the brightness and contrast in up to three windows at a time or up to 14 images in Internet Explorer. However, its usefulness in a relatively bright LCD is questionable, although it did bring out some detail in dark images.

The 150P4CB rivals the Eizo when it comes to horizontal viewing angles, but vertically these are quite narrow, with a drop in illumination occurring with a straightening of one's back. Minimal signs of banding and good DVD and photo reproduction make this a capable display, but there is evidence of compression at the dark ends of the colour and greyscales.

DETAILS

RRP £285 (£242.55 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Philips 020 8781 8372

www.consumer.philips.com

PROS DVI-D and D-Sub;

Lightframe; OSD; height adjustable

CONS No DVI cable; expensive; vertical viewing angle

VERDICT

A decent performer, but without a DVI cable it's a tad expensive

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



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COMPUTERS

www.ghc.co.uk

Insight

www.insight.com/uk



Sharp LL-T15A4-B

There's no denying the LL-T15A4-B is a compact unit – it occupies a very small footprint and the thin black bezel borders the picture beautifully. Having said that, it also sits extremely low on the desk, and we found ourselves uncomfortably looking down on the display, while yearning for some form of height adjustment.

Feature-wise, the speakers are loud and clear but not as crisp as those on the ADI or NEC. It lacks a DVI port, USB hub and pivot function, but the tilt function is smooth and you can plug in a set of headphones.

Five square buttons cover power, left and right adjust/volume, menu access and mode select. The latter offers three luminance settings: standard, office, and vivid. The rest of the OSD is laid out in a confusing way and takes some getting used to, but you'll eventually find the usual settings, albeit worded differently to the norm ('black level' for brightness, 'white balance' for colour temperature, and available settings of 'cool', 'standard', and 'warm').

Performance is somewhat varied. Whereas banding was non-existent, the photo and DVD image was a little too pastel for our liking, and the whole screen is one of the darkest on test.

DETAILS

RRP £219 (£186.38 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Sharp 01923 434 647

www.sharp.co.uk/lcdmonitors

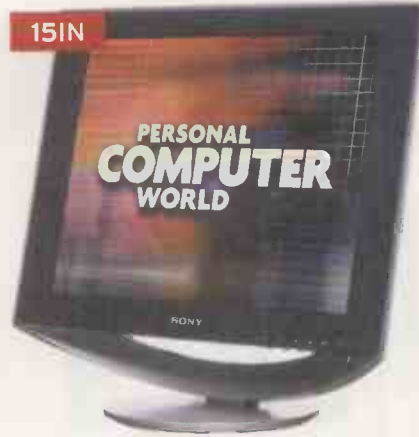
PROS No banding; speakers

CONS Low stand; the least bright screen here

VERDICT

A good price with an average performance, and a stand that is too low

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



Sony SDM-HS53

Sony has typically gone for something a little different. Using the same sized panel as all the other manufacturers, the two-toned unit has a smoked glass-like bezel that gives the display an almost widescreen feel. Couple that with a stand that has a parabolic curve to its neck and you have a display that certainly stands out. There's also a plastic cover that pushes into the back to cover the unsightly D-Sub and internal power cables.

Although there's no swivel, pivot or height adjustment, Sony has made a stern effort on the image quality front. Overall it came fourth – a result of excellent DVD playback with realistic skin tones and a vivid rendition of the test photo. Banding was almost negligible, and colour and greyscales evenly stepped. The only gripe is a low ranking score in the measured brightness test.

You can alter the backlight level using one of the buttons mounted along the right-hand underside of the bezel. The other four buttons lead you into a clear OSD, with settings for colour temperature and adjustment, gamma, and an OSD lock facility. Viewing angles in both planes are wide enough for a small group to gather round, but the bezel is prone to reflections.

DETAILS

RRP £269.08 (£229 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Sony 08705 424 424

www.sony-cp.com

PROS Image performance; design

CONS Reflective bezel; no DVI; lack of extra features

VERDICT

A set of speakers and a DVI port would have secured this product top spot

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



Viewsonic VE155s

The Viewsonic VE155s is the most basic flat-panel here. You won't find speakers, a USB hub, or DVI port, and even the D-Sub cable is of the captive variety. The stand is pretty simple too with no height adjustment, pivot or swivel functionality. The panel can of course be tilted, but in doing so we needed a firm grip on the base.

However, with plainness you sometimes get simplicity, and this is certainly true for the OSD. Four simple buttons mounted on the front of the silver coloured fascia work together to offer a no-fuss method of steering your way around the menus. You might wonder what buttons '1' and '2' do at first, but the prompts in each OSM soon teach you. Button '1' gives access to the OSD, and '2' acts as a selector, while the two arrowed buttons let you scroll through or adjust the settings. '2' also instigates the auto-adjust function. Other settings include fine-tuning and sharpness control.

Like its understated specification, overall performance was ordinary. It didn't really excel in any particular test, but it also didn't underperform. Banding was slightly noticeable, but did outperform the ADI, Iiyama and the Sharp in our subjective photo and DVD tests.

DETAILS

RRP £233.83 (£199 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Viewsonic

01293 643 900

www.viewsoniceurope.com/uk

PROS Simple OSD; solid stand

CONS Limited features

VERDICT

A very basic monitor, which is outshone by the competition in this test

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



Belinea 10 17 25

The first of our 17in models, the 10 17 25 is an analogue panel with 1w stereo speakers. It's finished in silver and looks clean and modern, but the lightweight stand doesn't swivel and tilting is a two-handed job, so this isn't a good choice if you'd like to be able to share your view.

There's no software included in the box, so if you want to use the Belinea drivers you must first download them from the FTP server of European distributor Maxdata.

In addition to the integral power cable, the back panel houses both an audio and headphones socket. These are poorly labelled, not colour-coded, incorrectly identified in the manual and difficult to access. At full volume, the twin speakers are surprisingly loud, but harsh and distorted at anything above 50 per cent.

Though the Belinea did poorly in our quantitative tests, it fared much better in our viewing panel. On both the factory default and 6,500K settings, colours looked natural. Horizontal viewing angle was good, but illumination dropped off fairly rapidly above and below the centre line.

The OSD is easy to use, thanks to the seven-button panel and annotated icons, but placing the power button in the middle seems an odd choice.

DETAILS

RRP £338.64 (£288.20 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Belinea 01344 788 900

www.belinea.co.uk

PROS Modern-looking; good OSD

CONS Narrow vertical-viewing angle; difficult setup

VERDICT

An average performer, with some niggling design faults

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



Cornea CT1702

The CT1702 is big for a 17in panel; it has a wide bezel and the bottom edge, which houses the speaker grille, almost sits on the desk. The black and silver design looks modern and striking. The tilt stand can be pretty unstable beyond about 15 degrees, but you shouldn't need to tilt it that far for normal use.

This panel positively bristles with inputs. In addition to a DVI and analogue port (with cables supplied for both), there are S-Video and composite video sockets so you can connect a camcorder, camera, VCR or DVD player. There's also a four-port USB hub. The USB and video connectors are conveniently located on opposite sides of the case.

The panel isn't auto-sensing, but cycling through the input options is a one-touch operation. The 2w speakers are very loud. Indeed, and the sound quality is, for a monitor, very good and easily adequate for presentations to small groups.

The Cornea fared badly in the quantitative labs tests, coming near the bottom of the pile on contrast and brightness tests. Although it was one of the sharpest panels tested, it was not a favourite among the members of our viewing panel, scoring 19 out of 30.

DETAILS

RRP £399 (£339.58 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Anders Electronics 020 7380 8181

www.anders-electronics.com

PROS Lots of input options; audio

CONS No auto-sensing; stand can be unstable

VERDICT

Good-quality display, with plenty of connectivity options

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



CTX PV 722E

The PV stands for pivot, so using Portrait Displays' pivot software, you can rotate this panel 90 degrees clockwise and have a portrait display rather than a landscape one, which is useful for lengthy Word documents and Excel tables.

In the past, pivot displays haven't proved all that popular; CRT monitors were too big and heavy, and flat panels worked best the way they were designed to, but the wider vertical viewing angles of recent displays make pivoting more practical.

The Pivot isn't the 722E's only feature. It includes a four-port USB hub, supplied as a separate box that slots into the rear of the stand, and is powered, in a slightly Heath-Robinson fashion, by a branch line off the main power lead. The two video inputs – one analogue, one digital – share a circular detent in the back panel with the power socket. There's also a stereo speaker module that plugs into the base of the display.

Interestingly, the 722E employs the same OSD as the budget CTX panel reviewed here – the S700A – so options for tweaking are limited to contrast, brightness and colour temperature settings. Overall, picture quality was good and, unlike the S700A, the 722E had no difficulty distinguishing colours in the shadow tonal range.

DETAILS

RRP £410.08 (£349 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

CTX 01923 810 821 www.ctxeurope.com

PROS Pivot display, dual-inputs; detachable USB hub and speakers

CONS No auto signal-sensing; can't swivel

VERDICT

Good performance and features, but clunky and heavy design

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



17IN



CTX S700A

The CTX S700A is about as basic as it gets for a 17in display, except that it has built-in speakers. These are hidden away behind grilles underneath the front bezel, which does little for the already poor sound quality.

The volume is better on this model than on the Sharp T17D4, and there's a colour-coded audio cable but no headphones socket. Setup is straightforward and the video cable is hard wired; all you have to do is connect it to the PC graphics card and the AC socket takes a standard power cable. The driver and ICC colour profile are supplied on a floppy with installation instructions in a small pamphlet.

Front-panel OSD controls double as one-touch contrast and brightness adjusters; beyond that, there's little to do other than an auto signal adjustment, two-colour presets of 9,300K and 6,500K, and a user-adjustable preset. It's common practice, particularly in design environments, to choose the lower, warmer colour temperature, which more closely resembles daylight. On this setting, the colours were well saturated, if a little red.

There was little to fault in the picture quality of this display. All in all, it's superb value for money.

DETAILS

RRP £304.33 (£259 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION CTX

01923 810 821 www.ctxeurope.com

PROS Easy setup; the least expensive 17in panel

CONS Beige colour and grey plastic buttons make it look cheap, and sound quality is somewhat lacking

VERDICT

Good value for money

FEATURES

★★★★★

PERFORMANCE

★★★★★

VALUE FOR MONEY

★★★★★

OVERALL

★★★★★

17IN



Iiyama Prolite E431S

The Iiyama Prolite E431S, weighing only 4.1kg, is a slim lightweight panel, finished in silver with a narrow bezel and lightweight stand. It has dual inputs and automatically adjusts to the input signal. Just plug in the cable and the monitor does the rest. If you have two computers connected, a front-panel button allows you to toggle between them.

The colour-coded audio cable connects at the rear and there's a headphones socket easily accessible on the bottom edge of the front panel. The 1.5w stereo speakers provided the best quality of any built-in monitor speakers we've heard and, with careful tweaking of the graphics equaliser settings, this panel provides sufficient volume and good enough sound quality to listen to music using headphones, not something you'd want to bother with using most of the other 17in panels on test.

The Iiyama turned in a consistently average performance in the quantitative tests, appearing midway down the table for contrast, brightness and sharpness. In terms of subjective viewing experience, it was not well received and this is reflected in the lowest performance rating of all the 17in panels. Despite that, it's well designed and offers good value for money.

DETAILS

RRP £351.33 (£299 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION Iiyama

01438 745 482 www.iiyama.co.uk

PROS Dual-input; auto-sensing; good audio

CONS Average image quality

VERDICT

A panel with good basic features. Let down a little by poor performance

FEATURES

★★★★★

PERFORMANCE

★★★★★

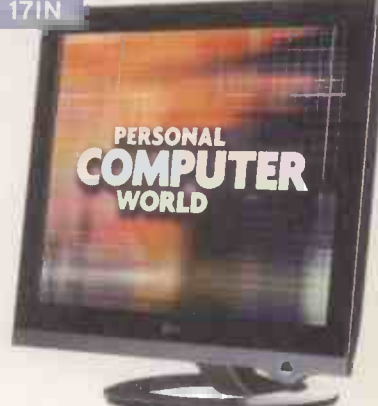
VALUE FOR MONEY

★★★★★

OVERALL

★★★★★

17IN



LG Flatron L1720B

With a black and silver surround, a chrome-plated base and a circular blue/orange power/standby light that surrounds the on/off button, this is one of the best-looking 17in panels on test.

Though you'd never guess to look at it, the 1720B is a basic, no-frills model, with just a single analogue connection. The power and video cables are neatly tucked away behind a removable panel at the rear.

The stand doesn't swivel but can be tilted backward by up to 25 degrees. This is just as well because it sits quite low on the desk and needs to be tilted up to get the best view. The 1720B has a reasonably good horizontal view angle, but doesn't cope so well with changes in the vertical viewpoint.

As well as driver software and an ICM colour profile, colorific calibration software is supplied. This works in a similar fashion to the Adobe gamma control panel that ships with Photoshop, where a wizard takes you through setting contrast, brightness and colour settings using screen targets and a printed swatch for calibration.

The LG turned in a highly creditable performance in our quantitative tests and above-average results in other tests. It fared slightly less well with the viewing panel, achieving an overall score of 19.5.

DETAILS

RRP £351.33 (£299 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

LG Electronics 0870 607 5544

www.lge.co.uk

PROS Good looks; colour calibration

CONS Poor vertical viewing angle

VERDICT

Looks good and offers advanced colour calibration and presets

FEATURES

★★★★★

PERFORMANCE

★★★★★

VALUE FOR MONEY

★★★★★

OVERALL

★★★★★



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17IN



NEC Multisync LCD 1701

The 1701 is a very basic offering; a no-frills 17in analogue LCD panel. Although basic, it looks good, finished in black and silver, and mounted on a square base that tilts and swivels.

Setup proved eventful. Having located the CD folder containing the .inf file, we installed the driver, but on checking the colour-management panel discovered that a profile for a Diamondtron CRT had been selected. When we replaced this with the correct profile, things started to look better.

The front-panel controls are slim, black buttons set into the bottom bezel so as to be almost invisible. With the exception of the power button, they're pretty superfluous, as, like the other NEC-Mitsubishi panels reviewed, all the usual OSD controls can be accessed via a display properties panel using Naviset software available from the website.

The 1701 has a tendency to compress tonal detail in both the highlights and shadows, and photographic images had an unpleasant green cast. We had to install the sRGB profile and adjust the monitor's colour temperature preset to achieve good results. Despite this, the 1701 received a much cooler reception from the viewing panel than the 1760VM, scoring 19 out of 30.

DETAILS

RRP £336.05 (£286 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices
PRODUCT INFORMATION

NEC-Mitsubishi 08701201160
www.nec-mitsubishi.com

PROS Simple, no-frills design with near-invisible front-panel controls
CONS Requires careful setup for best results

VERDICT

Good panel if you avoid the profile

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

17IN



NEC Multisync LCD 1760VM

The 1760VM is another panel that features a stand with a telescopic arm. It extends to 16cm above desk height, but it's not a pivot display.

There are dual auto-sensing inputs and you can easily toggle between two connected PCs, plus there are stereo speakers mounted in the lower bezel, which contains a headphones socket and OSD controls.

Initially, we were impressed with the 1760's ability to display tones well into the highlight and shadow regions, but our enthusiasm waned when we looked at photographic images, which were flat and washed out. This is because the default contrast setting was only 50 per cent. Increasing it did improved things, but only by changing the monitor colour temperature setting to sRGB and switching to an sRGB colour profile were we able to get good results when viewing photos.

Although most people never go near a monitor OSD once it has been satisfactorily set up, if you want to make the most of monitor controls, you can download Naviset software which, with a compatible graphics card, lets you make adjustments using your mouse and a control panel in the display properties dialogue box.

DETAILS

RRP £374.82 (£319 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices
PRODUCT INFORMATION

NEC-Mitsubishi 08701201160
www.nec-mitsubishi.com

PROS Dual inputs; auto-sensing
CONS Poor results with photo images using default settings

VERDICT

Needs careful tweaking to get the best from it

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

17IN



Philips 170B4BB

This model comes with a lot of Bs in its name. The final one stands for black, but there's also a silver BS and grey BG version. All three are dual-input 17in panels with an analogue and DVI-D video input. Bonus points to Philips for being one of the few makers of dual-input monitors to include auto-sensing.

The 170B4BB immediately recognised that we had connected the DVI port and locked on to the incoming signal without a button being pushed. Likewise, when we pulled the DVI cable and plugged in an analogue one, it switched without missing a beat. If you want to switch manually, the OSD calls the options 'analogue' and 'digital' rather than the less helpful 'input 1' and 'input 2'.

The supplied colour profile caused a few problems. Initially, colours were weak and washed out, and Photoshop launched with a warning that the profile was damaged. Using the OSD to switch to a colour temperature of 6,500K only made things worse by introducing an ugly green caste. The solution was to ditch the Philips profile and use the Windows supplied sRGB one.

The Philips turned in an excellent performance in our tests – second only to the LG1720B for contrast and brightness.

DETAILS

RRP £374 (£318.30 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices
PRODUCT INFORMATION

Philips 020 8781 8372
www.consumer.philips.com

PROS Excellent picture quality
CONS Damaged colour profile supplied

VERDICT

Everything you could ask for in a dual-input panel

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



17IN



Samsung Syncmaster 172S

The Syncmaster 172S is an analogue panel with stereo speakers built into the base. It's finished in silver and the dual-hinge stand allows for some vertical movement as well as tilt, but no swivel. All in all, it's quite an attractive-looking panel.

Installation of the driver and colour profile is handled automatically from the supplied CD, which makes setup a very simple affair.

The image quality is pretty good, although photos tended to look magenta. You can fix this result using the OSD to alter the individual RGB channels, or select one of the alternate presets. You could try reddish or bluish, but more accurate results would be achieved with the sRGB setting in combination with the Windows sRGB profile. Having said that, one of the advantages of this panel is that you can get fairly good results straight out of the box.

Sound quality from the speakers was, as you'd expect, at about the level of a good clock radio, but headphones were fine and the socket, plus a conventional volume wheel, are handily located on the side of the base. A wall-mounting bracket and even screws and rawplugs are included.

DETAILS

RRP £346.63 (£295 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Samsung 01932 455 000

www.samsung.co.uk

PROS Easy to set up

CONS No swivel and needs a bit of tweaking for best results

VERDICT

Good out-of-the-box performer, with potential for tweaking

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

17IN



Sharp LL-T17D4B

There's nothing overtly brash about the Sharp T17D4; it's just a well-designed functional display. The black casing adds only a couple of centimetres to the viewable area – hardly bigger than some larger 15in panels.

The flat rectangular base houses a lazy-susan-style rotational device that works well, allowing you to swivel the panel with barely more than a finger, but otherwise anchoring it firmly to the desktop.

There is a digital and analogue video input, yet only an analogue cable is supplied, which keeps the costs down but will appear stingy to anyone who buys the panel specifically for a device with digital outputs. Also disappointing is that the panel isn't auto-sensing, so if you use the digital input 2 connection you have to manually switch using a front-panel button.

A mode button offers four presets; standard, sRGB, vivid and a very dull 'office' mode. Picture quality is excellent on the sRGB setting, with natural colours tending on the pastel side.

The built-in 1w speakers were feeble-sounding, but the lack of decent volume from the headphone socket was less forgivable. But where it matters – picture quality – the T17D4 doesn't disappoint.

DETAILS

RRP £359 (£305.53 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Sharp 01923 434 647

www.sharp.co.uk/lcdmonitors

PROS Picture quality; dual-inputs

CONS No digital cable; no auto-sensing

VERDICT

A good buy if you want basic dual-input capability

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

17IN



Viewsonic VP171b

Only the colourful parrot badge and poorly designed model number detract from the Viewsonic VP171b's sleek looks. This is another pivot panel that uses the ubiquitous Portrait Displays Pivot Pro software. It has two analogue ports and one digital and a telescopic arm, which can raise the bottom edge to a height of about 16cm.

A CD contains the user guide, driver and colour profile, all of which are installed by a wizard. However, despite two attempts, only the user guide ended up on our test system, and we had to install the driver and colour profile manually.

The Viewsonic rated quite poorly in the quantitative tests, but was a massive hit with the viewing panel, which rated it the best of all the 17in panels on test. For normal landscape use, the Viewsonic is a winner in terms of picture quality.

For a pivot panel, however, the viewing angle was limited, particularly in the vertical direction, with the panel in the normal landscape configuration. So, if you're in the habit of getting people to gather round to check out your monthly sales figures or like to give impromptu Powerpoint presentations at your desk, this isn't the panel to choose.

DETAILS

RRP £457.01 (£359 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Viewsonic 01293 643 900

www.viewsonic.com/uk

PROS Two analogue and one digital port; picture quality is excellent

CONS Poor viewing angle

VERDICT

Good for multiple video sources, but not multiple viewers

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



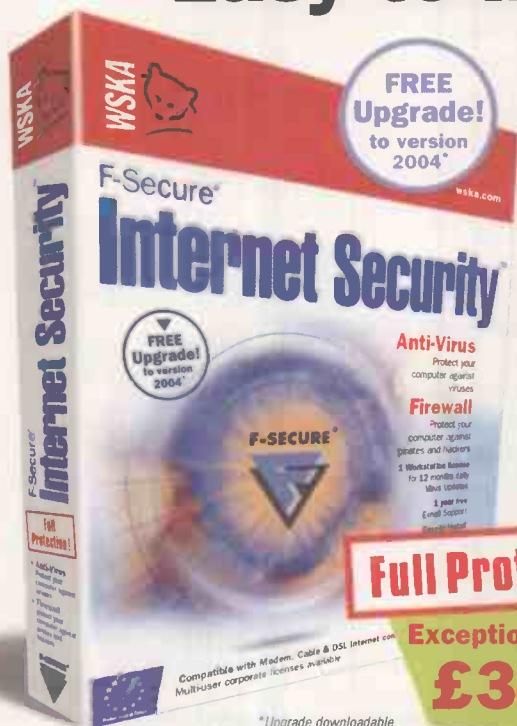
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July 2003



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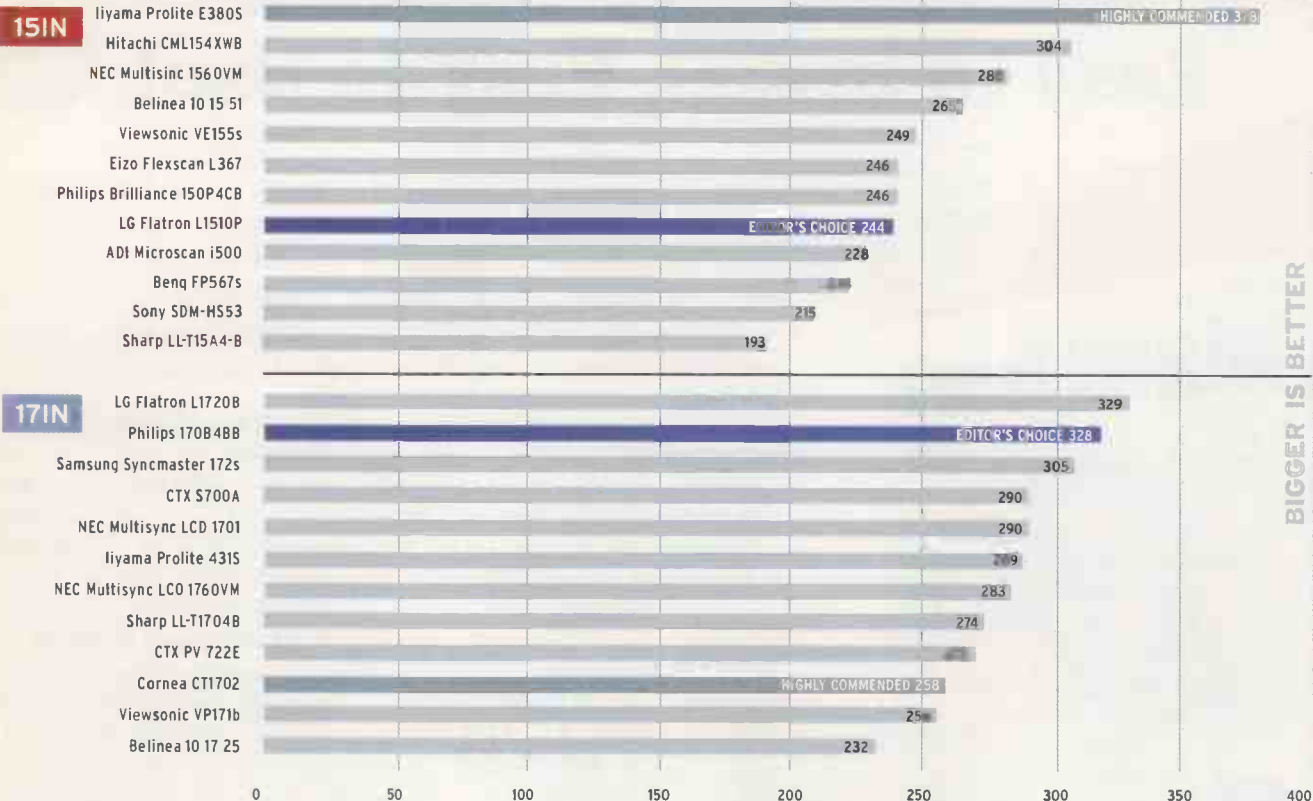


Zoner Media Explorer 5 includes all the tools you need to:

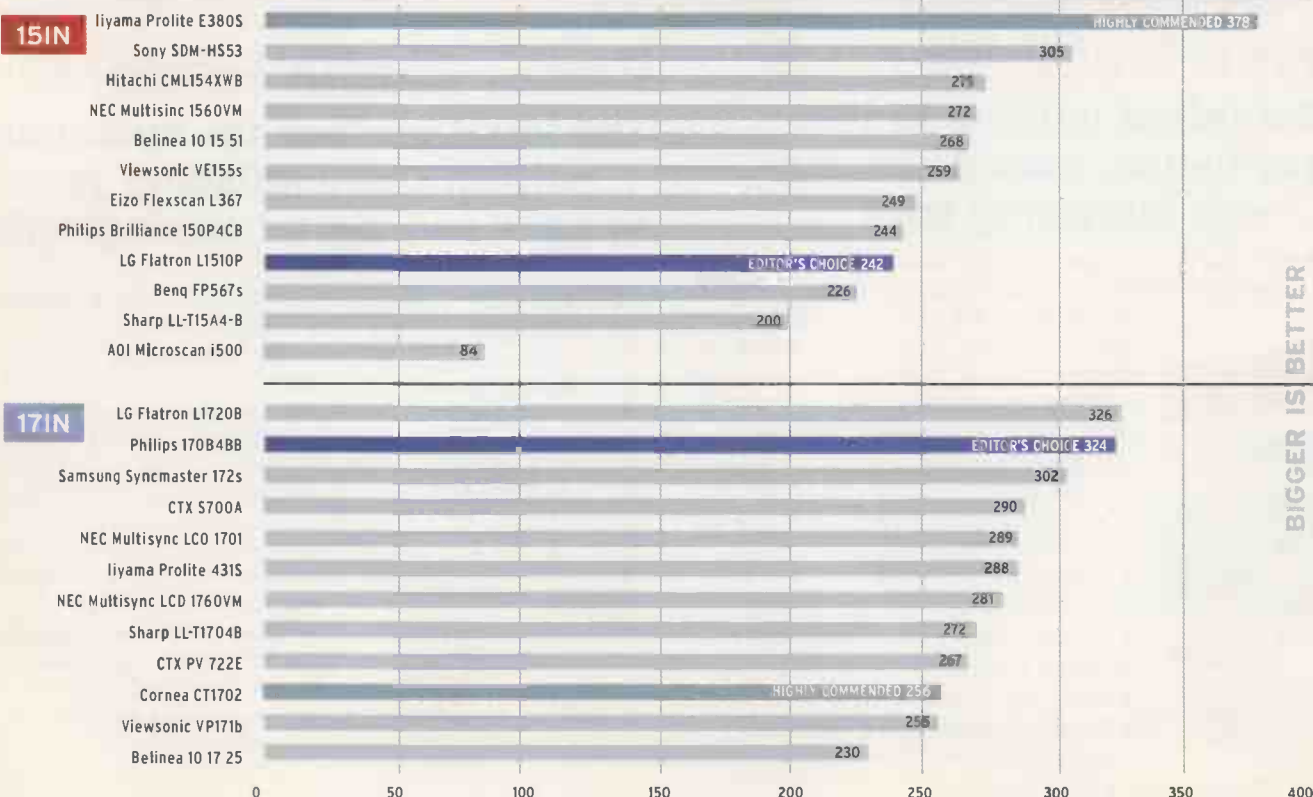
- Acquire images directly from your digital camera
- Manage your image & multimedia collections, create thumbnails, add keywords, preserve and take advantage of the EXIF information
- Enhance your images, fix your digital photographs, correct horizontality and collinearity problems, add descriptions
- Print several images per page, print contact sheets, calendars and reports (more than 150 templates)
- Create and publish Web galleries, save your collections in PDF format, send pictures by e-mail...

Lab results

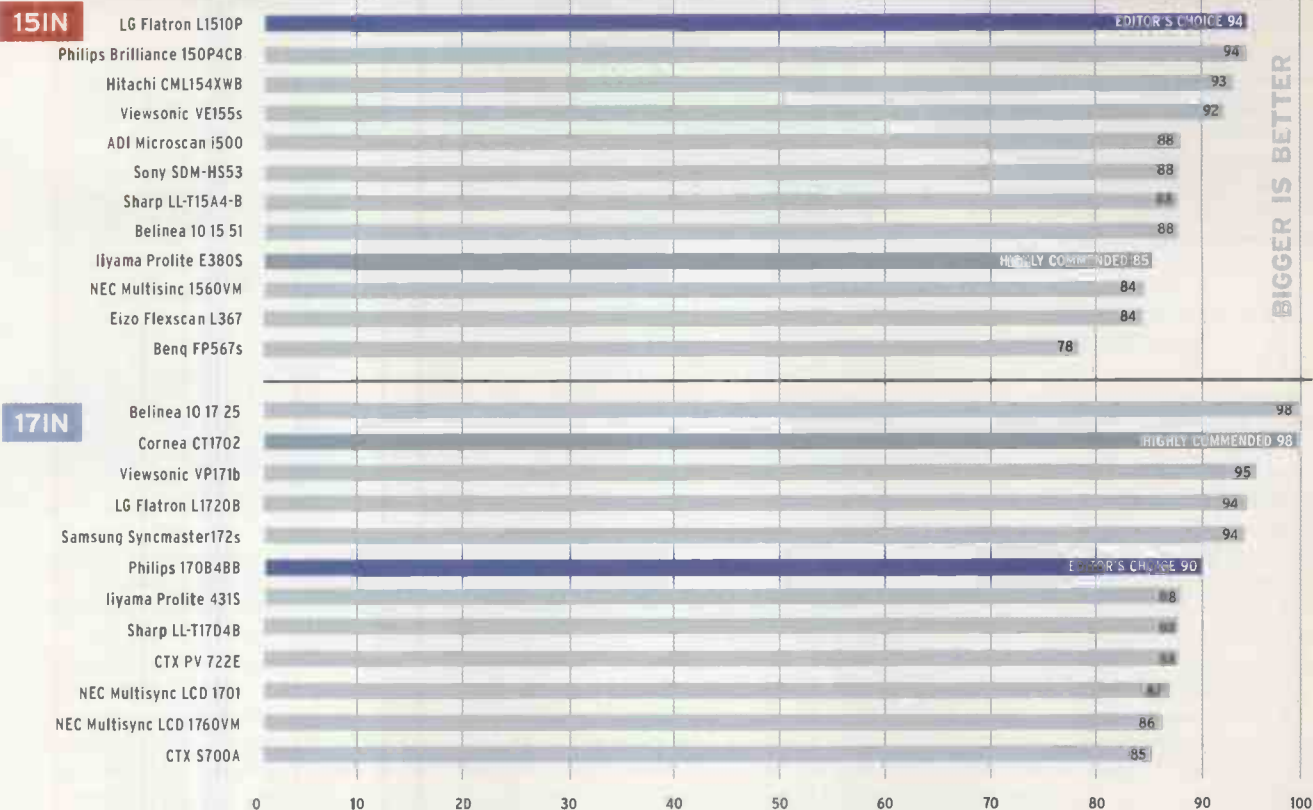
Measured brightness (Candelas per m²)



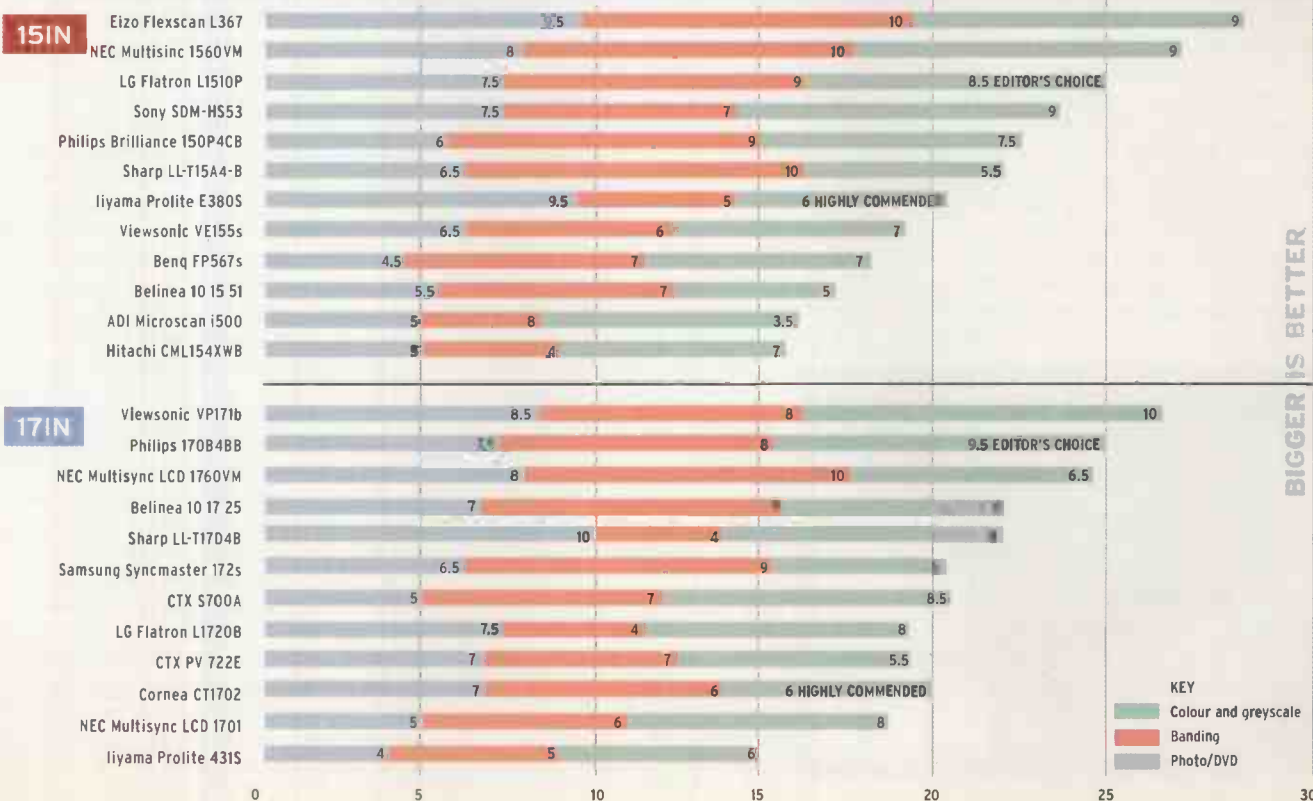
Checkerboard contrast ratio (ratio: 1)



Average MTF (sharpness) (per cent)



Subjective quality tests (each section scores a maximum of 10 points)



Please see page 140 for an explanation of how we tested the monitors

How we tested

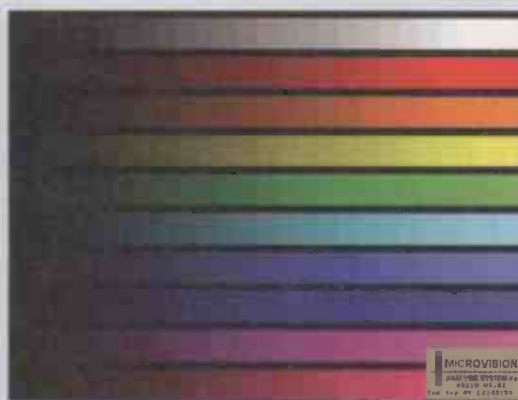
While obvious defects can be quickly spotted, evaluating a monitor's quality can be as much about preference as it is about raw performance. Using a Microvision SS210 Superspot device, we measured various parameters including, brightness, contrast, sharpness, screen uniformity, and colour reproduction. We then supplemented these results by asking users to look at the panels side-by-side displaying test images and photos, a DVD movie and test patterns generated by Displaymate Multimedia Edition (www.displaymate.com).

All our quantitative tests were carried out using a Microvision Superspot 210 Display Analysis System. Microvision makes test equipment for the TV and graphics displays industry and its Superspot Display Analysis Systems are used by many leading display makers for quality control and product development.

The SS210 consists of an OMM (Optical Measurement Module) mounted on a micro-positioning system with three degrees of freedom. Under computer control, the micro-positioner can place and focus the OMM on any location across the surface of the display under test. Positioning is in 0.625mm steps vertical and horizontal.

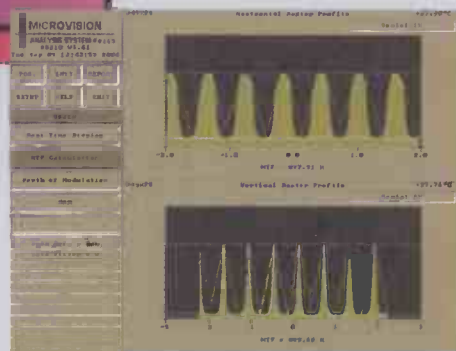
The OMM consists of a mono CCD camera and a diffraction grating Spectrometer. Both are temperature controlled, for optimum accuracy. Fine dimensional resolution is achieved from the camera's 65,000-element CCD grid, which has a cell spacing of 10microns. Measurement resolution can be adjusted between five and 35 microns by changing camera lens magnification. Spectral measurements of light frequency and amplitude can be made using the spectrometer, to a frequency accuracy of 7nm or plus or minus 0.005 x or y and an amplitude accuracy of plus or minus three per cent. Test display signals are generated by the Microvision controller, which includes a Quantum 250MHz programmable pattern generator.

Before testing the panels on the SS210, we carried out some configuration steps to ensure a fair test. First, we set each panel



Left: This screen displays 25 intensity levels for each of 10 principal colours. You can see how the colour scales reproduce on your display. This is important for mixing, matching and specifying colours as well as displaying photo images

Below: The Microvision SS210 makes accurate measurements of many display characteristics. Here are the results from an MTF test



to its 'native' colour temperature. This usually means manually setting each of the red, green and blue settings to equal levels, although some have specific Native modes. This ensures the maximum range of colours can be displayed – while choosing a pre-set colour temperature such as 9,300K or 6,500K may produce a colour balance you prefer, it will result in some reduction in the range of displayable colours and the accuracy of greyscale reproduction, especially at the very light end of the scale.

Next, we displayed the SS210's flat-panel alignment pattern and selected the panels' auto configuration options. On some monitors this resulted in geometry and contrast settings being optimised. Others left auto contrast to a separate option, which we also selected, and in some cases it was left to the user to determine. If no automatic contrast settings were available, we used the factory defaults unless a highly unsatisfactory result was achieved, in which case some manual adjustment was used. All SS210 tests were conducted in darkness.

From the wealth of results provided by the SS210, we've selected three key results which, combined with our subjective tests, provide differentiation between products.

Our brightness test (see graphs on the previous pages) is a measure of the peak output in candelas per square metre when displaying a full white screen. We measured a very large range in maximum brightness, especially in the 15in monitors group.

Our checkerboard contrast ratio test displays a pattern of black and white squares, measuring the intensity of both the black and white sections and comparing the two. This gives us a realistic measure of the displayable range from dark to

light and therefore the displayable image contrast. Contrast ratio is often quoted based on measuring full-black and full-white screens. This results in more impressive figures which can, however, bear little relation to a real user experience.

To measure sharpness, we used the SS210's modulation transfer function test which displays a pattern of single-pixel wide on/off line pairs, measuring the bright and dark parts of the pattern and comparing them to the ideal. A score of 100 per cent represents pure black and white. The closer the result to 100 per cent, the better. TFT panels running at their native resolution should score highly, enabling us to spot potential faults or setup problems.

Our subjective, viewing panel tests were conducted under our normal Labs lighting conditions; a standard D50 Illuminant. This provides the correct colour temperature for viewing sRGB displays as described in the standard. Using two high-quality Scene Double SD4+4X video splitters plugged into the master PC, all 12 monitors in the two categories were lined up for comparison.

Our tests with Displaymate were carried out with the monitors configured exactly as they were for our SS210 measurements. For viewing sRGB photos, we reconfigured the panels to use sRGB colour modes where available, otherwise we selected a 6,500K colour temperature. (6,500K is the specified temperature for sRGB displays). If no specific colour temperatures were available we just selected whichever we felt looked the best. We then kept these settings when viewing our DVD samples. We used a selection of scenes from The Matrix and Armageddon which contained various levels of motion, light and shadow, skin tones and colour detail.



The colour of a neutral greyscale can vary with intensity if the individual primary red, green and blue channels have different characteristics. This test pattern is designed to make it easy to spot colour tracking errors

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Group test>> TFT monitors








Table of features

15IN MONITORS

					
MANUFACTURER	ADI	BELINEA	BENQ	EIZO	HITACHI
MODEL NAME	MICROSCAN 100	10 15 51	FP567S	FLEXSCAN L367	CML154XWB
Price inc VAT (ex VAT)	£269.99 (£229.78)	£244.40 (£208)	£219 (£186.38)	£304.33 (£259)	£252.63 (£215)
Sales telephone	0870 444 1895	01344 788 900	01442 301 000	01483 719 500	01628 585 000
URL	www.adluk.com	www.belinea.co.uk	www.benq.co.uk	www.eizo.co.uk	www.hitachidigitalmedia.com
Weight (Gross) in kg	3.5	4.5	4.8	3.7	3
Dimensions (inc base) in mm (d x w x h)	345 x 156 x 334	385 x 255 x 410	190 x 354 x 362	379.5 x 326 x 329.5	204 x 353 x 370
Type of video connector(s)	VGA	VGA	VGA	VGA/DVI-I	VGA
Video adaptor cable supplied	✓	✓	✓	✓	✓
Video cable is permanently attached to monitor	X	X	✓	X	✓
Tilt and swivel	Tilt/45degree swivel	Tilt	Tilt	Tilt	Tilt
Height adjustment	✓	X	X	X	X
Vesa FDMI (Flat display mounting interface) compliant	✓	X	✓	✓	✓
Rotatable for landscape or portrait format	X	X	X	X	X
Integrated or separate power supply	Separate	Integrated	Integrated	Integrated	Separate
Integrated speakers	✓	✓	X	✓	✓
Headphone socket	✓	✓	X	✓	✓
Visible screen diagonal size (inches)	15	15	15	15	15
Integrated USB hub	✓	X	X	✓	X
USB upstream/downstream connections	1/4	0/0	0/0	1/0	0/0
POWER SAVING FEATURES & EMISSIONS/MANUFACTURING STANDARDS					
Vesa DPMS compatible	✓	N/S	N/S	N/S	✓
Energy Star	✓	✓	N/S	✓	✓
Maximum power consumption in watts	18	45	40	28	25
TCO 95/99/03	X/✓/X	X/✓/✓	X/✓/X	✓/✓/✓	✓/✓/✓
OPERATIONAL FEATURES					
Native resolution	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768
Bezel thickness (w x h) mm	17 x 15	18 x 18	19 x 24	24 x 12	20 x 24
Vertical/horizontal viewing angle (in degrees)	100/120	110/130	120/100 & 75/55	150/160	+45/-55 & +65/-65
Brightness (Candelas per square metre)	250	200	250	250	250
Contrast ratio	400:1	200:1	400:1	450:1	350:1
Image re-scaling (for non-native resolutions)	✓	✓	X	✓	✓
Can rescaling be turned off?	X	X	X	X	X
Stereo audio output	✓	✓	X	✓	✓
Audio input (connectors)	1 x Line In	1 x Line In	0	1 x Line In	0
IMAGE CONTROLS					
Front panel control buttons	Power, Plus, Minus, Menu	Select/Auto, 4 x OSD, Menu, Power	Power, Enter, Contrast, Brightness, Exit/Volume, Auto	Power, Fine Contrast, Enter, Control, Auto, Input Selection	Volume, Power, 2 x Function, 2 x Adjustment
Separate brightness/contrast/volume control	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓
Auto-setup	✓	✓	✓	✓	✓
User adjustable colour temperature	✓	✓	✓	✓	✓
sRGB mode	X	X	X	X	X
Number of adjustable colour presets	4	3	3	15	3
DISPLAY STATUS INDICATION					
On-screen menu	✓	✓	✓	✓	✓
Multicoloured power/standby indicator	✓	✓	✓	✓	✓
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

N/S = Not specified by manufacturer




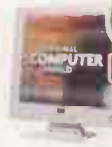

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IYAMA PROLITE E380S	LG FLATRON L1510P	NEC MULTISYNC 1560VM	PHILIPS BRILLIANCE 150P4CB	SHARP LL-T15A4-B	SONY SDM-HS53	VIEWSONIC VE155S
£233.83 (£199)	£257.33 (£219)	£280.83 (£239)	£285 (£242.55)	£219 (£186.38)	£269.08 (£229)	£233.83 (£199)
01438 745 482	0870 607 5544	08701 201 160	020 8781 8372	01923 434 647	08705 424 424	01293 643 900
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2.3	6.6	3.7	5.4	3.6	3.8	4.5
181.5 x 342 x 335.5	229 x 356 x 229	181 x 345 x 457	218 x 343 x 371	145 x 338 x 313	185 x 390 x 342	200 x 356 x 344
VGA	VGA/DVI-I	VGA/DVI-I	VGA	VGA	VGA	VGA
✓	✓	✓	✓	✓	✓	✓
x	x	✓	x	x	x	✓
Tilt	Tilt	Tilt	Tilt	Tilt	Tilt	Tilt
x	x	✓	x	x	x	x
✓	✓	✓	✓	✓	x	✓
x	✓	x	x	x	x	x
Separate	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated
✓	N	✓	x	✓	x	x
✓	N	✓	x	✓	x	x
15	15	15	15	15	15	15
x	✓	x	x	x	x	x
0/0	1/2	0/0	0/0	0/0	0/0	0/0
✓	N/S	✓	✓	✓	N/S	✓
✓	✓	✓	✓	✓	N/S	✓
33	28	35	20	26	25	30
✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	x/✓/✓	N/S/N/S/N/S	x/✓/✓
1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768
18 x 18	14 x 25	34 x 20	16 x 20	26 x 16	25 x 40	10 x 24
110/120	140/160	110/150	N/S/150	135/160	160/150	110/120
380	250	300	250	260	250	250
200:1	400:1	450:1	400:1	350:1	400:1	400:1
✓	✓	✓	✓	✓	✓	✓
x	x	x	x	x	x	x
✓	x	✓	x	✓	x	x
1	N/S	1 x Line In	0	1 x Line In	None	0/0
Power, Exit/Volume, Brightness, Contrast, Menu, OPQ	Power, Select/Source, Auto/Select, 2 x Select, Select/Brightness, Menu	Power, Reset/Mute, Select/1-2, Volume Up/Down, 2 x Select, Exit	Power, OK, Brightness, Select, Auto	Power, Volume Up/Down, Mode, Menu	Power, Menu, Up, Down, OK, Brightness	Power, Auto, Brightness, Contrast, OSM
✓/✓/✓	x/x/x	x/x/✓	✓/✓/✓	x/x/x	✓/✓/✓	✓/✓/✓
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
✓	x	✓	✓	x	x	x
4	3	7	5	4	4	3
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★








Group test >> TFT monitors

Table of features

17IN MONITORS

					
MANUFACTURER	BELINEA	CORNEA	CTX	CTX	IYYAMA
MODEL NAME	10 17 25	CT1702	FX172	S700A	PROLITE E431S
Price inc VAT (ex VAT)	£338.64 (€288.20)	£399 (€339.58)	£410.08 (€349)	£304.33 (€259)	£351.33 (€299)
Sales telephone	01344 788 900	020 7380 8181	01923 810 821	01923 810 821	01438 745 482
URL	www.belinea.co.uk	www.anders-electronics.com	www.ctxeurope.com	www.ctxeurope.com	www.iiyama.co.uk
Weight (Gross) in kg	5.8	6.6	7.5	10.5	7.4
Dimensions (inc base) in mm (d x w x h)	176 x 380 x 368	165 x 424 x 404	260 x 438 x 447	195 x 418 x 402	214 x 396 x 457
Type of video connector(s):	VGA	VGA/DVI-I	VGA/DVI-I	VGA	VGA/DVI-I
Video adaptor cable supplied	✓	✓	✓	✓	✓
Video cable is permanently attached to monitor	✗	✗	✗	✗	✗
Tilt and swivel	Tilt	Tilt	Tilt	Tilt	Both
Height adjustment	✗	✗	✗	✓	✓
Vesa FDMI (Flat display mounting interface) compliant	✓	✓	✓	✓	✓
Rotatable for landscape or portrait format	✗	✗	✓	✗	✓
Integrated or separate power supply	Integrated	Separate	Separate	Integrated	Integrated
Integrated speakers	✓	✓ (1)	✓	✗	✗
Headphone socket	✓	✓	✓	✗	✗
Visible screen diagonal size (inches)	17	17	17	17	18
Integrated USB hub	✗	✓	✓	✗	✗
USB upstream/downstream connections	0/0	1/4	1/4	0/0	0/0
POWER SAVING FEATURES & EMISSIONS/MANUFACTURING STANDARDS					
Vesa DPMS compatible	✓	✓	✓	✓	✓
Energy Star	✓	N/S	N/S	N/S	✓
Maximum power consumption	45	N/S	46	35	60
TCO 95/99/03	✗/✓/✗	✗/✗/✗	✗/✓/✗	✗/✓/✗	✓/✓/✗
OPERATIONAL FEATURES					
Native resolution	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024
Bezel thickness (w x h) mm	30 x 19	30 x 40	37 x 47	40 x 26	38 x 15
Vertical/horizontal viewing angle in degrees	120/140	+45/-65 & +70/-70	170/170	140/120	160/160
Brightness (Candelas per square metre)	250	250	250	250	250
Contrast ratio	350:1	450:1	500:1	400:1	350:1
Image re-scaling (for non-native resolutions)	✓	✓	✓	✓	✓
Can re-scaling be turned off?	✗	✗	✗	✗	✗
Stereo audio output	N/S	✓	✓	✗	✗
Audio input (connectors)	1 x Line in	1 x Line in	1 x Line in	0	N/S
IMAGE CONTROLS					
Front panel control buttons	Volume, Plus, Minus, Power, Auto/Select, Menu/Exit, Mute	Menu, Channel Up/Down, Auto, Select, Power	Power, Esc, Up Down, Enter	Power, Esc, Up, Down, Enter	Power, Auto, Plus/Brightness, Minus/Contrast, Menu, Input
Separate Brightness/contrast/volume control	✓/✓/✓	✗/✗/✓	✓/✓/✗	✗/✗/✗	✓/✓/✗
Auto-setup	✓	✓	✓	✓	✓
User adjustable colour temperature	✓	✓	✓	✓	✓
sRGB mode	✓	✓	✓	✓	✗
Number of adjustable colour presets	3	2	4	3	2
DISPLAY STATUS INDICATION					
On-screen menu	✓	✓	✓	✓	✓
Multicoloured power/standby indicator	✓	✓	✓	✓	✓
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

For the best TFT monitor prices try www.pcw.co.uk/bestprices

						
LG	NEC	NEC	PHILIPS	SAMSUNG	SHARP	VIEWSONIC
FLATRON L1720H	MULTISYNC 1760VM	MULTISYNC 1760VM	170B4E	SYNCHMASTER 172S	LL-17184H	VP1710
£351.33 (£299)	£336.05 (£286)	£374.83 (£319)	£374 (£318.30)	£346.63 (£295)	£359 (£305.53)	£457.01 (£359)
0870 607 5544	08701 201160	08701 201160	020 8781 8372	01932 455 000	01923 434 647	01293 643 900
www.lge.co.uk	www.nec-mitsubishi.com	www.nec-mitsubishi.com	www.consumer.philips.com	www.samsung.co.uk	www.sharp.co.uk/lcdmonitors	www.viewsonic.com/uk
6.8	6.8	5.3kg	5	4.8	6.3	6.5
128 x 394 x 412	205 x 374 x 480	196 x 374 x 383	180 x 375 x 393	216 x 385 x 396	222 x 381 x 412	238 x 392 x 445
VGA	VGA/DVD-D	VGA	VGA/DVI-D	VGA	VGA/DVI-I	2 x VGA, DVI-I
✓	✓ VGA only	✓	✓- VGA only	✓	✓ VGA only	✓ VGA only
x	x	x	x	x	x	x
Tilt	Tilt	Both	x	Tilt	Tilt/swivel 45degrees	Both
x	✓	x	x	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
x	x	x	x	x	x	✓
Integrated	Integrated	Integrated	Integrated	Separate	Integrated	Integrated
x	✓	x	x	✓	✓	x
x	✓	x	x	✓	✓	x
17	17	17	17	17	17	17
x	x	x	x	x	x	x
0/0	0/0	0/0	0/0	0/0	0/0	0/0
N/S	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
40	45	38	40	42	38	33
x/✓/x	x/x/x	✓/✓/✓	✓/✓/✓	x/x/x	x/✓/✓	x/✓/✓
1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024
11 x 26	34 x 18	33 x 16	22 x 20	10 x 20	32 x 17	18 x 16
140/160	140/160	120/140	80/80	170/170	150/170	140/140
250	250	250	260	250	250	260
450:1	350:1	450:1	400:1	500:1	430:1	500:1
✓	✓	✓	✓	✓	✓	✓
x	x	x	x	x	x	x
x	x	x	x	✓	x	x
0	1 x Line In	0	0	1 x Audio In	1 x Line out	0
Power, Auto/Select, Left, Right, Lightview, Menu	Power, Reset/Mute, Select/1-2, Plus, Minus, Left, Right, Exit	Power, Reset, Select, Plus, Minus, Left, Right, Exit	Power, OK, Up/Down, Left/Right, Auto	Power, Menu, Up/Down, Exit, Auto	Power, Left/Right, Down/Mode, Menu, Input	Power, 2 (Signal select), Up/Down, 1 (Signal Select)
✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
x	✓	✓	✓	✓	✓	✓
3	6	7	5	4	4	5
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



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(All test figures are based on the comparison with NVIDIA original fan-sink)

MSI TWIN FLOW™ Reference List

Model	Manufacturer
FX5900	MSI
FX5900	Asus
FX5900	Cardinal
FX5900	Cooler Master
FX5900	Galaxy
FX5900	Leadtek
FX5900	Liberty
FX5900	MSI

Model Comparison

Model	Manufacturer
FX5900	MSI
FX5900	Asus
FX5900	Cardinal
FX5900	Cooler Master
FX5900	Galaxy
FX5900	Leadtek
FX5900	Liberty
FX5900	MSI

Temperature Comparison

Model	Manufacturer
FX5900	MSI
FX5900	Asus
FX5900	Cardinal
FX5900	Cooler Master
FX5900	Galaxy
FX5900	Leadtek
FX5900	Liberty
FX5900	MSI



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- Microsoft® DirectX® 9.0 Support and OpenGL® 1.4 Optimization

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Tekheads
www.tekheads.co.uk
THX Trade
www.thx-trade.com

VGI Computers
www.vgicomputers.com
Watford
www.watford.co.uk

Editor's Choice

With so much choice available when it comes to TFTs it can be daunting shopping around for one. We rounded up 24 of the best monitors available and put them through their paces to see how they compare. In reality one person's perception of colour and sharpness can differ from another's, but you can't beat the precise measurement of the Superspot when it comes to quantitative labs testing, and that's where we found some of the real differences between products. Taking into account both the qualitative and quantitative tests, it wasn't hard to separate the wheat from the chaff.

The winners

If you're looking for a 15in flat panel, it's likely you want the best picture and a good set of features for as little as possible. With this in mind there's only one **Editor's Choice**, the **LG Flatron L1510P**.

Not only did our viewing panel give it third spot in our subjective viewing panel quality tests, but the L1510P also shared the top spot in our sharpness test. There was negligible banding and the colour and greyscales were smoothly stepped. Photo and DVD rendering were also relatively realistic. The monitor also has dual inputs; a D-Sub port for a standard analogue signal and a DVI-I input for receiving a digital

'One person's perception of sharpness differs from another's'

signal from a suitably equipped graphics card. And a DVI cable is included. A signal select button allows you to simply switch between the two sources.

The panel can be pivoted through 90 degrees and with the supplied Pivot Pro software you can do the same with your desktop, making it ideal for text editing. Finally, within easy access on the right side of the height-adjustable stand, is a two-port USB hub.

Choosing a runner-up wasn't as clear-cut, but in the end the **Iiyama Prolite E380S** gets our **Highly Commended** award. This is mainly because it had the brightest, most vibrant display of all the contenders and at £234 it's also one of the cheapest.



LG Flatron L1520P



Philips 170B4BB



Iiyama Prolite E380S



Cornea CT1702

The punchy picture impressed our viewing panel and was awarded a high rating in the colour and greyscale quality tests for clear and vivid graduated steps. However, there was some evidence of banding, and the photo and DVD results weren't quite as good as on some of the more expensive units. The OSD does offer some preset brightness levels to enhance the picture. An sRGB colour space mode standardises colour uniformity between the display and your other sRGB-compliant peripherals and software.

The **Editor's Choice** for 17in TFTs goes to the **Philips 170B4BB**. It was a breeze to set up and came with dual inputs – a DVI digital connection and a D-sub plug. It locks onto the incoming signal whatever its source, and switching between two simultaneously connected sources is a very simple process.

The one blot on the 170B4BB – poor performance when using the supplied profile – was not confined to the Philips and was fixed by using the panel in sRGB mode.

The true test of any display is its picture quality. The 170B4BB was one of the few panels which did consistently well in the quantitative tests and also impressed our panel of viewers with its performance.

In our contrast and brightness tests it was second only to the LG L1720B and where the brighter, more high-contrast panels tended to do less well in the sharpness test the 170B4BB held its own.

The viewing panel placed it second to the Viewsonic VP171B with 25 points out of a possible 30. While visual evaluations of a panel's picture quality are subjective, the 170B4BB's strong showing in both the quantitative and qualitative labs tests put its image quality credentials beyond doubt.

Our **Highly Commended** award for the 17in TFTs goes to the **Cornea CT1702**. We liked was the wide range of input options. The inclusion of video inputs makes it possible to connect video equipment directly to the panel via conveniently located sockets on the side. Although it doesn't autolock on an incoming signal, switching inputs requires only a single button press and, with some adjustment, the panel produced an excellent picture.

The CT1702 was supplied with both analogue and digital cables. When a digital cable isn't included, if you have a graphics card with digital output and no converter you can't make use of one of the main features. With the cost of a DVI cable around £40 inc VAT, we think one should be included in the box, and we're pleased to see that Cornea agrees.



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For small offices or if you work at home, space is at a premium, so a PC complete with an all-in-one printer, scanner, copier and fax is ideal. And you can buy one for just £799 ex VAT

£799 PCs with MFD

WORDS: RORY REID TESTING: VNU LABS PHOTOS: BRUCE MACKIE

When it comes to choosing a PC for home or small-business use, consumers have a rough time indeed. Such is the sheer number of options to consider and technology to get to grips with, it is no wonder we often feel overwhelmed by choice.

If you're primarily a home user, you'll want to ensure your new PC is fully capable of keeping up with the latest and most demanding versions of games and multimedia software. Meanwhile, if you're an office user, your main considerations may revolve around what software is included and what options are available in terms of networking, as well as printers, scanners, copiers and fax machines.

For this group test, we put nine systems that cost £799 ex VAT under the PCW microscope. You will find a wide variety of options for PCs catering to those who wish to combine regular home use with all-important office functionality.

Eight of the systems come with a multifunction device (MFD) that incorporates printing, scanning and copying facilities, and all of them have network ports plus a range of quality software aimed at making your office experience second to none. In rating these systems, we've taken into account the performance of the MFDs as well as the PCs. So whether it's Half Life 2 or Microsoft Excel you'll be settling down to, the range we have selected for this test is sure to feature something for you.



ECS S-Buddie

We start with the most unconventional entry in our group test, the ECS S-Buddie, which doesn't retail for £799, nor does it come packaged with a multifunction device (MFD). We allowed this system into the group test because ECS left room in the budget for an MFD. It is the only desktop system in our congregation and is aimed at those who may already own a printer/scanner/copier or have access to one across a network.

Squatting conspicuously atop the unusual purple-coloured Elitegroup motherboard, the 2.4GHz processor is one of only two Intel CPUs in this test. However, where the ECS falls in line with its compatriots is in relying on the same 512MB of Ram as seen throughout.

From the outset, it is obvious this is a system aimed at consumers who are unconcerned with upgrades. While three half-height PCI slots are available for use alongside a vacant AGP slot, there is certainly no scope for memory upgrades unless you are prepared to discard one of the two supplied 256MB modules.

Also, while the 32MB of onboard graphics memory may be sufficient for everyday office purposes, 3Dmark results of 1,088 show the S-Buddie as a machine not particularly well suited to 3D applications.

Meanwhile, 199 in our Sysmark test implies a capable system – but also one that trails behind the others – as illustrated by the office productivity score of 134.

Elsewhere, despite the lack of an office suite, the S-Buddie is one of only two entries which shipped with Windows XP Pro. Further points are awarded for the 15in TFT monitor, a combo drive with DVD playback as well as CD-RW functionality, a multimedia card reader and an external USB floppy drive.

On the whole, despite losing ground to its rivals in terms of performance and upgradability, the S-Buddie provides a solid foundation upon which a capable office system can be built – and a decent MFD can be picked up for just over £100.

DETAILS

RRP £703.82 (£599 ex VAT)
BEST PRICE & PRODUCT INFORMATION ECS
 08701205 370 www.ecs.uk.com
PROS Low cost; Windows XP Professional; TFT
CONS Low-end graphics; lack of software; no Firewire ports
VERDICT
 Outclassed in certain areas, but as a basic system, the S-Buddie fulfils a role

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



Evesham Axis 2600+

Like the majority of this month's submissions, Evesham's Axis 2600+ is based around the familiar pairing of an Athlon XP 2600+ CPU and 512MB of Ram. Hardly any surprises there, however the system does manage to sidestep a common computer cliché by avoiding the now ubiquitous beige case. We were pleased to see the understated, yet stylish silver and black exterior of the Axis 2600+, complemented admirably by the use of blue internal LEDs. Closer inspection of the Axis 2600+ soon revealed a PC which, despite its relatively docile looks, is adequately equipped to deal with multimedia applications.

Thanks to the inclusion of the Radeon 9600 Pro, the first ATI accelerator to use 0.13micron architecture, the Axis notched up one of the highest Unreal Tournament 2003 frame rates of the group test, 62fps, despite a modest 8,926 3Dmark result. Further credit must also be given to Evesham for its use of Nvidia's DirectX 8-compatible audio processor. This allows the Axis to deliver 3D-positional audio in Dolby 5.1 – an ideal accompaniment to DVD movies and games. A Firewire-equipped S/PDIF connector, along with the appropriate speaker setup, have both been provided, enabling users to reap the benefits.

Office users are catered for with the inclusion of Ability Office and HP's PSC 2110 MFD. While this is a fairly solid machine that boasts competent scanning, photo printing and a maximum output resolution of 4,800dpi, it does disappoint due to its noisiness and lack of speed.

The Axis 2600+ is a capable performer, particularly in terms of its multimedia abilities, but it is let down by its 80GB Western Digital hard disk, which appears petite when pitted against those in rival systems.

Elsewhere, however, the Axis 2600+ makes up for its shortcoming with the inclusion of a stylish and space-saving 15in TFT and a reassuring warranty package.

DETAILS

RRP £938.82 (£799 ex VAT)
BEST PRICE & PRODUCT INFORMATION Evesham
 0870 160 9500 www.evesham.com
PROS DX9 graphics; TFT screen
CONS Hard disk size; slow, noisy printer
VERDICT
 A versatile PC with adequate performance and graphics capabilities, alongside a competent, if uninspiring, MFD

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



Intellect XPC28N

Based on the popular Shuttle SN45G mini system, the Intellect XPC28N is the most visually striking PC in our group test. Housed in a smart cube-like case measuring just 185cm wide, it is an attractive proposition to those with space restrictions.

What's really important, though, is what's under the hood and, as if attempting to compensate for its diminutive stature, the XPC28N is furnished with just as much memory as its rivals, and has one of the fastest processors in the group – Athlon's XP 2800+. The consequence of this is a decent Sysmark figure of 218 – placing the tiny Intellect among the most powerful PCs on test.

From a multimedia perspective, the XPC28N is an adequate performer, thanks primarily to the 128MB ATI Radeon 9200. However, despite a large onboard memory, the 9200 is still a budget accelerator and, unlike others, does not support DirectX 9. This, alongside a mediocre 3Dmark score of 7,392, makes us question just how future-proof the card really is.

A good complement is the Sharp LL-T15S3 flat-panel monitor. Not only did it have a clear, bright display, but little desktop space is lost, thanks to its integrated speakers, however sound quality does suffer.

The Intellect is supplied with a Smartmedia Microdrive capable of deciphering content from Sony Memory Stick, Compact Flash (CF) cards, Secure Digital (SD) media, as well as the increasingly archaic 3.5in floppy disk format.

In terms of the Intellect's multifunction support, here provided by the HP PSC 2110, there is room for improvement. However, with photo-quality printing and 14ppm (pages per minute) text output, there is little to complain about other than the lack of a fax.

Stylish, compact and certainly not outclassed by its larger counterparts, the XPC28N is a serious candidate for any budget PC shopper – particularly those looking for something unusual.

DETAILS

RRP £938.82 (£799 ex VAT)
BEST PRICE & PRODUCT INFORMATION Intellect
 08701 225 590 www.intellect-uk.com
PROS Compact; stylish; powerful; Smartmedia reader
CONS Limited upgrade potential; no DX9
VERDICT
 Great value for money; this is an attractive and capable PC system with few flaws

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

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Catalyst Labs, April 2003 (USA)



CT1904 - ranked #1 in 19 inch monitor test: '...the CT1904 is ideal for rich graphic, gaming and video usage'.

PC Professional, June 2003 (Germany)



Cornea CT1702 monitor - 'Best Product 2003'

PC Achat magazine (France)



Cornea CT1904 monitor - 'stellar graphics quality and a very wide measured viewing angle'

PC World, August 2003 (USA)



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Jal Virgo 2800 Soho

Unlike the majority of systems featured here, Jal's offering seems unconcerned about catering to the needs of the gaming fraternity. Far from focusing on such novelties as high-end graphics cards or Dolby 5.1 sound, Jal has instead concentrated on a system aimed at the more serious office user.

It is therefore hardly surprising to see that the Athlon XP 2800+ CPU takes centre stage as one of the fastest AMD processors in our test. Also, in the case of our test system, the Virgo 2800 Soho is one of the few PCs whose memory is supplied on a single 512MB module. This offers the practical advantage of leaving three memory slots unoccupied for future expansion. While this negates the possibility of a slightly quicker dual-memory configuration, the performance of the Soho hardly suffers, as proven by a more than adequate Sysmark figure of 220.

As touched on earlier, where the Jal does stumble somewhat is in its lack of provision for decent multimedia or graphics support. Uninspiring 3Dmark results of just 4,714 and an Unreal Tournament botmatch frame rate of 36.91fps expose the system as one of the worst choices for gaming. Elsewhere, while the Virgo 2800 Soho does

not provide any Firewire connections, it is equipped with six USB2 ports, and a generous 120GB hard disk – 40GB more than that seen in the Evesham entry.

Commendably, Jal has supplied this system with the excellent Epson CX5200 all-in-one device. Not only is it a distinguished copier and scanner, but with 7ppm text output, it perfectly complements the Jal's focus as an office-oriented PC.

On the software front, Jal has included Microsoft's Works Suite 2003. This is a very competent system which, provided games and other 3D applications are not a concern, is worthy of your attention in a home-office environment.

DETAILS

RRP £938.82 (£799 ex VAT)

BEST PRICE & PRODUCT INFORMATION Jal

01782 848 100

www.jal.co.uk

PROS Good performance; great printer

CONS Graphics card; no Firewire ports

VERDICT

A powerful office-focused system with an excellent MFD

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



Mesh 2600+ Soho

If you ask Mesh, black is the new beige, as this Matrix 2600+ Soho, complete with ebony-fronted optical drive panels, illustrates. Looks aside, the Soho is equipped with twin 256MB DDR400 modules, and a meaty Athlon XP 2600+ processor clocking in at 2.1GHz.

The inclusion of Asus' capable A7N8X Deluxe motherboard means the system has a solid foundation and scope for expansion, thanks to its five PCI slots, four of which are unoccupied. Video output is provided by Nvidia's GeForce FX 5200, an excellent budget card which clocked up a respectable 3Dmark score of 8,112. Laden with 128MB of dedicated memory and full DirectX 9 support, the 5200 pushed Unreal Tournament's Botmatch benchmark to 51.33fps, and is well paired with the excellent 19in Mitsubishi Diamond Pro 930 monitor. While this display is based on aging CRT technology, it still comes highly recommended.

Providing the storage and data access is a combination of a 120GB Maxtor hard drive and a Sony optical arrangement consisting of 16-speed DVD-Rom drive and a four-speed DVD writer which supports both plus and minus formats. The Soho also comes with Pinnacle Studio 8 SE, which

allows you to create movies, shorten and rearrange clips, add sound and burn movies to DVD and other formats.

In terms of accessories, the Soho is well equipped with the outstanding Lexmark X5150 all-in-one printer/scanner/copier, which boasts a maximum 16ppm output and 48bit colour scanning. A 56K modem, Logitech Internet keyboard and wired optical mouse complete the package.

Performance-wise, the Soho achieved a Sysmark score of 212 – understandable, considering the Asus board, plucky CPU and decent quantity of Ram. Overall, this system is great for the budget user – particularly due to its highly coveted DVD writing capabilities.

DETAILS

RRP £938.82 (£799 ex VAT)
BEST PRICE & PRODUCT INFORMATION Mesh
 0870 046 4747

www.meshcomputers.com

PROS DX9 graphics; MFD; DVD +/- rewrite

CONS CRT monitor

VERDICT

A versatile PC with decent graphics, performance and DVD focus

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



Multivision Ionix Pro 5150

Representing Multivision this month is the Ionix Pro 5150 – a system based around the potent Athlon XP 2800+, 512MB of Ram in a dual-memory configuration, and the company's usual propensity to deliver significant levels of performance.

Sheathed in a black Multivision case, the Ionix 5150 presents itself as a sleek machine, with small touches of finesse. Rather than simply choosing to install the 16-speed DVD and CD-RW optical drives in a standard manner, Multivision has covered each of the drive trays with elliptical plastic covers, giving the system a rounded appearance. Other noteworthy touches include the USB and Firewire connectors behind a small panel at the side of the system.

Beyond its appearance, the Ionix 5150 Pro is a PC imbued with high-performance components, in a configuration that produces favourable benchmark statistics. The Multivision managed to post Sysmark 2001 figures of 234 – second only to Nethighstreet. It did, however, rack up the highest office productivity score, indicating its advantage in a work situation. And, like the Jal machine, the Ionix includes Microsoft's Works Suite 2003 office suite.

Graphics performance was strong, thanks to the bundled ATI Radeon 9600 accelerator. Boasting support for DirectX 9, the 128MB of onboard memory helped the Ionix 5150 achieve a 3Dmark score of 9,130, placing it in a respectable fourth position.

One minor gripe was the inclusion of the Flatron 900P monitor, which does not complement the looks of the base unit. However, this monitor performs well, with a sharp and accurate display.

Significantly for home/office users, the Lexmark X5150 MFD is a good inclusion. Apart from lethargic photo reproduction, this MFD produces high-quality text, helping to cement the Multivision as one of the most solid inclusions.

DETAILS

RRP £938.82 (£799 ex VAT)
BEST PRICE & PRODUCT INFORMATION Multivision
 0870 220 2822

www.multivision.co.uk

PROS Performance; monitor; MFD

CONS True black optical drives would be more aesthetically pleasing

VERDICT

Great for those seeking a high-performance PC, a great monitor and MFD on a tight budget

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



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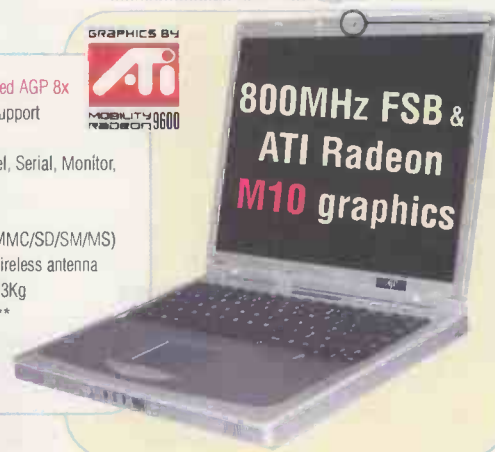
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- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3D Sound & Speakers with 5.1 channel output, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Carry Case, Windows XP Home with CD & Manual, External USB 3.5" FDD (Optional), Wireless LAN module (Optional), Bluetooth module (Optional)

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- Built in 56K fax/modem
- 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: 4xUSB 2.0, IrDA, TV-Out, Parallel, Monitor, PS/2, S/P DIF output
- Built in Bluetooth Support & Built in Wireless antenna
- Audio DJ onboard
- 329(W)x290(D)x44mm(H) / Weight: 3.7Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3.5" FDD, Built in 3D Sound & Speakers with 5.1 Channel output, 1x PC Card Slot, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Media Player), Windows XP Home with CD & Manual, Wireless LAN module (Optional), Bluetooth module (Optional)

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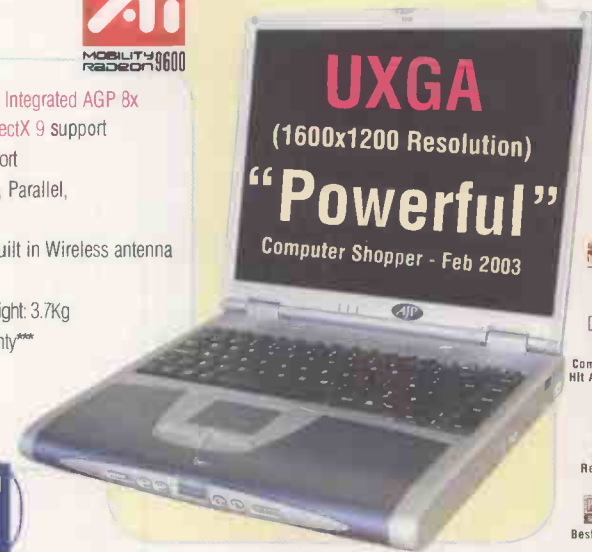
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Nethighstreet Net Evo 799

This month's entry from Nethighstreet is a P4-based system housed inside a decent, albeit unremarkable case. There is the usual pair of 256MB Dimms, fed instructions by a Hyper-threading-enabled 2.8GHz P4.

Delve deeper into the system, and an expansion-oriented Gigabyte motherboard can be found, complete with five available PCI slots, and room for an extra two memory modules. Perhaps in an effort to spice up an otherwise uninteresting base unit, a northbridge fan with flashing LEDs, is just visible through the system's rear vent.

Performance, as you'd expect from a Nethighstreet PC, is there in abundance. The Hyperthreading technology embedded within the P4 CPU enables the processor to execute two threads (parts of a software program) in parallel, allowing software to run more efficiently. Intel's theories, although challenged by its rival AMD, were effective in our tests, with the Nethighstreet clocking up a leading Sysmark score of 246.

The rest of the PC, including a 120GB hard disk, is of a high standard. The 128MB Radeon 9600 Pro graphics card is a high-quality budget accelerator with decent performance, and includes TV-out, DVI support and potential for overclocking.

On the business side, the Lexmark X5150 MFD, awarded a Highly Commended accolade in PCW October, is an inspired inclusion. Traditionally, despite claiming high print resolutions, Lexmark devices have struggled – but not in the case of the X5150. Strong text quality was matched by vivid, if somewhat sluggish, photo printing and scanning. Included as part of the software bundle is Microsoft's Works Suite 2003, which should give you a good start on the office suite front.

The Samsung Syncmaster 753 monitor is a great flat-screen device, but it is based on space-guzzling CRT technology. On the whole, however, the Nethighstreet is a commendable system with few drawbacks.

DETAILS

RRP £938.82 (£799 ex VAT)
BEST PRICE & PRODUCT INFORMATION Nethighstreet
 0870 777 5252
www.nethighstreet.com
PROS Eight USB2 ports; CPU; MFD
CONS No Firewire ports; space-intensive CRT monitor
VERDICT
 Despite a lack of Firewire ports, this is a powerful, versatile system for home or office use

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



Systemax Inspire 3187

Bullying its way into this issue's group test, the Systemax Inspire 3187 is helmed by the highest rated AMD processor in our collection, the Athlon XP 3000+. Manufactured using the same 0.13micron process as the Athlon 64 (previewed last month), the 3000+ has a number of advantages over its lower-rated predecessors – most notably a larger cache memory.

By including this processor alongside 512MB of memory, Systemax has produced a system capable of keeping up with its quickest competitors, regardless of whether they are based on AMD or Intel architecture. This configuration of CPU, memory and the competent MSI MS-6729 motherboard allow the 3187 to produce a high, if not overly startling, Sysmark score of 232 – enough for third place in our test.

Also noteworthy was the inclusion of an ATI All-in-Wonder 9800SE Pro, which went a long way to providing a more than adequate graphics platform. Equipped with 128MB of Ram, an assortment of VGA, DVI and TV-out connectors, as well as a TV-tuner with remote, this card doesn't lack in features. The 9800SE Pro is not low in performance either, as indicated by the group-winning 3Dmark score of 13,460.

The impressive multimedia capabilities of the 3187 are boosted further by the inclusion of a Dolby 5.1-capable sound processor, alongside the requisite S/PDIF port to reap the full benefits. Also, the inclusion of a reasonably large 120GB hard drive is a thoughtful one, particularly for users who are willing to take advantage of the 3187's multimedia focus.

Where the Systemax does stumble, though, is with the average Lexmark X1150 MFD. However, provided colour photo printing is not a high priority, this can be overlooked. Barring the 17in CRT monitor, we believe the remainder of the package is excellent, and users can expect a fast, well-featured system for a low price.

DETAILS

RRP £938.82 (£799 ex VAT)
BEST PRICE & PRODUCT INFORMATION Systemax
 08707 297 366
www.systemaxpc.co.uk
PROS Fast CPU; all-in-one graphics card
CONS MFD; CRT monitor
VERDICT
 A very well-specified PC, boasting huge power and a multitude of useful features

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



Time 2600 Pro VQ

Despite being the most ordinary looking PC in our test, the Time 2600 Pro VQ holds its own against its rivals in the areas that matter more. The Pro VQ has an Athlon XP 2600+ processor, plus 512MB of Ram.

Also making a positive impression is the DirectX 9-compliant Radeon 9500 graphics card, which managed an impressive 3Dmark score of 10,780 – the second highest in our test. Ramping up the possibilities for a thoroughly immersive multimedia experience is the inclusion of an S/PDIF connector, providing support for Dolby 5.1 sound.

Time has also included a card reader capable of using Sony Memory Stick, Compact Flash (CF), Secure Digital (SD) and Multimedia Card (MMC) media. Complementing this perfectly is an enormous 160GB Seagate hard drive, which augments the focus as a truly multimedia system, capable of housing large quantities of files. And to help create those files, Time has excelled itself on the office suite front and is the only entrant to have included Microsoft's quality Office XP.

Despite requiring the almost archaic use of a screwdriver to access its innards, the Time boasts a neat, accessible layout, housing a total of five PCI

expansion slots, three of which are unoccupied.

The HP PSC 1205 MFD, arguably the smallest on the market, is a joy to use. Even on cheap copier paper, users will find excellent text results, although the quality of its photo prints failed to impress.

In terms of raw performance, the Time system held its own, clocking up a respectable 214 in Sysmark. Where it did impress us, however, was its score of 165 in office productivity tests – one of the highest achieved in this group.

Well specified and powerful, this is a system that proved to be a definite all-rounder, thoroughly deserving of its place at the forefront of this group test.

DETAILS

RRP £938.82 (£799 ex VAT)

BEST PRICE & PRODUCT

INFORMATION Time

0870 830 3116

www.timecomputers.com

PROS DX9 graphics; Dolby

5.1; performance

CONS Bland case; CRT monitor

VERDICT

An excellent all-round PC with enough features to keep most users content

FEATURES

★★★★★

PERFORMANCE

★★★★★

VALUE FOR MONEY

★★★★★

OVERALL

★★★★★

Why MFDs?

As demonstrated by the growing popularity of TFT monitors, notebook PCs and the now conventional preference of tower cases over their desktop counterparts, consumers are extremely concerned about saving space.

In a business environment, and now more than ever in home arrangements, users are forced to squeeze an increasing variety of computer peripherals into ever-decreasing amounts of space. Printers, scanners, copiers and fax machines are mainstays of the office, but with more and more people choosing to work from home, the space afforded by the workplace is a luxury not available to us all.

Multifunction devices (MFDs) are a space-saving alternative to having two or more separate devices on the desktop. They traditionally combine a printer with a scanner mounted on top, and some include a copier and fax machine.

Original MFDs were based on mono laser printers, sheet-fed scanners and bundled fax capabilities. However, today's users are more likely to scan photographs, hence sheet-fed devices giving way to flatbed technology. Likewise, inkjets have been given the nod over mono lasers. Fax technology, meanwhile, has been excluded in many cases in order to keep prices down and because modern modems feature the technology anyway.

The advantages of combining separate devices are numerous. Most obviously, the space occupied by two or three separate peripherals is reduced dramatically. Second, these devices can be used as inexpensive document copiers and produce the same level of printing performance as the standalone printers upon which they are based.

Elsewhere, the simplicity of having three devices in one extends to basic considerations such as having to refer to a single manual instead of several. Furthermore, a single set of cables reduces the level of confusion and, indeed, the number of ports that are occupied in a PC, allowing far greater capacity for future expansion.

With the number of advantages they provide, it is easy to overlook the negative factors associated with MFDs. Unfortunately, though, they do exist – particularly the fact that the only function that can be shared across a network is the device's printing facility.

Elsewhere, there are concerns regarding the reliability of such machines. It is a common belief that if a problem arises in one area of the device, the remaining functions are also susceptible to failure, creating havoc for anybody who is reliant on at least one function being in working order at any one time. However, the reliability of today's MFDs is extremely high and the chances of failure are about as likely as that of standalone devices. Bearing in mind the main selling points of an MFD and the benefits they provide in terms of space and convenience, they are proving to be a much coveted and elegant alternative to using a multitude of devices. For a detailed look at MFDs, see our October group test.



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- 40GB Hard Drive
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- 32MB nVidia GeForce4 FX Go 5200 Graphics Card
- DVD+Rewriter Drive
- Integrated 56Kbps V92 Modem - 10/100 Ethernet
- Microsoft® Works 7.0
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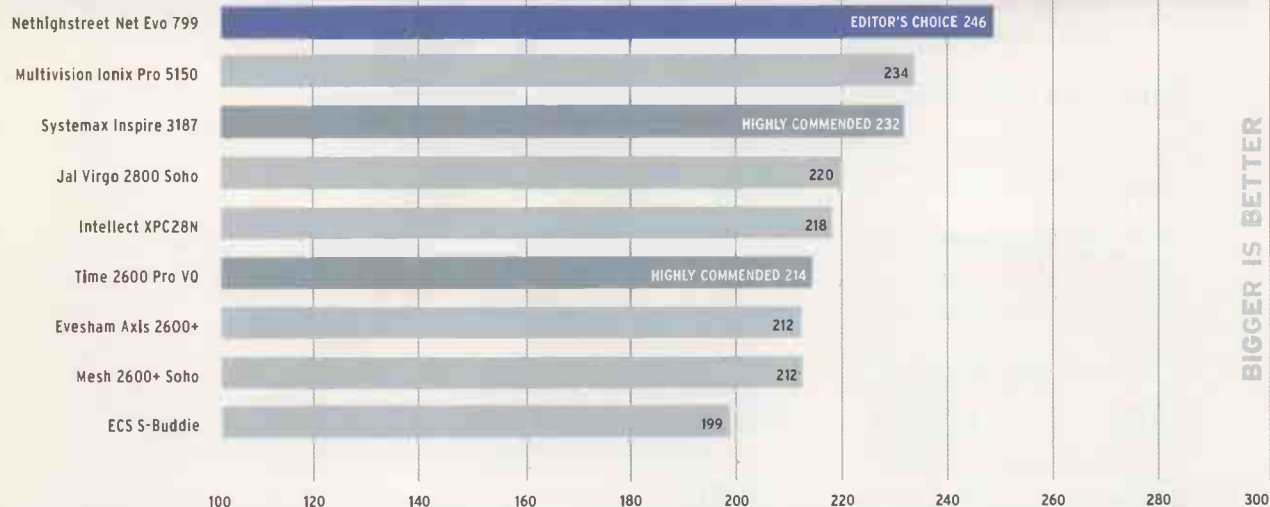
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Lab results

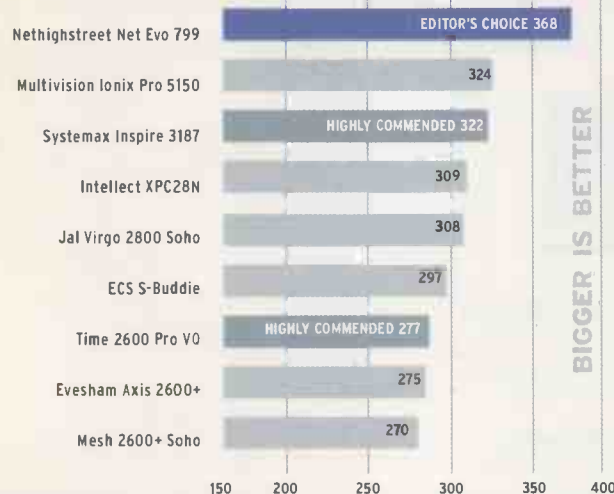


Sysmark 2002 overall



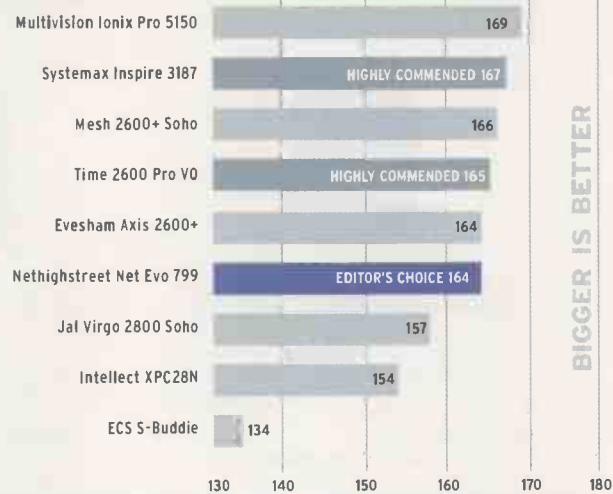
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Sysmark 2002 Internet content creation



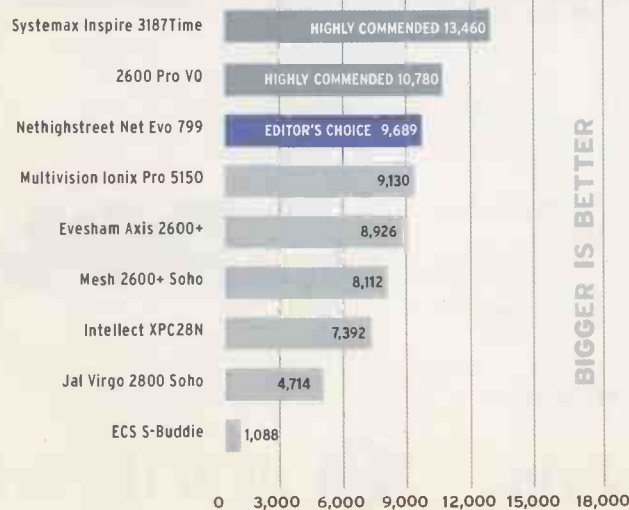
BIGGER IS BETTER

Sysmark 2002 office productivity



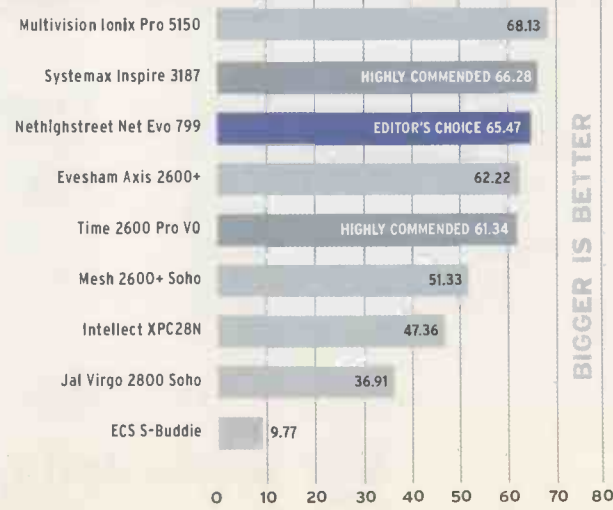
BIGGER IS BETTER

3Dmark 2001 (1,024 x 768 at 32bit)



BIGGER IS BETTER

Unreal Tournament (fps) (1,024 x 768)



BIGGER IS BETTER

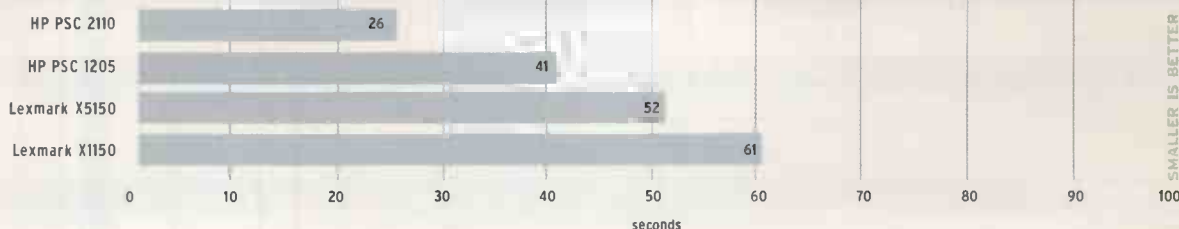
Note: Not all scales begin at zero

Please see page 12 for an explanation of how we tested the PCs

MFD results



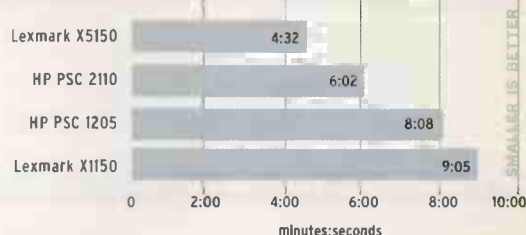
Time taken to scan the PCW cover at 300dpi in 24bit colour



Time taken to print 10 pages of text



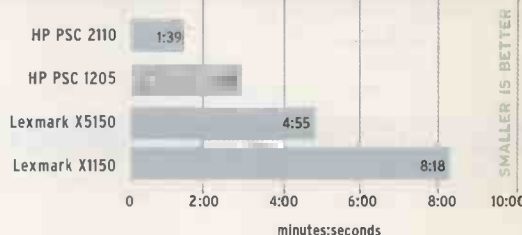
Time taken to print 10 pdf pages



Time taken to print 10 pages of mixed content



Time taken to print a test photo



How we tested the MFDs

When testing multifunction devices (MFDs), it is important to ensure we accurately measure the speed of the scanning components, as well as the machine's printing performance in both photo and text modes. Since they are all inkjet-based devices, we ran our standard inkjet tests on each of the machines using plain text, pdf and mixed content documents, plus an A4 photo assessment.

For text documents, PCW used the most appropriate paper – in this case photocopy paper, since this most closely emulates the media used by home and business users. Photos, meanwhile, were printed on each manufacturer's recommended photo paper; important since many papers are manufactured to react in a specific way to their corresponding printer.

As well as timing how quickly each device could complete a test, we wanted to ensure that the results were presentable.

In particular, our text-based 50-page word-processed document should be suitable for use in a business environment, and the photo output should closely rival traditional silver halide prints achieved with a 35mm camera.

Our 50-page pdf test used a section



This photo and pdf were used in our tests





of Apple's design guide for software developers. It comprises monochrome text and coloured icons, with an overlaid watermark. This test demonstrates each printer's ability to handle colour on photocopy paper. Our A4 photo test, meanwhile, is a composite of five images selected to test primary colours, skin tones and detail resolution. Here, we wanted to see smooth transitions between similar shades of colour, such as the various blues of a sky, and clearly defined edges in complex sections.

For the scanning tests, we connected each device in turn to our test system featuring a 2.2GHz Intel Pentium 4, 256MB of DDR-Ram and a large, fast hard drive. Four timed tests were performed, including the scanning of the full cover of PCW's November 2002 issue at 300dpi in 24bit colour.

In all cases we tested using the set of cartridges or ink wells supplied with the device as sold through the usual retail channels. See above graphs for the results.

Group test >> £799 PCs with MFDs

Table of features

					
MANUFACTURER	ECS	EVESHAM	INTELLECT	JAL	
MODEL NAME	S-BUDDIE	AXIS 2600+	XPC28N	VIRGO 2800 SOHO	
Price inc VAT (ex VAT)	£703.83 (£599)	£938.83 (£799)	£938.82 (£799)	£938.82 (£799)	
Sales telephone	08701 205 370	0870 160 9500	08701 225 590	01782 848 100	
URL	www.ecs.uk.com	www.evesham.com	www.intellect.uk.com	www.jal.co.uk	
HARDWARE SPECS					
Processor	Intel Pentium 4A, 2.4GHz	AMD Athlon XP, 2.1GHz 2600+	AMD Athlon XP-A, 2.08GHz 2800+	AMD Athlon XP-A, 2.1GHz 2800+	
Memory quantity and type	512MB DDR SD-Ram	512MB DDR SD-Ram	512MB DDR SD-Ram	512MB DDR SD-Ram	
Occupied/spare memory	2/0	2/1	2/0	1/2	
Max memory in this config	512MB	1GB	1GB	2.5GB	
Max memory supported by mbd	2GB	3GB	2GB	3GB	
Hard disk manufacturer, model	Seagate, ST340016A	Western Digital WD800JB-00CRA1	Maxtor 6 Y080L0	Maxtor 6Y120L0	
Hard disk size	40GB UltraDMA100	80GB UltraDMA100	80GB UltraDMA133	120GB UltraDMA133	
Storage drive manufacturer	LG GCC-4120B DVD-RW	Sony DVD-Rom DDU1612	Samsung SN-352 DVD CD-RW	Artex WRR-52Z	
Drive speed	DVD:8x, CD:12x 8x 32x DVD-Rom/CD-RW	16x/40x DVD-Rom	52x 24x 52x	52x 32x 52x	
MOTHERBOARD AND EXPANSION AND I/O COMPONENTS					
Motherboard model	ECS L4S5MG3	MSI/MS-6729-IL	Shuttle FN45	Gigabyte/GA-7VT600(-L)	
Chipset manufacturer/model	Sis 651	Nvidia Nforce2	Nvidia Nforce2 Ultra 400	Via Apollo KT600	
No of 3.5/5.25in bays	2/1	5/4	2/1	4/4	
No of free 3.5/5.25in bays	0/0	3/2	0/0	2/2	
No of PCI/shared/AMR slots	3/0/1(CNR)	5/0/0	1/0/0	5/0/0	
No of free PCI/shared/AMR slots	3/0/0	4/0/0	0/0/0	4/0/0	
No of USB1.1/USB2/Firewire	0/5/1	0/4/1	0/4/2	0/6/0	
No of serial/parallel/PS/2	1/1/2	1/1/2	1/0/2	2/1/2	
Built-in Lan port	✓	✓	✓	✓	
MULTIMEDIA					
DVD manufacturer	N/A	MSI 522452 CD-RW	N/A	OEM DVD-Rom 16x	
DVD speed	N/A	52x 24x 52x CD-RW	N/A	16x	
Sound card model	C-Media CMI9738	Nvidia Nforce MCP	Nvidia Nforce2 MCP	Realtek ALC655	
Speakers model	Built into monitor	Creative Inspire 5300	Built into monitor	Nicole SD311	
Graphics card model	Sis 650	Power Colour Radeon R96	Gigabyte GV-9200	Aopen Aeolus FX5200	
Chipset	Sis 650	ATI Radeon 9600 Pro	ATI Radeon 9200	Nvidia Geforce FX 5200	
Memory and type	32MB	128MB	128MB	128MB	
Monitor model	Elitegroup EZ15G	Philips 150S4	Sharp LL-T15S3	NEC Multisync LCD1560NX	
Monitor max viewable diagonal	15in	15in	15in	15in	
Max flicker-free resolution	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	
MULTIFUNCTION DEVICE					
Bundled multifunction device	N/A	HP PSC 2110	HP PSC 2110	Epson CX5200	
Dimensions (w x d x h in mm)	N/A	463 x 370 x 220	463 x 370 x 220	453 x 434 x 254	
Scan resolution	N/A	600 x 1,200	600 x 1,200	1,200 x 2,400	
Maximum printing resolution	N/A	4,800 x 1,200	4,800 x 1,200	5,760 x 720	
OTHER INFORMATION					
Misc hardware/modem	Mitsumi USB floppy drive, Tech WW-5 mouse, HSP56 MR modem	Ceratech Accuratus keyboard, CNXT V.92 Data Fax Voice	Intel 536EP Modem, Microsoft Multimedia keyboard & mouse	Microsoft Multimedia keyboard and mouse, Intel 536EP V.92 modem	
Bundled software	Windows XP Pro, Cyberlink PowerDVD	XP Home, Ability Office, Pinnacle Studio 8SE, Ahead Nero 5.5	Windows XP Home	Windows XP Home, MS Works Suite 2003, PowerDVD XP, Ahead Nero 5.5	
Standard warranty*	1yr RTB	2yrs on-site, 1yr RTB	3yrs RTB	2yrs on-site P&L, Life labour RTB	
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	
Performance	★★★★★	★★★★★	★★★★★	★★★★★	
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	
Overall score	★★★★★	★★★★★	★★★★★	★★★★★	

* (RTB = return to base, C&R = collect and return)

£799 PCs with MFDs <<Group test

				
MESH	MULTIVISION	NETHIGHSTREET	SYSTEMAX	TIME
MATRIX 2600+ SOHO	IONIX PRO 5150	NET EVO 799	INSPIRE 3187	2600 PRO V0
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0870 046 4747	0870 220 2822	0870 777 5252	08707 297 366	0870 830 3116
www.meshcomputers.com	www.multivision.co.uk	www.nethighstreet.com	www.systemaxpc.co.uk	www.timecomputers.com
AMD Athlon XP, 2.1GHz 2600+	AMD Athlon XP-A, 2.1GHz 2800+	Intel Pentium 4A, 2.8GHz	AMD Athlon XP-A, 2.1GHz 3000+	AMD Athlon XP, 2.1GHz 2600+
512MB DDR SD-Ram	512MB DDR SD-Ram	512MB DDR SD-Ram	512MB DDR SD-Ram	512MB DDR SD-Ram
2/1	2/1	2/2	2/1	2/1
1.5GB	1.5GB	2.5GB	1.5GB	1.5GB
3GB	1.5GB	4GB	3GB	1.5GB
Maxtor 6Y120P0	Seagate, ST3120022A	Maxtor 6Y120L0	Samsung SP1614N	Seagate, ST3160021A
120GB UltraDMA133	120GB UltraDMA100	120GB UltraDMA133	120GB UltraDMA133	160GB UltraDMA100
Sony DDU1612 DVD-Rom	Mitsumi DM-2000TE	Asus DVD-Rom E616	Sony DVD-RW DW-U10A	MSI MS-8352M CD-RW
16x/40x DVD-Rom	16x/50x DVD-Rom	16x/48x DVD-Rom	DVD: +RW:2.4x 2.4x, -RW:4x 2x, Rom: 8x, CD:24x 10x 32x DVD+RW/-RW/CD-RW	52x 24x 52x
Asus/A7N8X v2.0 Deluxe	MSI-MS-6729-IL	Gigabyte/GA-8IPE1000	MSI-MS6729	MSI-MS-6729-IL
Nvidia Nforce2 Ultra 400	Nvidia Nforce2	Intel Springdale i865PE	Nvidia Nforce2	Nvidia Nforce2
4/3	4/4	8/4	4/3	4/3
2/1	2/2	6/2	2/1	1/1
5/0/0	5/0/0	5/0/0	5/0/0	5/0/0
4/0/0	4/0/0	4/0/0	4/0/0	4/0/0
0/6/2	0/4/2	0/8/0	0/2/1	0/5/1
1/1/2	1/1/2	2/1/2	1/1/2	1/1/2
✓	✓	✓	✓	✓
Sony DW-U10A DVD RW	Liteon LTR-52327S	Samsung CD-R/RW SW-252B	N/A	MSI-8216 DVD-Rom 16x Max
DVD+RW:2.4x/2.4x, DVD-RW:4x/2x, DVD-Rom:8x, CD:24x/10x/32x DVD+RW/DVD-RW/CD-RW	52x 32x 52x CD-RW	52x 24x 52x CD-RW	N/A	16x DVD-Rom
Nvidia Nforce MCP	Nvidia Nforce2 MCP	Realtek ALC655	Realtek Avance AC97	Nvidia Nforce2 MCP
Creative SBS250	Creative Inspire P580	Cyber Acoustics A300E	Videlogic ZXR-500	Videlogic ZXR-500
MSI	Connect 3D Radeon 9600	Power Colour Radeon R96-A	ATI Radeon 9800 SE	OEM Radeon 9500
Nvidia Geforce FX 5200	ATI Radeon 9600	ATI Radeon 9600 Pro	ATI Radeon 9800 SE	ATI Radeon 9500
128MB	128MB	128MB	128MB	128MB
Mutiubishi Diamond Pro 930SB	LG Flatron F900P	Samsung Syncmaster 753DFX	CTX EX700F	LG Flatron F700P
19in	18in	17in	17in	16in
1,920 x 1,440	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024
Lexmark X5150	Lexmark X5150	Lexmark X5150	Lexmark X1150	HP PSC 1205
469 x 395 x 240	469 x 395 x 240	469 x 395 x 240	445 x 308 x 163	426 x 259 x 170
600 x 2,400	600 x 2,400	600 x 2,400	600 x 1,200	600 x 1,200
4,800 x 1,200	4,800 x 1,200	4,800 x 1,200	4,800 x 1,200	600 x 600
Logitech Internet keyboard, SoftK56 Data Fax Voice modem	Intel 536EP V.92 modem, Logitech Internet keyboard and mouse	Microsoft Internet keyboard and mouse, Bestdata Data Fax modem	Neto Dragon 56K Voice Modem	Samsung Wireless keyboard and mouse, Generic SoftK56
XP Home, Pinnacle Studio 8 SE, Cyberlink PowerDVD XP, Ahead Nero 5.5	Windows XP Home, Microsoft Works Suite 2003	XP Home, MS Works Suite 2003, Intervideo WinDVD4, Ahead Nero 5.5	Windows XP Home	XP Pro, Microsoft Office XP Standard, Cyberlink PowerDVD XP
3yrs on-site P&L	2yrs on-site, 3yrs RTB labour only	1yr RTB P&L, 2yrs RTB labour only	2yrs on-site, 1yr RTB	3yrs RTB
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
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★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

Editor's Choice

In this group test we have seen some exciting and varied entries vying for your hard-earned money. For the £799 ex VAT price point, manufacturers have been able to squeeze in just the right number of exciting features to entice home users, yet not break the bank for office consumers.

While the majority of manufacturers chose to pile in fast, low-cost processors in the form of AMD Athlon XPs, we also saw two Pentium 4 entries from Nethighstreet and ECS. Particular credit also has to be given to those manufacturers that chose not to hold back on provisions for decent graphics performance. The sheer range of graphics cards on display was encouraging, particularly as the majority were not onboard cards requiring shared system memory.

We also appreciated the range of multifunction devices on offer, although the Lexmark X5150, winner of a Highly Commended award in October's MFD group test, did seem to be a favourite among our suppliers. All the PCs also had built-in Lan cards, so are ready to be networked in your home office.

The winners

Although all our entries had their star qualities, there were three systems which stood head and shoulders above the rest. The first is the **Nethighstreet Net Evo 799**

'There are just the right number of exciting features for home users'

799, which wins the **Editor's Choice** award. Despite coming bundled with the space-guzzling Syncmaster 753 monitor, this system garnered our affections by clocking up an immense 246 in Sysmark tests. This was thanks to the fact that the system is founded on 512MB of memory, and a very fast Pentium 4 2.8GHz processor. Extreme performance was complemented by the inclusion of the superb Lexmark X5150 MFD, which, although common throughout this group test, still proves a tremendous addition to any PC. Photo output quality was impressive, but text wasn't as sharp as other MFDs we tested in October. Print speeds were good on text, however, photo printing and scanning were both slow.



Nethighstreet Net Evo 799



Systemax Inspire 3187



Time 2600 Pro VQ

Elsewhere, the Nethighstreet impressed us with the inclusion of a suitably large 120GB hard disk. Although not as sizeable as the one in the Time PC, this sort of capacity is not to be taken lightly. Also impressive was the inclusion of the Samsung 52x 24x 52x CD-RW and a DVD-Rom drive for all your playback needs. As well as this, you get eight USB2 ports – a generous number by anyone's standards, and the potent Radeon 9600 Pro graphics card – a budget accelerator which repeatedly proves itself extremely capable.

The first recipient of a **Highly Commended** award is the **Systemax Inspire 3187**. Where this entry impresses is in the inclusion of the extremely fast AMD Athlon 3000+ CPU. While the chip itself may only run at 2.17GHz, it still managed to attain one of the highest office productivity scores. This was thanks in part to the support for a 333MHz FSB, which passes information quickly between the processor and memory, thus avoiding bottlenecks. Importantly, the 3000+ also houses a large 512KB of Level 2 cache, resulting in impressive performance jumps, particularly in sound, video and photo-editing applications.

Systemax has also included an immense hard drive in the form of Samsung's SP1614N – a perfect addition for anyone using multimedia files. Continuing the 3187's great setup is the ATI Radeon 9800 SE graphics card. Feeding off 3DNow technology embedded within the AMD CPU, this card managed to clock up 13,460 in 3Dmark. The 9800 SE also features a TV tuner with remote control, allowing you to watch terrestrial television. The Lexmark X1150 MFD received a Great Value award in the September issue of PCW. Although we found it slow, the output was good, with crisp text and shading evenly rendered. The scanner has a good range of features and is easy to use.

Our second **Highly Commended** award goes to the **Time 2600 Pro VQ**. While certainly not on the same level of performance as either the Systemax or Nethighstreet, this system still managed to hold its own. Overlooking the fact that the Athlon XP 2600+ and 512MB of Ram don't form the quickest of pairings, the Pro VQ comes supplied with Windows XP Professional. The included MFD, HP's PSC 1205, is a decent performer that would cost you £99 if you bought it separately. Text quality was excellent and setup was easy. We had some problems with banding in the photo printouts, but if you need an MFD for text document printing and scanning functions, you could do worse.

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Internet access with dedicated high speed supanet optimized 56k modem
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Extreme 2700 PC

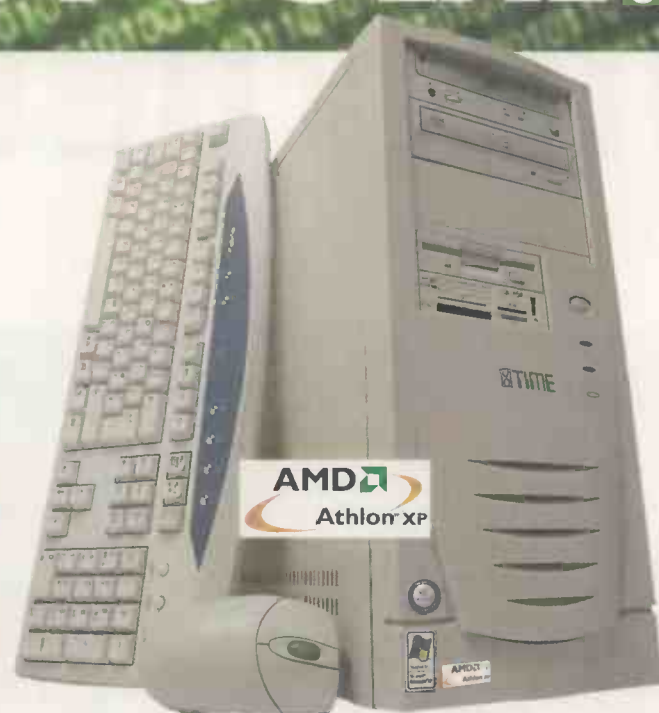
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If you have an email address
you will have received spam.

We've tested 10 packages,
both free and paid for and
for different OSs to see if
they really can address the
junk mail epidemic

Spam solutions

WORDS: NIGEL WHITFIELD TESTING: VNU LABS

A mere irritation a few years ago, spam now forms such a massive proportion of the email transferred over the Internet that many people feel they need some way of filtering it out, if their email address is to remain useful. It has also prompted moves in many countries to write legislation that can help roll back the tide, and we ask if that is likely to be more successful than Canute (see page 173).

Regardless of legislation, the solution for many Internet users is some sort of spam filtering. There are many different approaches – filtering by known senders, using blacklists of known spammers, checking email for key words, or more sophisticated analysis of the content of

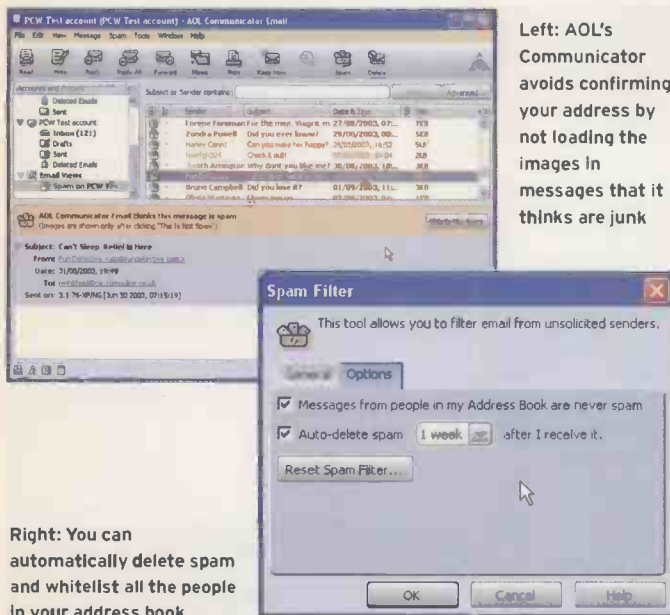
a message. All have their pros and cons, and some may work better than others for certain users.

In this group test, we've looked at 10 packages, covering software for Windows, Linux/Unix and Mac OS X. There are subscription-based services, paid-for software, and freeware. Approaches to the solution are just as varied, including products that work 'out of the box', and others that need to be trained to work properly. This month's cover disc has trial versions of eight of the products reviewed here.

Whether you use email sparingly or rely on it for business, and whether you're a technically knowledgeable computer user or a novice, spam is something you'll have to deal with sooner or later.



Group test >> Anti-spam software



Left: AOL's Communicator avoids confirming your address by not loading the images in messages that it thinks are junk

Right: You can automatically delete spam and whitelist all the people in your address book

AOL Communicator

Despite the anti-spam controls AOL has in place, users often have to cope with a lot of spam in their mailboxes; the size of the service makes it easy for spammers to guess valid addresses.

AOL Communicator is a standalone email program that connects to the AOL servers, either dialled up through AOL or via another connection, and lets you access your mail with more features than the standard AOL client. It can also connect to POP and Imap accounts elsewhere, but you have to configure at least one AOL email address.

As well as allowing you to create folders and view multiple mail accounts, the program adds spam filtering and – for AOL accounts only – a reporting option, to block such messages from your account in future. Spam filtering can be turned on or off for individual accounts, and you can whitelist people in your address book so messages from them are never treated as junk, minimising the number of manual interventions.

There's no training mode as such, but you can reset the spam database. Messages thought to be spam are flagged with an icon and coloured, but they appear in the mailbox with ordinary mail. A separate 'views' option includes a spam view showing just those. There isn't one for just showing

mail that's not spam, however. It means you can quickly review the spam, then right-click and select 'Delete all spam' to end up with the messages you want. We found a relatively low hit rate; it should improve with training, but we'd hoped for a higher score.

One useful feature is that when a message is thought to be spam, images contained in it are not downloaded, helping to ensure they can't be used to confirm your address works. Click 'This is not spam' at the top of a message, and the images will appear.

Communicator can make a difference to AOL users. If you're a heavy emailer, there are other features you'll appreciate as well.

DETAILS

RRP Free

PRODUCT INFORMATION

AOL

www.aol.co.uk

SYSTEM REQUIREMENTS

AOL account

PROS Avoids downloading

images in suspected spam

CONS Requires an AOL account to work

VERDICT

A much better solution for AOL users than the email facilities of the standard software

FEATURES

EASE OF USE

VALUE FOR MONEY

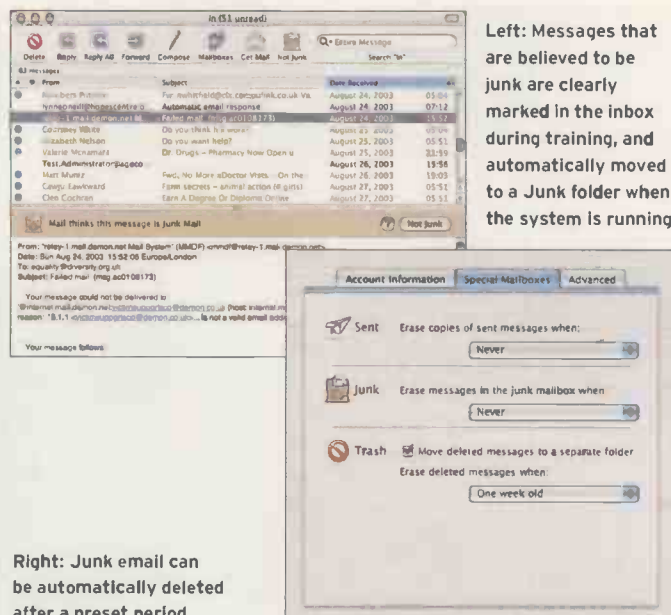
OVERALL

★★★★★

★★★★★

★★★★★

★★★★★



Left: Messages that are believed to be junk are clearly marked in the inbox during training, and automatically moved to a Junk folder when the system is running

Right: Junk email can be automatically deleted after a preset period

Apple Mail

Apple's Mail client is included with OS X, so it is the natural choice for most users of that operating system. It's relatively easy to use, but there are alternatives, and the Unix base of the system means that you could even run Spam Assassin with a certain amount of fiddling around. But is it worth it, when Mail has built-in junk filtering?

Bear in mind that Mail's filtering, unlike that in some other packages, will work with Imap as well as POP email, so it can filter messages in your .Mac account and elsewhere.

Unlike most of the packages we tested, Mail has an official 'training' mode, during which messages are detected as junk but not moved to a junk mail folder. Each message is highlighted in brown by default, and a bar across the top reinforces the statement that Mail thinks it's junk; a Not junk button at the top of the message and on the tool bar allows you to change the status. You can also mark as junk messages that Mail didn't detect.

However, images are still loaded in junk mail, which is unfortunate – you can turn off images for all messages, but not just for that subset. And in training mode, you'll need to create a folder for junk, or delete it after it's been marked. When you switch to automatic mode,

a junk mail folder appears, and messages are moved there automatically; if you have multiple accounts, there are subfolders for each one.

You can still automatically review and alter the status of messages, and junk can be deleted at preset intervals. With a score almost identical to that of AOL's Communicator (which will soon be available for OS X as well), performance isn't stunning, but the ease of use and integration with other programs such as Address Book and iChat may be reason enough for OS X users to stick with Mail rather than attempting to add an alternative to their system.

DETAILS

RRP Included with Apple OS X

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Apple

www.apple.com/uk

SYSTEM REQUIREMENTS

Macintosh OS X

PROS Reasonable performance;

Apple ease of use

CONS Training the software can be a tedious process

VERDICT

Not the best performer, but improves with training

FEATURES

EASE OF USE

VALUE FOR MONEY

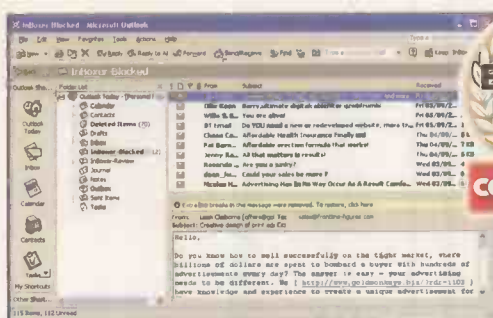
OVERALL

★★★★★

★★★★★

★★★★★

★★★★★



Above: Simple keep and block buttons appear when you're browsing folders with Inboxer installed on your PC

Right: You can add an address or a whole domain to your trusted or blocked senders list with Inboxer



Audiotrieve Inboxer

Inboxer is from Audiotrieve, a company whose original expertise is in speech recognition. The version we tested was a late beta, but behaved flawlessly – though we did have minor installation problems on one system. It's based on the Spambayes open-source product (see later), but brings a few extra things to the party, notably a prebuilt database so you can get off to a flying start without having to worry about training. You also get easy options to allow you to add or block individual addresses and whole domains, and support via email, web and telephone.

Installation is simple; after running the setup program, a wizard runs in Outlook, and you can automatically add all your contacts to the allow list. As messages arrive they're sorted into one of two folders – Inboxer blocked and Inboxer review. The former is where all the mail that is definitely spam is dumped – in our tests, nothing else ended up there at all. The second folder is where messages are put if they're questionable, which makes for a much quicker review process.

Depending on which folder you're in, Inboxer provides block, unblock or both buttons on the toolbar; clicking on a message or group of messages moves them to either the spam folder for blocking, or the inbox

for unblocking, and trains the database according to your choices; you can also drag and drop good or bad messages, and Inboxer will learn accordingly.

A third Inboxer button gives extra options including the trusted/blocked senders list, allowing you to add a sender or a whole domain to either. To view the lists, Inboxer creates a new message with the information on it, which is a little clunky.

That minor niggle aside, Inboxer is a joy to use; it does its work, it doesn't crash, it doesn't misfile many messages and it detects a lot of spam. It's about as close to 'fit and forget' as you can have while still being reliable.

DETAILS

RRP \$24.95 (£15.60)
(Or free 21-day trial)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Audiotrieve www.inboxer.com

SYSTEM REQUIREMENTS

Microsoft Outlook 2000, 2002 or XP

PROS Works out of the box; review system makes training easy

CONS The white and blacklist interface needs improvement

VERDICT

Easy to use, effective and adds features to open-source parent

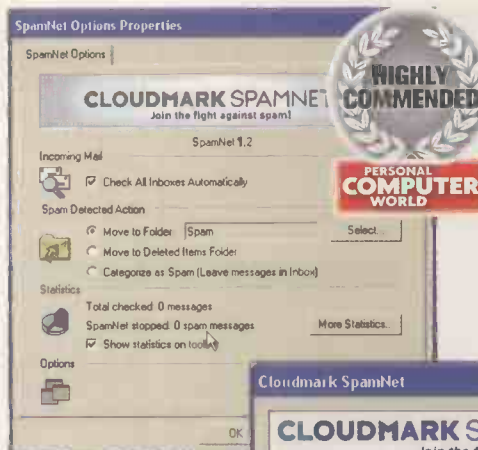
FEATURES

EASE OF USE

VALUE FOR MONEY

OVERALL

★★★★★
★★★★★
★★★★★
★★★★★



Right: Some other Spam Net users may not have the same view of a message as you do



Left: Spam Net is very easy to configure, but the defaults are fine for most people

Cloudmark Spam Net

Spam Net was originally free, but now operates as a service, which will cost you around £30 a year. It works by calculating a signature for messages and checking as messages arrive to see if they've been declared spam by other users of the service. If so, the message is moved to a spam folder. The system is apparently bright enough not to be confused by those random collections of letters spammers stick on the end of their names or subject lines.

As with most of the other plug-ins, there are block and unblock buttons you can use if you disagree – if, for example, a spam is fresh, it may not be in the database. When you click to block, information about the message is sent to Cloudmark's servers – meaning, incidentally, that you'll need to be able to connect to Cloudmark. Common proxies are supported for use behind firewalls. A weighting system ensures new users can't skew statistics too much.

We had no problems with mailing lists, and using it was pretty painless – though we did notice a potential downside. Not everyone agrees on what spam is; some users obviously thought the postmaster and virus notifications generated by Sobig.F fell into that category. We didn't, so had to unblock such

messages; that was also pretty easy, though, and unblocking messages from the same source twice will automatically whitelist a sender for you.

You can also manually add addresses to a whitelist should you correspond regularly with people who keep being blocked (though you may wish to reconsider your relationship if they are spammers!).

Installation was simple, and performance was among the best we tested; whether you choose Spam Net will depend to a large extent on whether you're willing to pay for an ongoing service instead of a piece of software.

DETAILS

RRP \$3.99 (£2.50) per month
(Or 30-day free trial)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Cloudmark www.cloudmark.com

SYSTEM REQUIREMENTS

Microsoft Outlook 2000, 2002 or XP

PROS Simple to use; allows you to help others

CONS Monthly subscription necessary

VERDICT

A simple and effective tool for a modest monthly fee

FEATURES

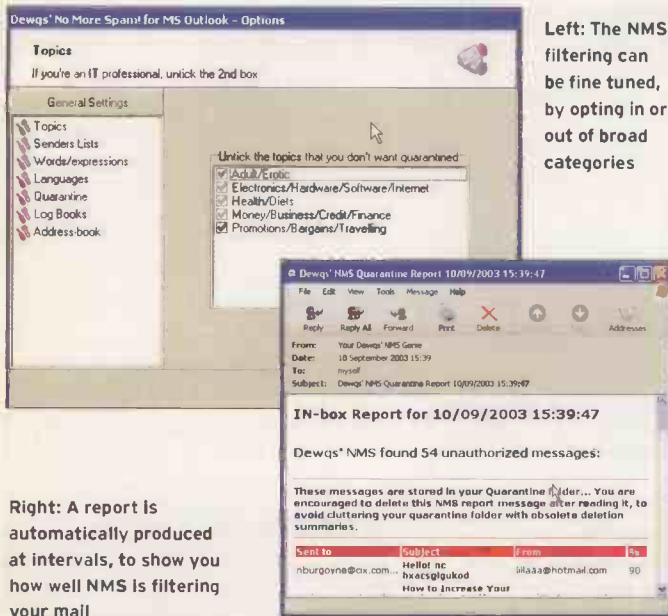
EASE OF USE

VALUE FOR MONEY

OVERALL

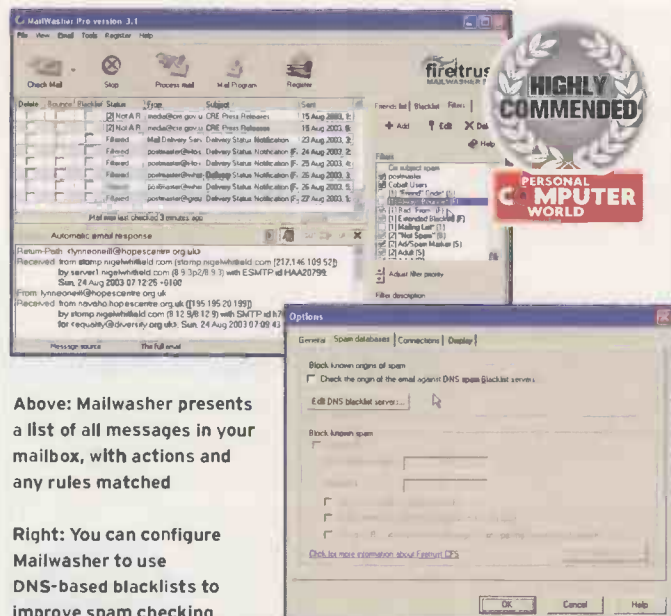
★★★★★
★★★★★
★★★★★
★★★★★

Group test >> Anti-spam software



Left: The NMS filtering can be fine tuned, by opting in or out of broad categories

Right: A report is automatically produced at intervals, to show you how well NMS is filtering your mail



Above: Mailwasher presents a list of all messages in your mailbox, with actions and any rules matched

Right: You can configure Mailwasher to use DNS-based blacklists to improve spam checking

Dewqs' Tribes NMS

NMS (No More Spam) is available in two versions; a standalone mail filter, which works a little like Mailwasher for people who don't use Outlook, or the Outlook plug-in, which we tested. It provides most of the same features as the standalone but isn't quite as configurable.

On startup, the plug-in scans your Outlook address book for contacts to add to permission lists, and provides a list of categories of messages that you might want to scan for; so a doctor, say, might not want to filter out medical-related messages. You can also filter based on the alphabet used, which should let you remove curious oriental spam at a stroke.

A Quarantine folder is created during installation, as a subfolder of your inbox. Mail is filtered automatically as it's downloaded, which did seem a little slow.

Buttons in the Outlook toolbar let you ban or protect based on words or senders, so you can click on a message and use the allow word option to check parts of the subject line, for instance. Unlike some other packages, clicking to protect a sender when they've been quarantined just allows further messages through – it doesn't move the message back to your inbox. Similarly, clicking to block on junk message in your inbox leaves it there.

Reliability was good, with over 96 per cent of our junk mail detected and one of the lowest number of interventions required (see How we tested and graphs on page 173). Periodic reports popped up to show us how the system was behaving, but for some reason they were created as blank messages in Outlook Express, even though the system was set to use Outlook for mail.

NMS behaves well and, with the extra options, the standalone is worth a look if you have other mail clients. But the speed and lack of polish mean that, despite the accuracy, Outlook users will probably do better to choose Inboxer or Spambayes.

DETAILS

RRP £23 (£14.40) for one laptop and one desktop (or free 90-day trial)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Dewqs' Tribes www.dewqs.com

SYSTEM REQUIREMENTS

Windows 98/later • Outlook 2002/XP

PROS Effective detection; few interventions needed

CONS Doesn't move messages when marking

VERDICT

Standalone version offers more for users of other mail programs

FEATURES ★★★★★

EASE OF USE ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

Firetrust Mailwasher Pro

While many of the PC solutions we've looked at are designed to work as a plug-in for Outlook, Mailwasher Pro is a standalone program, so you can use it with Eudora, Outlook Express, Netscape, Opera or anything else. It will filter POP3 and Hotmail accounts and during setup will import your mail settings from Outlook, Outlook Express, Eudora and Netscape.

Using Mailwasher is a multi-stage process: you check mail with it, review your inbox list – marking messages to delete, bounce or keep – then click Process Mail, at which point messages are deleted. Then click to go to your email program and download just the mail you want. It sounds clunky but works pretty smoothly, and you can easily add filters for mail you want to keep. You can also check against DNS blacklists for extra filtering and, later this year, a Firetrust database of known spam.

However, most of this is done with rules. Lots of them, and they are pretty complicated at times. Mailwasher doesn't come with any installed, though it does have some heuristic spam filtering. If you had to set up all the rules manually, we wouldn't rate this, but luckily, after installation, an email arrived with instructions for downloading a prewritten set of rules, which was used for our

tests with pretty good results. Some need minor tweaks, and there are other niggles – while building a new filter rule, you can't scroll the list of messages to check something.

If you don't mind the three-step method for getting new mail, it's a lot easier than it seems; for example, clicking to add a friend will immediately mark all messages from them, and some viruses are detected. You can hide good mail from the list, making it easier to skim for false positives, so saving time.

If you don't use Outlook, it's a great solution – probably even better when the 'known spam' database option is available.

DETAILS

RRP \$29.95 (£18.70)

(Or 30-day free trial)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Firetrust www.firetrust.com

SYSTEM REQUIREMENTS

Windows 95 or later

PROS Works with most

mail programs

CONS Comes without rules built in

VERDICT

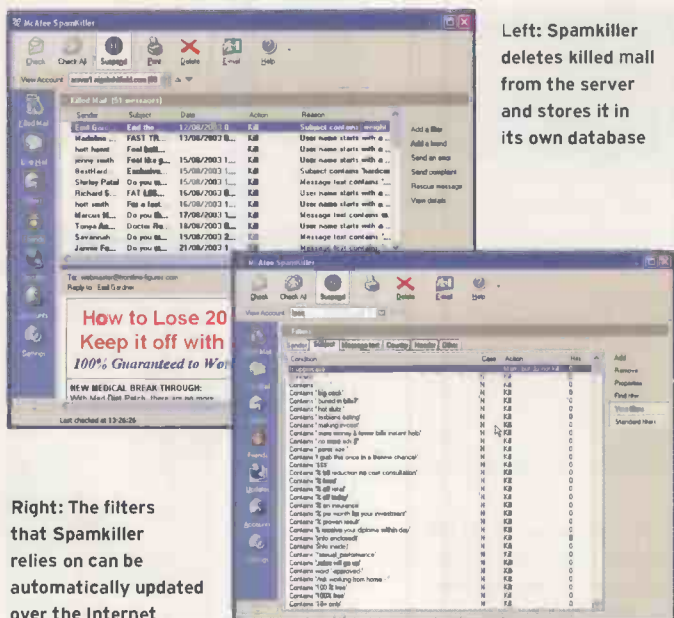
Configurable and flexible – when you have the rules set up. Great for people who don't use Outlook

FEATURES ★★★★★

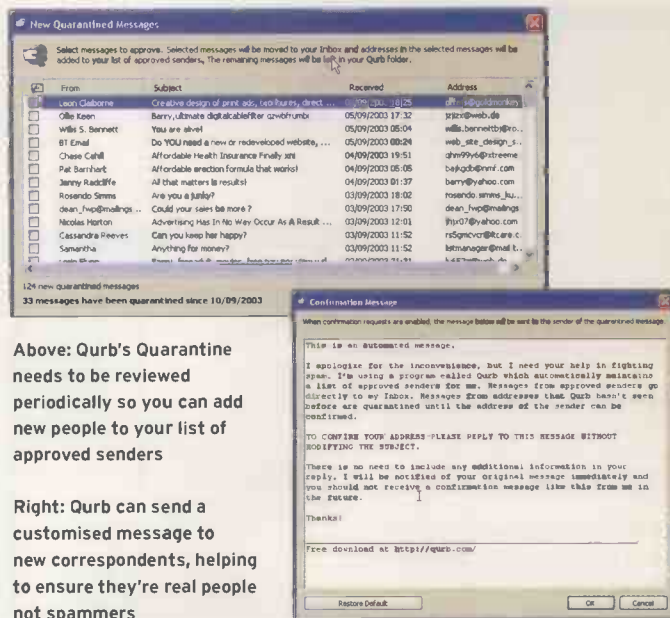
EASE OF USE ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★



Left: Spamkiller deletes killed mail from the server and stores it in its own database



Above: Qurb's Quarantine needs to be reviewed periodically so you can add new people to your list of approved senders

Right: Qurb can send a customised message to new correspondents, helping to ensure they're real people not spammers

McAfee Spamkiller

Spamkiller is obviously a program that sets out to be in the same mould as the very successful Mailwasher. It doesn't get there, however, having fallen off the rails somewhere around the point usability was considered.

Unlike Mailwasher, Spamkiller comes with a set of predefined rules, and new sets can be downloaded over the Internet via an auto-update. The installation added McAfee's security centre to our PC, proceeded to download an executable file without offering any clues as to whether we should open or save it, and then, finally, we got to Spamkiller. Curiously untrue to its name, it committed suicide repeatedly while trying to process the third of our mail downloads.

When you connect to the mail server, Spamkiller marks messages, depending on whether they matched various rules, or were in your friends list. You can easily add addresses to the friends list – as long as it's the first on a line. If there are two addresses in a header field, and you want the second, you'll have to type it in manually.

That's annoying enough, but the really irritating thing is that messages that are detected as spam are deleted from the server right away, and held in the bowels of Spamkiller. You can

recover them, at which point, they're mailed back to your mailbox – not much fun for modem users – with lots of their headers ripped off, ready to download again the next time you check mail. Don't do this on GPRS, folks! And some of the messages that are shown in the 'Live mail' pane have been marked for deletion anyway. Sure, the rules are flexible – but we didn't notice at the start that when we set up a new one for mail we wanted, the default action was to kill it instead!

Someone, somewhere, thought this was an intuitive and efficient way to sort out junk mail. They were wrong.

DETAILS

RRP £17.99 (£15.31 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

McAfee <http://uk.mcafee.com>

SYSTEM REQUIREMENTS

Windows 95 or later • IE 5.0 or later
PROS Automatically updates filters with new rules

CONS Horrible interface; poor detection rate

VERDICT

An overcomplicated, confusing and less reliable clone of Mailwasher

FEATURES

EASE OF USE

VALUE FOR MONEY

OVERALL

★★★★★

★★★★★

★★★★★

★★★★★

Qurb

Qurb doesn't work in the same way as other packages tested here. It eschews the keyword or heuristic scanning of messages for a simple authorised sender facility, only allowing messages from authorised senders to reach your inbox. To avoid a struggle, don't install it on a fresh PC – it analyses contacts and your saved emails to build an initial list of senders and, without that, you'll have to do a lot of clicking to allow people through.

You can set up an automatic response, which works well – people will receive a standard email the first time they contact you and they must reply leaving the subject unchanged. When they do, they're added to your list. If you receive such a message from another Qurb user, it will automatically respond for you.

To keep you on top of messages from people not on your approved list, a periodic reminder tells you there are quarantined messages to review; if there is more than one from a single sender, a click on the first will let all the others through.

Mailing lists are simpler than you'd imagine, as well. Qurb recognises headers commonly found in list messages and works out what to allow through, giving us no problems on that score. If you approve a message that was copied to several people,

it will also add all their addresses, which is usually a good thing.

We did have some niggles – we like to receive bounces if our email doesn't get through but, while you can add a whole domain to your list, you can't add postmaster@everywhere, for example. If messages are forged, of course, they'll be able to slip through if they appear to be from someone in your list.

Qurb certainly keeps the junk away, and it's very easy to set up. Whether it's the solution to your junk problem will depend on how extensive your contact list is; some people will find the challenge-response system too much trouble, others will love it.

DETAILS

RRP £24.95 (£15.60)

(Or unlimited free trial)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Qurb www.qurb.com

SYSTEM REQUIREMENTS

Microsoft Outlook 2000 or 2002 • Windows 98 or later

PROS Stops all unsolicited email

CONS Quarantine system may confuse some users

VERDICT

A sturdy solution to spam – but tedious if starting from scratch

FEATURES

EASE OF USE

VALUE FOR MONEY

OVERALL

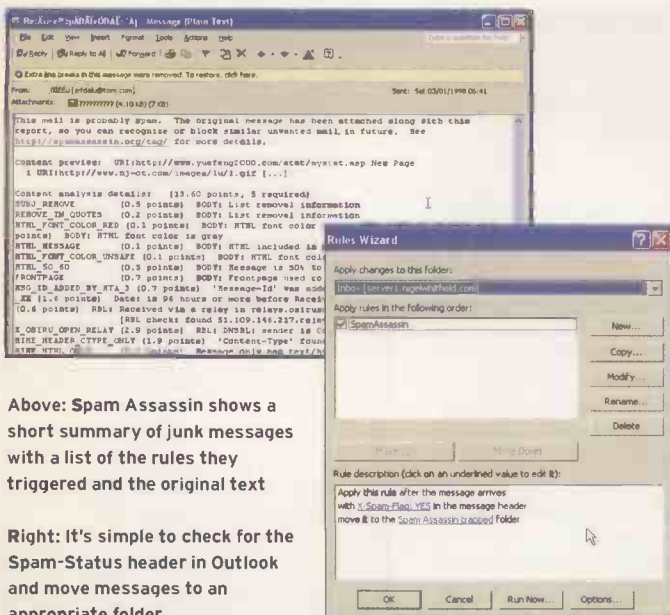
★★★★★

★★★★★

★★★★★

★★★★★

Group test» Anti-spam software



Above: Spam Assassin shows a short summary of junk messages with a list of the rules they triggered and the original text

Right: It's simple to check for the Spam-Status header in Outlook and move messages to an appropriate folder

Spam Assassin

Sпам Assassin is the best known of the Unix spam filtering systems; we tested version 2.55. You can use a vast array of options to tweak things, including support for distributed spam database and enabling the system to learn from the messages that have already been processed. However, it can be fiddly to set up, especially if you want to combine it with other tools to provide an anti-virus system. Thankfully, for many Linux distributions, you can find a package that makes installation simple.

Spam Assassin uses rules and Bayesian analysis to decide if a message is spam, and you can choose the thresholds at which an X-Spam-Status: YES header is added to a message; some people simply trust the program to bounce all the junk it finds.

In our default configuration, when a message was thought to be spam, the entire body was turned into an attachment, and replaced with a report from Spam Assassin giving the score, rules triggered, and a summary of the first lines of the message, so you won't accidentally download tracking images or execute malicious script. Performance was adequate – though it can be slow if you don't have a well-specced system on which to run it.

We used the spamc/spamd system, where Spam Assassin

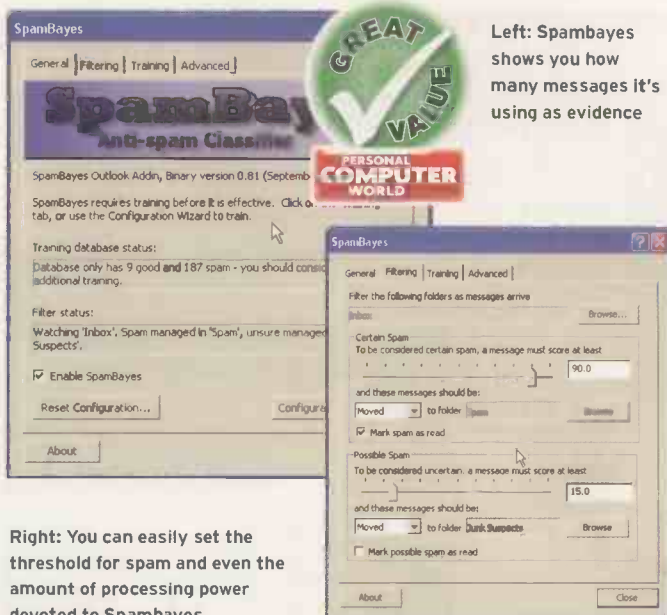
runs in the background and a small client program passes messages to it, receiving results. This speeds things up, but when the system was heavily loaded, we found a few messages weren't scanned, though were delivered safely. We didn't use the sa-learn system to update the database, which would give better figures.

With support for Internet blacklist, auto whitelisting and storing different preferences for each user on a system, Spam Assassin is one of the most flexible solutions, and available for Windows. If you're of a technical mind, or want to protect lots of mailboxes, it's worth a serious look.

DETAILS

RRP Free
PRODUCT INFORMATION
<http://spamassassin.org>
SYSTEM REQUIREMENTS
 Linux/Unix • Perl
PROS Helps avoid tracking images in junk mail
CONS Getting the best out of this package requires extensive tinkering
VERDICT
 A high-performing package for Linux/Unix users; could be even better with careful configuration

FEATURES ★★★★★
EASE OF USE ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★



Left: Spambayes shows you how many messages it's using as evidence

Right: You can easily set the threshold for spam and even the amount of processing power devoted to Spambayes

Spambayes

Sпambayes is open source, available as a plug-in for Outlook; it's also the product at the core of Audiograbber's Inboxer, though the two look quite different.

Installation is straightforward – much improved on earlier versions – but, unlike its commercial counterpart, the product comes uneducated. That means you really need a folder of junk and some good messages to point it at, so you can teach it what to look for.

Spambayes can watch multiple inboxes, and the control panel allows you to determine how much of your PC's resources are dedicated to checking messages. Those that are determined to be junk are put in one folder, and a Junk Suspects folder holds those you need to review manually. During our testing no messages were erroneously put in the Junk folder, though we did have to review quite a few, as you'd expect with an untrained program.

Buttons are provided to mark messages as good or bad, and clicking on them moves the message to the appropriate folder and uses it to train the database. We found this a bit slow sometimes; it's quicker to drag and drop the messages, which has the same effect. It's important to note that only the

messages you change the status of are used for training – not the ones the system decides are junk. But you can always point the plug-in at any folders of known good or known junk messages and rebuild the database.

The overall results put Spambayes ahead of Inboxer, but that's likely to be because the training was all using our messages rather than a pre-supplied database. Spambayes is efficient, and if you don't want the whitelist/blacklist features or the support offered by Inboxer, it's worth a look. For being simple to use, effective and completely free, it merits a PCW Great Value award.

DETAILS

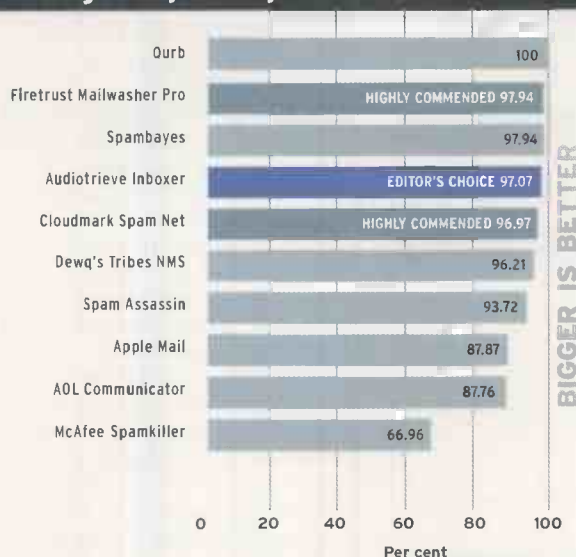
RRP Free
PRODUCT INFORMATION
<http://spambayes.sourceforge.net>
SYSTEM REQUIREMENTS
 Microsoft Outlook 2000 or later • Windows 98 or later
PROS Free; great performance; easy to use
CONS Interface lacks polish; needs initial training
VERDICT
 Once trained, this software can compete with the commercial packages

FEATURES ★★★★★
EASE OF USE ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★

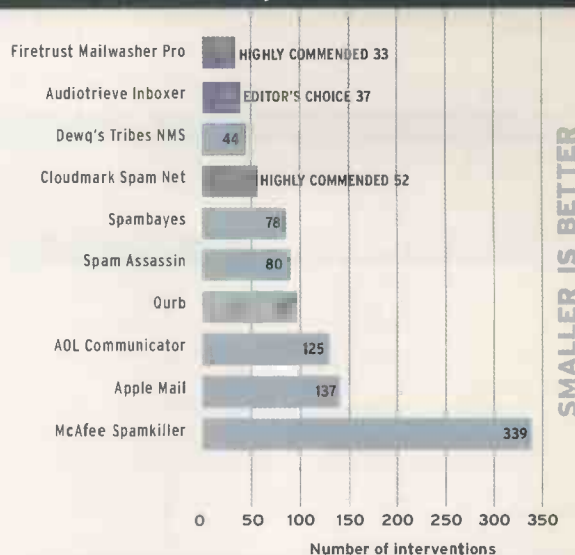
Lab results



Percentage of spam kept from inbox



Total interventions required



How we tested

Testing spam filtering packages presents a particular problem; you can't just test each package for a few days and see what happens, because you won't necessarily receive the same messages each time. In order to produce the fairest test possible, you need identical messages fed to each package.

To provide this, we set up 10 mailboxes on a server, all receiving copies of messages sent to a collection of addresses, including some that are known to receive lots of junk mail. While many people may have just one email address, as more users register their own domains, they're likely to have extra addresses delivering messages to the same mailbox.

The collection of messages was split up into a dozen different downloads, of varying sizes, covering a period of a few weeks, and totalling just under 1,000 messages. They included personal messages to a variety of the addresses in use, three different mailing lists, bounced message and – since tests were carried out before 10 September – a few copies of the Sobig.F virus and the assorted bounced messages that various mail systems generated when a virus with our address in the headers was sent to them.

Those packages that work in conjunction with a Windows email program were tested with Outlook 2002, since most of them support that in preference to Outlook

Express; the features table on page 174 indicates which other mail systems each package supports. Outlook was populated with an address book containing some – but not all – of the addresses of the senders of legitimate mail in our test data, and the first mailbox download was carried out without filtering enabled, giving an Outlook installation that contained a mixture of legitimate and spam messages, much as many people would have before they decide to install one of these filtering systems.

For each subsequent download, we recorded the number of messages that were falsely declared to be not spam (false negatives) and the number that were false positive. For those packages that had a third 'review' category, we recorded the number that were put there, and how many of those were actually valid messages.

The first of our two graphs (above left) shows the percentage of spam messages that were successfully diverted from our inbox by each package; the 100 per cent reading for Qurb is a result of it only allowing messages from known senders to be delivered. Higher percentages mean less junk mail to wade through. The amount of spam diverted, however, is only half the story. False positives are a nuisance too, as is an excessive number of messages held 'for review'.

We therefore counted the number of interventions necessary – either a spam

message that needs to be moved from the inbox, or a valid message that must be recovered either from a spam folder or from the review folder. We didn't count any spam that was held in a review folder as requiring user intervention – it can, after all, be deleted with a quick click once the valid messages have been retrieved. The second graph (above right) shows the number of interventions necessary to arrive at the correct result – that is, a mailbox with all the legitimate messages and no spam. Obviously the lower the number, the less work you'll have to do.

Packages were used with their default or manufacturer supplied or recommended settings, with any auto-update option run after installation to ensure they were current. We did, however, add filters to those packages that allowed it for the mailing lists that appeared in some mailboxes, after the first occurrence of those lists, as we anticipate an ordinary user would do once they realised legitimate mail was being blocked.

The results give a fair representation of how the various packages fare in normal use. It's important to note, however, especially with those packages that have learning modes or lists of permitted and banned senders, that results in the real world are likely to change over time as the program or the user amends options to ensure legitimate email is never stopped.

Table of features

SUPPLIER	AOL	APPLE	AUDIOTRIEVE	CLOUDMARK	DEWQS' TRIBES
PRODUCT	COMMUNICATOR	MAIL	INBOXER	SPAM NET	NMS
Website	www.aol.co.uk	www.apple.com	www.inboxer.com	www.cloudmark.com	www.dewqs.com
Price *	Free	Bundled with OS X	\$24.95 (£15.60)	\$3.99 (£2.50) monthly	\$23 (£14.40)
Platform tested/others	Windows/OS X (soon)	Mac OS X	Outlook/Exchange	Outlook/OE (soon)	Outlook/Windows
POP3/Imap	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓
AOL/Hotmail/Mapi	✓/X/X	X/X/X	X/✓/✓	X/X/X	X/✓/✓
FILTERING					
Bayesian/heuristic	✓	✓	✓	X	✓
Keyword	X	X	X	X	✓
White/blacklist	X/X	X/X	✓/✓	✓/✓	✓/✓
DYNAMIC LISTS (EG ORDB, SPAMCOP)					
Checksum	X	X	X	✓	X
Reporting	✓ (AOL only)	X	X	X	X
Virus filter	X	X	X	X	X
Auto reply (challenge/respond)	X	X	X	X	X
Learning	✓	✓	✓	X	✓
Image filter	✓	X	X	X	X
Bouncing	X	X	X	X	X
Create whitelist from address book	✓	X	✓	X	✓
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Ease of use	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



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SUPPLIER	FIRETRUST	McAfee	QURB	SPAMASSASSIN	SPAMBAYES
PRODUCT	MAILWASHER	SPAMKILLER	QURB	SPAM ASSASSIN	SPAMBAYES
Website	www.firetrust.com	www.mcafee.com	www.qurb.com	http://spamassassin.org	http://spambayes.sourceforge.net/
Price *	\$29.95 (£18.70)	£17.99 (£15.31 ex VAT)	\$24.95 (£15.60)	Free	Free
Platform tested/others	Windows	Windows	Outlook/OE (soon)	Linux/Windows	Outlook/Linux, Windows
POP3/Imap	✓/✓	✓/✓	✓/✓	✓/✓ all server-based	✓/✓
AOL/Hotmail/Mapi	✓/✓/✓	X/✓/✓	X/X/X	X/X/X	X/X/X
FILTERING					
Bayesian/heuristic	✓	X	X	✓	✓
Keyword	✓	✓	X	✓	X
White/blacklist	✓/✓	✓/✓	✓/✓	✓/✓	X/X
DYNAMIC LISTS (EG ORDB, SPAMCOP)					
Checksum	Coming soon	X	X	✓	X
Reporting	X	✓	X	X	X
Virus filter	✓ (limited)	X	X	X	X
Auto reply (challenge/respond)	X	X	✓	X	X
Learning	X	X	X	✓	✓
Image filter	X	X	X	X	X
Bouncing	✓	✓	X	X	X
Create whitelist from address book	X	X	✓	X	X
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Ease of use	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

*No VAT on downloads

Spam and the law

There has long been controversy over what defines spam and how it can be controlled. Many junk emailers prefer to describe themselves as 'legitimate email marketers', though we suspect the bulk of Internet users would dispute there is such a thing. In at least one recent case, a major UK IT company discovered that the list of email addresses it had been sold on the understanding that it contained the names of only people who had consented, was nothing of the sort.

And a UK email transmission house that sent out a mailshot offering people the one-time opportunity of opting out had addresses clearly harvested from domain registration details – hardly the best practice that they maintained to PCW they were following.

It's hardly surprising, then, that the EU has insisted on an opt-in system, designed to ensure that any company advertising via bulk email must only send messages to people who have consented to receive them. Italy, for example, has enacted a law ensuring that spammers based there face prison sentences. In the UK, from 11 December, spammers will face a £5,000 fine from magistrates or an unlimited amount in a jury trial. But that's only for sending to private addresses. Spam to companies won't be outlawed, and it remains to be seen how diligent people will be in checking email lists. As anyone who's registered with the Telephone Preference Service knows, some companies are reluctant to pay attention to such rules until they're fined, and the Data Protection Service is not always quick to action.

The biggest problem is jurisdiction. While there's little doubt that companies operating within the EU will have to clean up their act, much spam originates elsewhere, with China and the US well-known culprits. China has started to take the issue seriously, but the US is doing anything but. The proposals being discussed in the US can best be described as tailor made for direct marketers, allowing an opt-out register. So, it will be OK to send junk mail, as long as you allow the sender to opt out from receiving more. The result, many people fear, will be even more spam as some decide it's been legitimised, and less scrupulous operators use requests to have an address removed as a means of confirming it is active. With a hard core of junk mail senders in Florida believed to be responsible for vast quantities of spam, a lack of meaningful action by the US authorities means the tide of junk is unlikely to be stemmed by EU directives or clampdowns in other countries; the usability of email may fall victim to the lobbying power of American 'free trade'.

Editor's Choice

The anti-spam packages we've reviewed here cover a range of different approaches, with simple pattern matching or address book comparison at one end, up to constantly learning databases using advanced Bayesian analysis to establish the 'spamminess' of messages. Some aim to work as simply as possible from the moment you install them, without needing users to do much more than click on the occasional misfiled message, while others require a period of learning, the construction of rafts of rules to make the best of the system, or that your correspondents respond to automated challenges before they can email you.

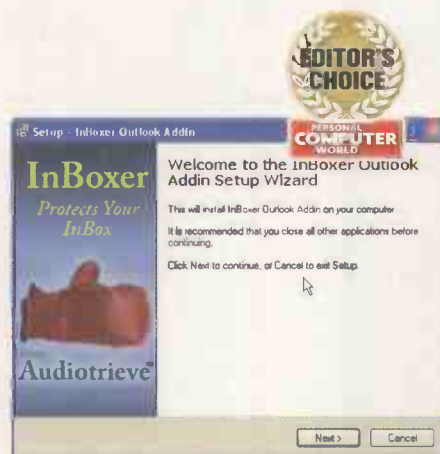
There's also a mixture of free, open-source, and paid-for products – including one, Inboxer, which is based on its open-source counterpart Spambayes. Whoever said that open source doesn't leave room for innovation and profit?

Many of the packages we looked at can be recommended, but we can pick only a couple to receive awards. Among those that are nevertheless extremely capable are Spam Assassin, which turned in a very creditable performance in its default configuration and is, we know, capable of even more with careful configuration and additional training. While we tested the Linux/Unix version, it's also available for Windows and

'Some aim to work as simply as possible, others require training'

can form the core of a robust spam and virus filtering system for a whole network, as well as protecting just a single mailbox as we did in the PCW Labs.

Spam Assassin was also notable for the way in which it replaced the body of messages with its own report, turning the message into an attachment; that provides a degree of protection, both from viruses or scripts and embedded images, which can help stop junk senders from verifying your address works; the only other package to do something similar was AOL Communicator, which doesn't download the images contained in messages deemed to be spam. We'd like very much to see this sort of behaviour in other packages.



Audiotrieve Inboxer



Cloudmark Spam Net



Firetrust Mailwasher Pro

The winners

Our Editor's Choice award goes to a package that's based on open source. It provides a simple interface and performed well in our tests, both in terms of the detection rate and the number of interventions required. It needed no initial training and, by providing a 'not sure' review folder, cuts down on the amount of time spent wading through messages to decide manually if they're spam or not. One of the few packages to score no false positives at all, it's easy to use, learns from the messages that you review to become even better over time, and integrates seamlessly with Outlook. We have no hesitation at all in awarding the **Editor's Choice** award to **Audiotrieve's Inboxer**.

There are two packages that we feel deserve a **Highly Commended** award; they provided a good degree of protection, with a minimal number of user interventions required to end up with the 'correct' result – a mailbox with all your real messages and none of your spam.

The first of these is **Cloudmark's Spam Net**, which works smoothly and efficiently to filter out your messages, based on the feedback from a whole network of users. It's easy to use and install, but after the trial period you will have to pay a small subscription. It coped well with our test data, including mailing lists, and false positives can be handled simply, ensuring that when you unblock a sender, it won't be blocked again by other network users.

Our next **Highly Commended** award goes to **Firetrust's Mailwasher** which was one of the best performing of the packages, and required relatively little intervention to filter all the mail. It can also be used with just about any email client, since it works as a standalone application – and so it may be the best solution for those who don't have Outlook on their PC.

However, the results belie the fact that, out of the box, Mailwasher doesn't have rules set up; a link to a preprepared set arrived as one of the tips and tricks emails sent to those who download the package and, without those, it would have required a lot more work to make the package as effective. The two-stage method used by Mailwasher – check with the program, clean the mail, and then collect your messages with your email program – may also put off some users, especially newer ones. It's not a solution you'd want to explain to a novice over the telephone. Those two downsides between them mean Mailwasher merits only a **Highly Commended** award.

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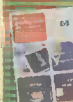
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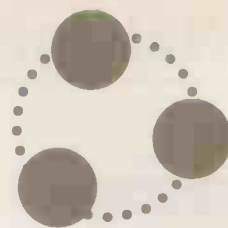
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Windows Storage Server 2003

Microsoft has introduced a dedicated file and print server implementation of its flagship Windows Server 2003. Designed to be used as a Nas (Network Attached Storage) platform, this replaces the old Windows 2000-based product and offers improved file-sharing performance for both SMB- and NFS-based applications. Other benefits include Volume Shadow Copy Services (VSS) to



take realtime snapshots for data backup, plus support for MPIO (Multi-Path I/O) and iSCSI. There's also support for eight-way clustering and improved San (Storage Area Network) integration, including the ability to act as a gateway to multivendor SANS.

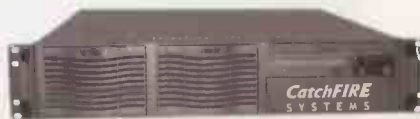
Windows Storage Server 2003 is available in two editions. Enterprise Edition is a highly scalable file storage server that meets the data availability and performance needs of enterprise data centres, while the standard Edition is a reliable, dedicated file and print server, ideal for enterprise departments, branch offices, and small and medium-sized businesses.

This month's group test looks at two Linux servers aimed at the business world, and we also take a look at a 3Com network switch

Load balancing becomes user-aware

Maximising existing infrastructure is the in thing at present, with some unique twists on old themes appearing among recent product announcements. One example is Catchfire Systems, (www.catchfiresystems.com), which has launched a new 'customer-aware' load balancer.

Implemented as a Linux-based appliance, the Firenode load balancer tracks and prioritises HTML page requests based on content and, optionally, the identity of the customer. According to Nigel Thomas, marketing director in Europe, administrators can then set limits on the number of users allowed onto a site yet, when traffic surges,



Firenode only tags web page requests from customers, so a bottleneck shouldn't occur

guarantee bandwidth to high-value transactions.

Unlike basic surge suppression, prioritisation based on customer identity isn't automatic. The Catchfire appliance relies on the host application to feed in the required information. Some reprogramming is therefore needed, but the API is very straightforward and a lot less burdensome than prioritising by other means, such as site segmentation.

Standard Intel-based server hardware is used to host the Firenode software and the product has been shown to handle in excess of 100,000 concurrent transactions.

Although all traffic is routed through the appliance, it only looks for and tags page requests, so the system shouldn't be a bottleneck. Multiple network ports are configured for both performance and redundancy, with automatic failover to a hot standby another option.

According to Catchfire, the Firenode appliance will be competitively priced against conventional load balancers. And, as with the Peribit Sequence Reducers (see below), we'll bring you more details as soon as a review system is available.

Peribit tackles latency

Peribit (www.peribit.com), which uses unique DNA sequencing technology to compress Wan traffic, is addressing latency. A new version of its MSR (Molecular Sequence Reduction) software, due in October, includes Packet Flow Acceleration (PFA) to speed up apps running over Wan links to create Lan-like performance.

PFA fine-tunes TCP session setup then transparently requests more data from the sender to keep packets flowing. Using existing TCP/IP mechanisms and

implemented in Peribit Sequence Reducer hardware at each end of a Wan link, it is transparent and application/protocol independent. It's easier to deploy than approaches that attempt to adjust TCP window sizes, as it requires just a tick box entry in the management interface.

PFA allows bandwidth gains made possible with MSR compression to be fully exploited and is a no-cost bonus for customers with existing Peribit products. It also comes as standard on all new Peribit Sequence Reducers including the latest SR-80, released in November, which can handle up to 320 Wan connections at speeds of up to 45Mbps/sec.

Peribit has promised to send us a couple of Sequence Reducers to let us to check out these claims.



Oldies but goodies

Legacy systems may be old hat but they don't just disappear overnight, and they often have to be integrated into more modern solutions. Companies with older AS/400 systems will, therefore, be interested in the release of a new Visual RPG for .Net product from ASNA (Amalgamated Software of North America) (www.asna.com).

AVR for .Net will enable RPG programming teams to create modern applications using advanced technologies, such as web services and object-oriented programming. There are also plans to provide seamless access to Microsoft's Yukon version of SQL Server when it ships next year – all of which not only means easier integration of legacy applications into more modern web-based systems, but also substantially shorter development cycles.

NETWORK SWITCH

3Com Switch 7700

A modular Gigabit Ethernet device for networks of 500-plus users

Officially a 3Com solution, the Switch 7700 is the first product to be released as part of a joint venture setup with Chinese telecoms giant Huawei. The deal enables 3Com to compete in the high-end switch market, from which it withdrew in the late 1990s to concentrate on smaller enterprises.

Designed to satisfy the needs of organisations with networks of 500 users or more, the Switch 7700 will appeal particularly to higher education, local government and financial institutions. These organisations require the high levels of performance and reliability provided by the new hardware, which offers a mix of Layer 2 and 3 Gigabit Ethernet switching plus support for the kind of VLAN, QoS (Quality of Service) and security technologies that are necessary when building or extending large converged voice and data networks.

Maximum bandwidth is 96Gbits/sec, with a Gigabit Ethernet throughput of 71.1 million packets per second. Some qualification of these figures is required, due to the way the switch is implemented. At the heart of the product is a Layer 3 switching engine that provides a fabric into which up to six interface blades can connect. The fabric itself has a bandwidth of just 64Gbits/sec, but because each blade connects via an 8Gbits/sec full duplex backplane link, the company can claim an aggregate 96Gbits/sec. Each blade can perform local Layer 2 switching, only passing packets to the Layer 3 fabric when more intelligent routing is required.

The Switch 7700 is an impressive-looking beast, with everything housed in a large rackmount chassis that can be fitted with three hot-swap power supplies. The Layer 3 fabric comes as standard and, like the interface blades, can be hot-swapped. But because



there's only one Layer 3 blade, you're limited to Layer 2 switching while the fabric is unplugged.

Maximum port density is 288, achieved by fitting six 48-port 10/100Mbps/sec UTP blades at £3,122 ex VAT each. There's also a 24-port 100Base-FX blade at £5,622 ex VAT, but most users will opt for at least one Gigabit blade to provide backbone connectivity between other wiring closet and departmental switches. Two blades are provided for this purpose, both eight-port devices costing £2,185 ex VAT. One comes with eight 10/100/1000Mbps/sec UTP interfaces, while the other can support a variety of copper and fibre cabling using industry standard GBIC (Gigabit Interface Converter) modules.

A bonus with the GBIC card is that it allows the Switch 7700 to connect to others over long distances, although customers expecting support for 3Com XRN (Expandable Resilient

Networking) will be disappointed. XRN uses Gigabit Ethernet to link switches together and eliminate single points of failure, the Switch 7700 relying on open standards such as VRRP (Virtual Router Redundancy Protocol) and RSTP (Rapid Spanning Tree Protocol) to provide resilience. These, together with multi-port link aggregation and OSPF (Open Shortest Path First) routing, enable the Switch 7700 to be used to build robust distributed infrastructures and work with existing XRN deployments.

Other features of note include advanced QoS capabilities with eight queues per port for the prioritisation of voice and data traffic. Hardware-based multicast routing is another plus, along with integrated security using ACLs (Access Control Lists) for users and devices on the Internal Lan and Radius (Remote Authentication Dial-in User Service) to authenticate external users.

The Switch 7700 is a robust chassis-based product with Layer 3 routing capabilities, QoS support and a bandwidth of 96Gbits/sec

3Com claims the Switch 7700 is also 10 Gigabit ready, although when and how this will be added is unclear. The lack of a web interface could be an issue but, in this market, a CLI (Command Line Interface) is the preferred management interface. There's also full SNMP and RMON, support for integration into existing network management systems, including 3Com's Network Supervisor application.

3Com is clearly gunning for Cisco and its Catalyst products, which, at a price, offer greater throughput at the top end. When configured to match the Switch 7700, however, 3Com claims to undercut Cisco by 20 to 30 per cent. The variability of corporate discounts may reduce that, but the Switch 7700 offers as standard a lot of what is optional on the Catalyst products, and could prove a real threat to their dominance in this market.

DETAILS

PRICE From £16,152 (£13,746 ex VAT) for the starter kit

CONTACT 3Com 01442 438 000
www.3com.com

SPECIFICATIONS

11U rackmount Ethernet Switch • 3 redundant hot-swap power supplies • 7 I/O slots • 64Gbits/sec Layer 3 switch blade • 6 hot-swap Layer 2 switching blades • 96Gbits/sec aggregate bandwidth • 4096 VLANs, 8 QoS queues per port
PROS Bandwidth; switching capabilities; 8 QoS queues per port
CONS No direct support for 3Com XRN; no web management; single Layer 3 fabric blade

VERDICT

Offers the functionality to build large converged networks at an affordable price

PERFORMANCE	★★★★★
FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★

IMAGING SOFTWARE

Powerquest V2i Protector 2

Backup and disaster recovery made easy



Version 2 of V2i Protector can take images of Windows NT and Server 2003 systems, plus 2000 and XP workstations

We were impressed enough by V2i Protector to give it a PCW Recommended award back in March. Version 2 not only addresses the limitations noted in that review, but makes the product even easier to use.

Once limited to Windows 2000 servers, V2i can now be used in mixed Windows environments, with support for older Windows NT servers and Windows Server 2003. A new Desktop Edition (£49 ex VAT) takes image backups of Windows XP and Windows 2000 Professional workstations, either locally or from the same console used to manage servers.

As before, images can be taken in real time to local or remote network storage, including NAS (Network Attached Storage) and San (Storage Area Network) devices. Direct imaging to removable media is also possible and extended in v2 with support for writable CD/DVD drives and disk spanning. A disk-to-disk copying facility makes the utility useful for cloning and recovering systems.

Backing up open files and databases without interruption is key to V2i, and a new facility lets you image and restore multiple volume sets at the same time.

Tweaks have been made to the core imaging technology, and a

new facility creates incremental images rather than re-imaging whole volumes. There's also a complementary incremental rollback facility to restore systems to a specific moment.

The user interface is streamlined, and enhancements to the Powerquest Recovery Environment on the bootable CD support the latest storage and networking hardware better.

This is a worthwhile new release that makes V2i Protector more of a must-have for enterprises of all sizes.

DETAILS

PRICE £734 (£625 ex VAT) per server

CONTACT Powerquest
0118 952 2600

www.powerquest.com

SYSTEM REQUIREMENTS

Servers: 256MB Ram and 22MB disk space for server agent; workstations: 128MB Ram and 20MB disk space

PROS Hot incremental imaging & rollback; support for writable CD/DVD & spanned media; interface

CONS No direct support for tape drives

VERDICT

A great backup and disaster recovery tool made even better

EASE OF USE ★★★★★
FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★

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DOCUMENT SCANNER

HP Scanjet 8290

This heavy-duty device offers a fast, efficient solution for corporate users



The Scanjet 8290 costs more than most desktop scanners, but has the speed and capacity to be used as part of an automated document management system

With good-quality desktop scanners available for less than £100 ex VAT these days, you might wonder why you would want to spend almost £1,500 on the Scanjet 8290. Robust engineering and a built-in document feeder are part of the answer, enabling the Scanjet to handle high volumes at consistently high speed and so be deployed as part of an automated document management system. On top of that, the HP scanner comes with a bundle of useful applications and utilities to help mark it out from cheaper personal offerings.

Like most modern scanners the 8290 is a flatbed device, capable of scanning 256 greyscales or 48bit colour at an impressive native resolution of 4,800 x 4,800 dpi (dots per inch). Maximum paper size is 8.5 x 14in, in addition to which you get a 50-sheet automatic document feeder that is not only able to feed up to 25 pages per minute (ppm), but can also handle double-sided documents. Transparencies can also be handled, with a transparent material adaptor (TMA) to take 35mm slides and negative strips built into the lid, as standard.

A USB2 interface provides for high-speed host connectivity, enabling the scanner to be used with any PC running Windows 98 or above or an Apple Mac with OS 9.1 or higher. There's also a SCSI kit in the box (including an adaptor for the host PC) for use on systems without USB ports or those running Windows NT. Power comes from a small external AC adaptor.

Unpacking and assembling the document feeder and the other bits and pieces takes a while, but it's a job you only have to do once. There's no shipping screw to worry about and the scanner is ready for use as soon as it's switched on, with no need for lamp warm-up as on many cheaper products. Plus it's fast, HP claiming a four-second preview time which the Scanjet 8290 had no problem achieving in our tests.

Overall scanning time will, naturally, depend on the software used, with a whole bundle of products to choose from here. Basic image capture, for example, is catered for using HP's own photo and imaging software, which, as well as editing, offers facilities to share captured images via a web server and as email attachments, and to copy documents using a local

or network printer. These features can also be accessed using 'one-touch' buttons on the front of the scanner to, for example, scan directly to email or take a quick photocopy with very little instruction required.

For more demanding users, Adobe Photoshop Elements 2.0 is also included, along with Readiris Pro OCR (optical character recognition), software to convert multilingual documents into editable electronic files. And it's here that you really appreciate the speed of the 8290, which, coupled with the 25ppm automatic feeder, takes the strain out of the repetitive scanning of large documents.

Of course some expertise is needed to get the best out of the OCR software, but a high level of accuracy comes as standard. The HP scanner comes with Kofax VRS (Virtual Re-Scan) software to check and adjust for errors in alignment, brightness, contrast and image clarity automatically. Bought separately, the Kofax software costs well over £100 ex VAT.

Lastly the Isis (image and scanner interface specification) driver allows the Scanjet 8290 to be integrated easily with other applications. That makes it

possible, for example, to scan direct to a pdf file using Adobe Acrobat Distiller, although the Adobe application needs to be sourced separately. Similarly, you can use the Isis driver to integrate the scanner into a wider document management system, which is what the Scanjet 8290 is really designed for.

We found the Scanjet 8290 very easy to get to grips with. The need for a local PC/Macintosh host means it's not quite as flexible or as robust as a network multifunction scanner/copier, but it's a good choice for medium-sized workgroups nonetheless. For organisations with less demanding needs, the cheaper Scanjet 8250 at just £749 ex VAT offers the same basic specification with a 15ppm document feeder. And if you want to start out really small, the basic 8200 with no feeder and minimal supporting software is just £449 ex VAT.

DETAILS

PRICE £1,703 (£1,449 ex VAT)

CONTACT HP 08705 474 747

www.hp.com

SPECIFICATIONS

4,800 x 4,800 native resolution • 48bit colour • 256 greyscales • Integrated transparency adaptor • Duplex automatic document feeder, 50-sheet capacity, 25ppm • USB2 & SCSI interfaces • Scanning, image-editing and OCR software • Isis driver
PROS Automatic 25ppm document feeder; transparency adaptor; one-touch buttons; applications/utilities
CONS Requires a PC or Mac host

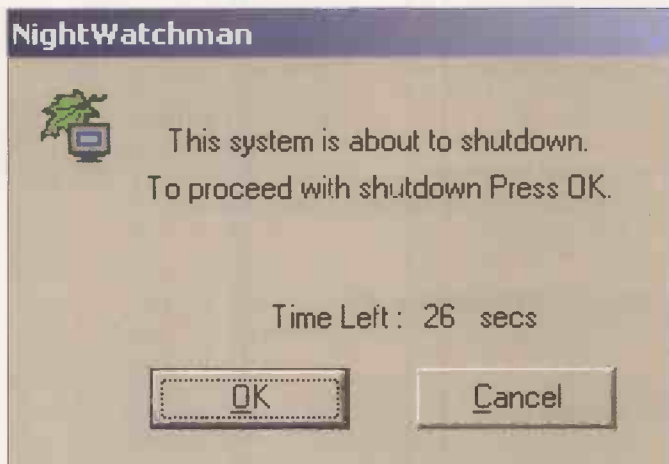
VERDICT

Compares well with specialist scanners for use with network document management systems

FEATURES	★★★★★
PERFORMANCE	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★★

POWER MANAGEMENT SOFTWARE**1E Nightwatchman**

Save electricity, money and the planet



Nightwatchman can be used to make sure desktop PCs are regularly powered down or rebooted to a manageable state

Nightwatchman is one of those applications that could prove valuable, particularly on large corporate networks. In this instance, Nightwatchman makes it possible to power off desktop PCs, reducing power bills and making sure systems are left in a manageable state.

It uses the power management facilities built into Windows and the Bios of desktop and notebook PCs. On recent models these will conform to the Advanced Configuration and Power Interface (ACPI) specification, although older Advanced Power Management (APM) systems are also supported. Using either of these, Nightwatchman attempts to configure itself during installation to shut down the host PC. In addition, however, it can restart older non-ACPI/APM systems.

Apart from an optional taskbar control, Nightwatchman is configured either from the command line or using scripts. Three modes are supported, starting with passive mode where the local user must click 'OK' before a shutdown. The same button is presented in active mode, together with a countdown dialogue, which is also displayed in forced mode,

with users unable to cancel the shutdown in forced mode.

As well as powering systems off completely, Nightwatchman can also reboot them, plus it's possible to securely log off users and close any open files or applications before a shutdown.

We found it straightforward – the only issues being the lack of support for Windows 95/98 and facilities to centrally deploy and manage the utility. That said, other applications such as SMS (Systems Management Server) can be used to distribute it, and support for Windows scripting makes it easy enough to manage on a large scale.

DETAILS

PRICE From £9.99 (£8.50 ex VAT) per PC

CONTACT 1E 020 8326 3880
www.1e.com

SYSTEM REQUIREMENTS

Windows NT4 with SP6, 2000 or XP

PROS Support for API and APM; restart of older systems

CONS No central deployment or management tools; no support for Windows 95/98

VERDICT

A neat utility, worth looking at if energy saving is a concern

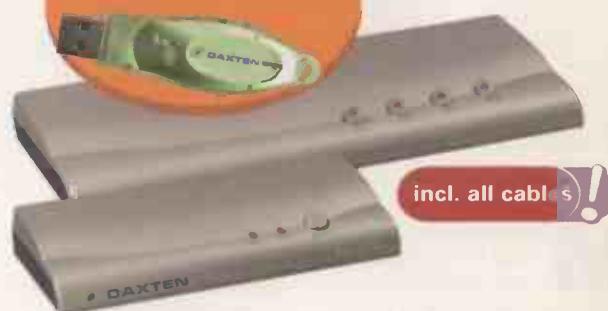
FEATURES

ENTERPRISE VALUE ★★★★★
EASE OF USE ★★★★★
OVERALL ★★★★★

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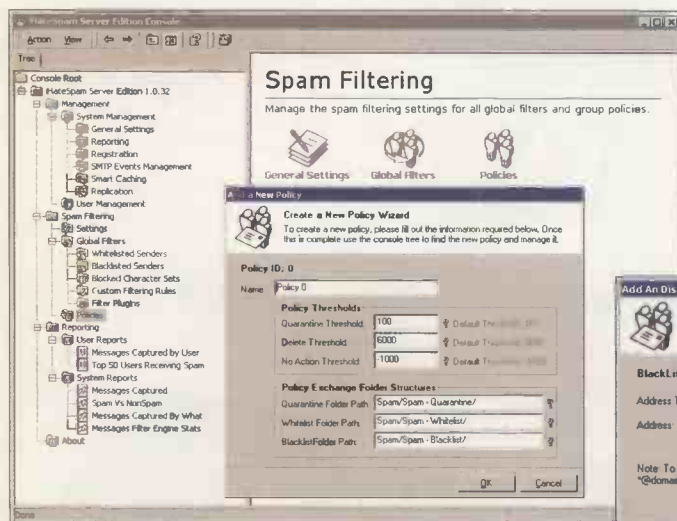
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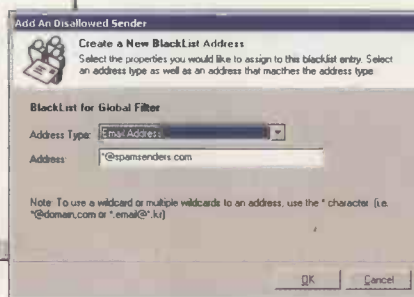
Sunbelt Software Ihtespam Server Edition

An effective and user-friendly tool at a reasonable price



Left: Applied at the server level, anti-spam policies can be easily tailored to suit different users or groups of users

Below: Custom blacklists of potential spammers can be created and maintained by the administrator or users in Outlook



Most anti-spam tools – like those in this month's group test (see page 167) – are designed to work at the client level, making them difficult to set up and manage on a large network. Plus messages still have to reach user inboxes before they're filtered, with all of the filtering work done on the client PC. The server edition of Ihtespam addresses these issues by implementing anti-spam policies centrally, potentially blocking unsolicited messages before they get to a single inbox.

Ihtespam Server Edition is an add-on for use with either Exchange Server 2000 or the recently released Exchange Server 2003 product, reviewed in last month's *PCW* Network section. Currently, the software needs to be installed on the Exchange server itself, although a gateway product should be available by the time you read this. Similarly, a version for use with older Exchange 5.5 systems, not dependent on Active Directory, should be available before the end of the year.

No client changes are needed for Ihtespam to work, making for very fast deployment, with the server software managed from a familiar MMC (Microsoft

Management Console) snap-in. Instant protection can be given to all server users, using the default anti-spam policy, with options to create and tailor additional policies to suit different types of user, as required.

Because it applies a mixture of detection technologies, a high level of detection is possible using Ihtespam, with the developers at Sunbelt Software claiming over 90 per cent with a minimal number of false positives, out of the box. Techniques include software that will search for suspicious content in each message, perform structural analysis of any HTML code, and look for discrepancies in header information. It also looks for telltales such as randomised numbers and letters in a subject line or message. Although it's possible to trap messages using foreign character sets, this option only works where character sets are applied consistently throughout a message.

In addition, the software will refer to a blacklist of known spammer addresses and domains. This is held locally rather than being externally hosted, and can be updated to take advantage of feedback from users of the standalone Ihtespam product. However,

this does have to be initiated manually. Custom server-wide black and whitelists can also be created and – optionally – each user can be configured with their own.

The ability to include users in the management of spam is unique to Ihtespam and helps boost the level of detection and reduce the number of false positives. For example, where messages get through the server-side filters, they can be blocked in future by users dragging them onto their blacklist folder in the Outlook client. By adding sender details to their local whitelist, users can also ensure they receive messages that could be trapped by corporate policies.

As well as checking for spam, custom rules allow administrators to perform more general content filtering. However, the facilities aren't quite as extensive as with a custom content filtering application, and only apply to incoming mail. You will also need to check for viruses separately to fully secure your email system.

On the positive side, there's good flexibility when it comes to dealing with suspected spam. Messages can, for instance, be deleted or diverted to either a specified admin mailbox or customisable spam folders in

recipient Outlook inboxes. A custom message can also be inserted into the subject line to identify potential spam. Administrators can further fine tune the anti-spam filters, weighting the different technologies to help reduce false positives.

Because it works on the server, Ihtespam Server Edition can protect all Exchange users including those accessing their mail via Outlook Web Access, thin clients or mobile devices. It also works with clustered Exchange setups, and includes built-in reporting facilities that find out which users are receiving the most spam, for example, or which of the filters is proving the most effective in blocking it. However, you do need SQL Server 2000 or MSDE for the reporting option to work.

Quick to get going and easy to administer, the server edition of Ihtespam has a lot to offer companies looking to reduce the spam burden. Other server-side solutions are available, but few are as complete as the Sunbelt product which, at around £10 ex VAT per user, is well worth evaluating.

DETAILS

PRICE £499 (£425 ex VAT) for 50 users

CONTACT Sunbelt Software
01905 745 722

www.sunbelt-software.com

SYSTEM REQUIREMENTS

500MHz Pentium II • 128MB Ram • 20MB free disk space • Windows 2000/2003 Server • Exchange Server 2003 or 2000 with SP3 • SQL Server 2000 for reporting

PROS Multiple anti-spam technologies applied at the server; flexible quarantine options; user-maintained blacklists and whitelists

CONS Only works with Exchange; no automatic update of blacklists

VERDICT

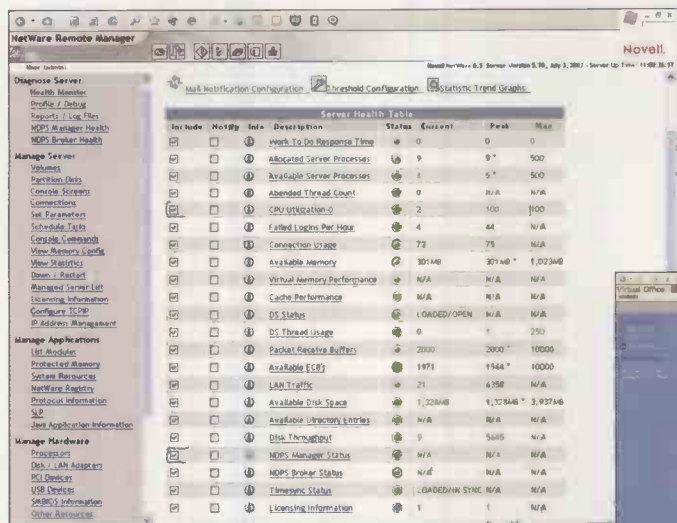
Affordable and effective tool that is easy to use and maintain

FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
EASE OF USE ★★★★★
OVERALL ★★★★★

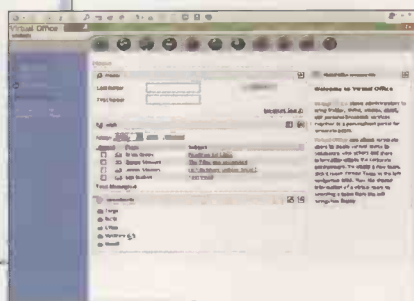
NETWORK OPERATING SYSTEM

Novell Network 6.5

Existing users requiring open source compatibility should check this out



Network 6.5's Nterprise Branch Office, allows remote network management (left), and Virtual Office Services (below), enables web-based user productivity



With Windows and Linux the centre of attention these days, it's easy to overlook alternatives to the more talked about network operating systems (NOSs). One such alternative is Novell's Netware, the product that started it all back in the 1980s, development of which continues with the release of Netware 6.5.

This latest version is based on the traditional Netware core, booted from Dos and running the custom NSS (Novell Storage Services) file system. However, you no longer need special client software to make use of the facilities on offer, thanks to support for native file access for Windows, Unix and Apple Macintosh systems, added in the 6.0 release and enhanced here. There are also plans for a move to a Linux core, but that won't happen until Netware 7.0 ships, towards the end of 2004. For now, Novell has ported a number of open-source applications to the NLM (Netware Loadable Module) environment, starting with the latest 2.0 version of the Apache Web server.

As well as Apache, the popular Tomcat web application server has been ported to Netware, along with PHP and Perl servers

and the MySQL database engine. This release includes Extend, the Java 2 Enterprise Edition (J2EE) application server, originally from Silverstream and previously available as an add-on, but now fully integrated into the Netware package. Several development tools are also bundled, including the Extend Workbench and Beans for Novell Services. On top of that, you get the Netware Web Search Server, which can be used to add search facilities to Internet and intranet sites hosted by the Novell platform.

The latest 8.7.1 release of the Novell Edirectory service is a key component of Netware 6.5, with a new DirXML starter pack to enable this protocol to be used for integration with Microsoft Active Directory and Windows NT domains. Clustering is also enhanced, and support for iSCSI has been added so Netware servers can take advantage of the latest IP-based San (Storage Area Network) technologies. A new server consolidation utility handles updating the directory tree when consolidating servers and copying data to new locations while maintaining ownership and access rights.

Elsewhere there's been some tidying up and enhancement of the various web-based user

productivity services released by Novell over the past couple of years. Referred to collectively as the Virtual Office Services, these include Ifolder, to provide access to information on the server from a browser and automatically back up and synchronise locally held data. Server pooling and PDA access is added to Ifolder in this release, plus there's automatic versioning to enable users to recover previous versions of documents themselves.

The Iprint service gives similar browser access to shared printers, with new local driver install and auditing facilities. Shared folders, calendars and threaded message boards in Virtual Teams enable users to work collaboratively and share information, while Eguide helps them find names, addresses and other information, which can now be in Edirectory or any other LDAP (Lightweight Directory Access Protocol) directory.

Enhancements to the storage management services include a new snapshot option enabling backups to be taken in real time. Another new feature is Nterprise Branch Office, multifunction appliance software bundled into the Netware package for the deployment of managed

network services at remote offices. Nterprise Branch Office software can be used to build workgroup storage appliances with auto-provisioning, to grant visiting users access rights based on credentials held on the corporate LDAP server. Local data and services are replicated at the central site, the local appliance acting as a disposable service cache for a high level of disaster tolerance.

Netware has come a long way since the 1980s and is now very much standards-based and able to co-exist with a range of other platforms. That said, it can't run other open-source applications, and the biggest market remains the existing customer base who, if they have upgrade protection, can move to the new version at no extra cost. A low-cost competitive upgrade (from £213 ex VAT for five users) is also available for those with other software. However, if you're considering such a move, you might want to wait until the Linux-based version, with better industry support, ships next year.

DETAILS

PRICE From £846 (£720 ex VAT) for five users

CONTACT Novell 01344 724 000 www.novell.com

SYSTEM REQUIREMENTS

Server class PC with Pentium II or AMD K7 processor • 512MB Ram • Hard disk with room for 200MB Dos partition and minimum 2GB Netware SYS: partition • CD-Rom drive • One or more Ethernet Lan adaptors

PROS Ports of Apache, Tomcat and other open-source applications; enhanced virtual office services; iSCSI and DirXML support; Nterprise Branch Office appliance
CONS Based on Netware engine, so can't host other open-source apps

VERDICT

A significant revamp of this solid NOS that will appeal most to existing customers looking for open source compatibility

FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
EASE OF USE ★★★★★
OVERALL ★★★★★



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Linux in business

WORDS: ALAN STEVENS TESTING: VNU LABS PHOTOS: BRUCE MACKIE

Using Linux servers in the commercial world has only become viable recently. We test and review two leading packages to see how they compare with the more traditional Windows offering

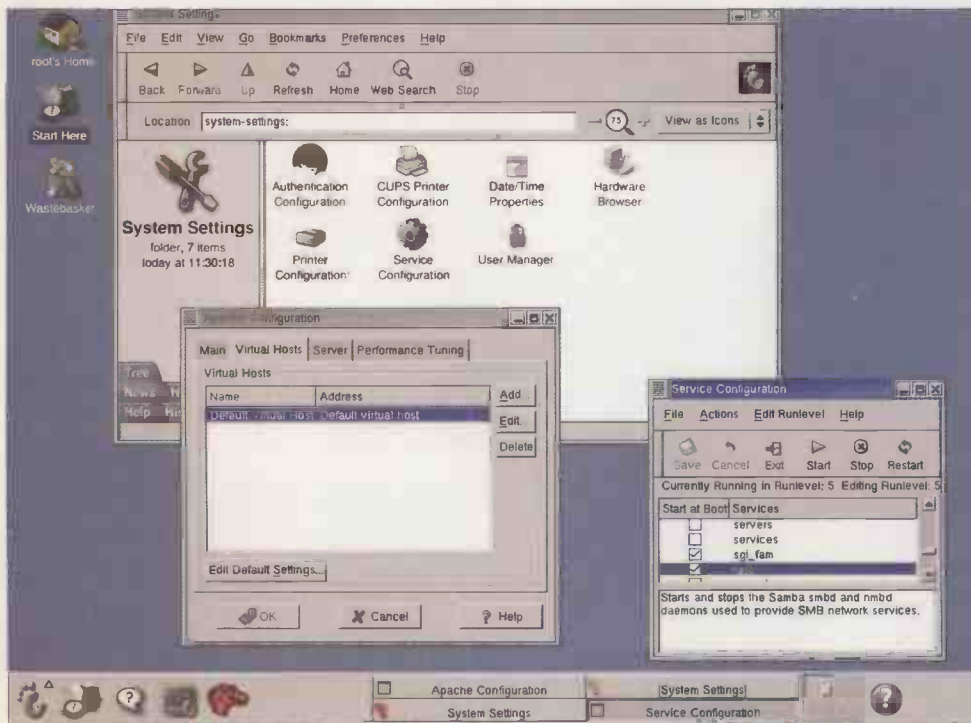
For the past 10 years the mid to high-end server market has been dominated by proprietary Risc-based hardware, running proprietary implementations of Unix. Received wisdom is that only through this approach is it possible to provide the level of scalability, security and availability needed to host large corporate databases and other enterprise applications.

That thinking is being challenged. First by the development of highly scalable SMP (Symmetrical Multiprocessor) hardware, based on Intel processors that outperform Risc-based rivals and cost less. It's also possible to achieve the same levels of scalability, security and availability using both Windows and, increasingly, open-source Linux software.

Take-up of Linux has grown apace, fuelled by the porting of more enterprise apps. The leading commercial providers of Linux have introduced enterprise products and two of the market leaders, Red Hat and Suse, are featured here; as well as the software, they can provide the kind of commercial support demanded by enterprise customers.

There are, though, lots of companies yet to be convinced that Linux is a good idea. And it's not all good news, with limitations in current offerings, even though they have the backing of some of big server vendors such as Dell, HP and IBM. Here we look at what you can expect in terms of features and performance with the latest enterprise Linux products, and how they stack up against that other competitor, Windows.





Enterprise Linux AS 2.1 is based on a stable release of the Red Hat Linux software with the usual choice of graphical desktops and management tools



Red Hat Enterprise Linux AS 2.1

Red Hat is one of the longest established and best known of the commercial Linux distributors. It is also the company most associated with business-class deployment, increasingly emphasising the benefits of its support and maintenance services over and above the more usual cost benefits of open source – the traditional line taken by other vendors.

Another benefit comes from the relationships forged by Red Hat with leading server vendors to not only pre-load its software ready for enterprise customers, but for those vendors to provide first-line software support as part of their maintenance agreements. All of the tier one vendors, for example, have signed up to such agreements, including Dell, Fujitsu-Siemens, HP and IBM. Recently, too, Red Hat added Sun Microsystems to the list, the Unix giant finally bowing to the inevitable and giving a general thumbs-up to the Linux platform and Red Hat in particular.

As far as addressing the specific needs of enterprise customers is concerned, Red Hat first started to take the market

seriously in 2001, with its Red Hat Advanced Server product. This not only introduced bundled maintenance and support services, but also a much longer release cycle of 12 to 18 months, compared to the more usual four to five months for consumer releases. Since then the product line has been revamped with Advanced Server, the implementation we tested in the Labs for this feature, now known as Red Hat Enterprise Linux AS (RHEL AS). There's also an ES version for departmental servers (essentially AS without the clustering and load balancing options and with cheaper maintenance) and RHEL WS for enterprise desktops.

All three are based on a well-established Linux kernel, now several generations behind the latest Red Hat 9.0 product, which is aimed at the more general consumer market. If it's state-of-the-art Linux code you're after, you really need to look elsewhere as the enterprise software is deliberately conservative. It has even had functionality, such as the Logical Volume Manager (LVM) and a large number of the bundled

applications, removed to enable the company to deliver a stable platform and provide the kind of pre- and post-installation support demanded by corporate customers.

Pricing and support

The level of support you can expect to get from Red Hat depends primarily on what you're prepared to pay, and on the number of systems involved, with volume discounts available for large accounts. In all cases, however, there's no charge for the software itself or the media, where supplied. You pay an annual maintenance fee which, for the AS product, starts at £1,225 ex VAT per server.

That fee buys you a standard maintenance agreement with telephone support available 12 hours a day, five days a week (12/5) with, typically, a one-day response/resolution guarantee. There are no limits on the number of incidents that can be reported under this agreement. Also included is an annual subscription to the Red Hat Network (RHN) service. This provides online access to the Red Hat Knowledgebase as well as update notification and

automatic patching plus access to additional server management facilities, such as tools to validate and correct system and application operation remotely.

Alternatively, customers can buy a premium maintenance agreement, giving 24/7 support with a one-hour response time, again, with no incident limits. In the case of the AS product premium maintenance starts at around £2,042 ex VAT per server per year, the exact price of all Red Hat products being dependent on the prevailing euro exchange rate.

As with all implementations of Linux there's no client licensing to worry about, although there is a maintenance charge for the WS version if installed on desktops. Pricing may also differ if you opt for support from a server vendor which will typically provide first- and second-line support, escalating incidents to Red Hat only when it is unable to provide a resolution within agreed timescales.

Functionality

The product we looked at and tested was the 2.1 release, which is basically the old Red

Hat 7.2 software with a few enhancements to the kernel to make it more scalable. It's available at present for two platforms, effectively x86 servers with 32bit processors or systems with 64bit Itanium CPUs. Up to eight processors can be supported in each case, with 16GB of memory.

Among the various kernel enhancements, Red Hat offers support for asynchronous I/O whereby applications can request data then carry on processing instead of having to wait for results to be returned. It has also enhanced SCSI I/O spinlock, a feature of the 2.4 kernel that co-ordinates simultaneous requests to critical I/O driver code and data structures from multiple processors in an SMP server. In the standard kernel, spinlocks control access to large sections of code, providing limited opportunity for parallel execution. In RHEL the granularity is finer allowing multiple I/O requests to be processed in parallel. And that can provide real performance benefits in large SMP systems with multiple SCSI or Fibre Channel host bus adaptors.

The process scheduler, too, is enhanced in RHEL and there's bundled IP load balancing support and high-availability clustering as standard in the AS package. Clustering is limited to just two nodes in RHEL 2.1 but is useful as it can be deployed with a range of applications such as Oracle and SAP and provides active/active failover

for organisations looking for maximum up-time.

Installation and configuration of RHEL is much the same as it is for the consumer versions of Red Hat Linux. The management interfaces aren't quite as swish as those provided by Suse in its products, but they do the job and in the enterprise market there's plenty of command line and scripting expertise, such that ease of use isn't a major issue.

The popular Apache Web Server is included as part of the AS product, along with other open-source tools needed to develop and implement web-based applications. However, one limitation of the current 2.1 release is that it still ships with the older Apache 1.3 code, which lacks the scalability of the later 2.0 version (see our test results on page 196 for details).

You can always download and substitute the Apache 2.0 software yourself, as we did in our tests, although it won't be supported under the existing Red Hat maintenance agreement. Added to that, the 2.1 product is shortly to be replaced by a new 3.0 release, having reached the end of its 18-month planned lifecycle. That will include both an updated kernel, the Apache 2.0 Web Server and a range of other enhancements.

Enterprise Linux 3

Still in beta testing when this review was written, the RHEL 3 is expected to ship in October or November and will also



The Red Hat Network is an online portal service providing access to not just support information but automatic update notification and delivery

address a number of the limitations of the current product. Most of these are achieved simply by moving to a newer kernel and incorporating some of the later components already established in the consumer product.

Among the most notable changes, RHEL 3 will scale to 16 processors with improvements also to the Hyperthreading support. It will also be available on a number of extra platforms, including 64bit AMD servers and the majority of IBM I Series, P Series, Z Series and OS/390 systems. Large memory support too will be enhanced, as will the GCC 3.2 development tools and a kernel level IPsec implementation has been added to improve VPN (virtual private network) capabilities.

Java support is enhanced in the new release as well and some of the options left out of the 2.1 product, such as the LVM, have been added back in. The inclusion of LVM is important given the increasing trend towards storage virtualisation on large corporate networks. However, high-availability clustering, enhanced to support up to eight nodes, becomes a separate add-on even for the AS product in RHEL 3.

Finally it's worth pointing out the wide industry support for the Red Hat platform among software vendors. All the major applications are certified to run on RHEL including those from BMC, IBM/Lotus, Oracle, SAP, Veritas and others. As part of the testing regime leading up to the release of RHEL 3, Red

Hat will have collaborated with the software vendors to ensure compatibility and stability of their products on the new platform.

The bottom line here is that, although Red Hat Enterprise Linux might not be the most exciting, cutting edge or scalable of Linux implementations, that's really not an issue. It works, is well understood and widely adopted and supported throughout the industry. Customers also get bundled maintenance and support, direct from the developers, and a stable platform that delivers the goods in an uncomplicated and reliable way. Which, at the end of the day, is what most enterprise customers look for.

DETAILS

PRICE From £1,439.37 (£1,225 ex VAT) per server per year, with standard maintenance
CONTACT Red Hat 0800 358 2018
www.europe.redhat.com

PROS Stable kernel with performance enhancements; high-availability clustering; choice of maintenance agreements; automated updates with Red Hat Network

CONS Version 2.1 has limited platform support and Apache 1.3

VERDICT

Stable and well supported enterprise Linux from a company taking an increasingly businesslike approach to this market. It should be even better when 3.0 ships

FEATURES

ENTERPRISE VALUE ★★★★★
EASE OF USE ★★★★★
OVERALL ★★★★★



Remote management tools are another bonus available to users of RHEL via the Red Hat Network service

The Maxdata Platinum 7200R is a good example of the type of scalable four-way SMP server used to host Linux-based enterprise applications



Maxdata Platinum 7200R

To enable us to test the scalability of the enterprise versions of Linux included here we were loaned a Platinum 7200R rackmount server from Maxdata. Maxdata doesn't deal direct, however this Germany-based company is one of the biggest Intel OEMs this side of the Atlantic, supplying everything from notebooks to enterprise servers through a network of authorised resellers and system integrators throughout Europe.

The Platinum 7200R is typical of the type of high-end platform supplied by Maxdata to host back-end databases and other enterprise applications such as mail servers and ecommerce systems. It can be configured to order to suit a range of requirements and scaled as required. The review system shipped with a full complement of four 2GHz Xeon MP processors with 1MB of onboard cache per CPU.

Designed expressly for SMP deployment, Xeon MP processors offer support for Intel's Hyperthreading technology which fools the operating system into acting as though it has twice the number of virtual processors available.

These can then be supported by up to 24GB of ECC-protected DDR memory implemented using industry standard Dimms on a plug-in memory board. The test system came with 4GB fitted, which is a typical amount for this type of server.

A Serverworks SMP chipset is at the heart of the Intel motherboard in the 7200R, which also includes most of the I/O controllers expected on this type of system. For instance there's an integrated ATI Rage XL video interface, complete with 4MB of video memory which is more than enough, even for high-resolution graphical server consoles. And there's onboard SCSI to handle the storage, courtesy of an Adaptec AIC 7902 controller.

The Adaptec chip is a dual-channel Ultra320 device, so is more than sufficient to handle the operating system and any application software likely to be installed on the server. However, for extra performance and availability the test system also shipped with a plug-in Raid controller. A 64bit PCI-X adaptor was used here, again this came from Intel, and had 64MB of ECC-protected cache memory,

affording Raid levels 0, 4, 5 or 10 support as required.

Up to five drives can be accommodated in hot-swap bays in the chassis itself, the test system shipping with four 36.7GB Ultra320 Seagate Cheetahs with a 15,000rpm spin speed. Three of these were configured as a Raid 5 volume for our tests, with the fourth acting as a hot spare for maximum availability. Again, that's a good configuration to cope with the core operating system software and any applications hosted on this type of server. Data will normally be held elsewhere, either on more scalable external storage or on a San (storage area network).

On the networking front a 10/100Mbps/sec and a Gigabit Ethernet interface are both integrated onto the Intel motherboard and it's possible to use both for server access, or reserve the 10/100Mbps/sec port for management access. There's also plenty of scope for further expansion with four hot-plug, 64bit/100MHz, PCI-X slots plus two more of the same without hot-plug capabilities and two 32bit/33MHz PCI slots for less demanding adaptors such as additional Ethernet

cards. Teaming of Ethernet interfaces is also supported where other Intel cards are used, making it easier to use the extra bandwidth these afford as well as provide valuable load balancing and redundancy.

Intel's server management software and built-in management interfaces come as standard on this server with support for both in-band and remote access. The chassis features numerous high availability features, such as a bank of six hot-swap fans arranged in two rows for extra resilience. The system we tested was also fitted with a full complement of three hot-swap power supplies, just two of which are required to keep the system operational – providing so-called N+1 redundancy.

Last, but not least, the server comes with a three-year on-site warranty which can be further improved upon by the supplier or system integrator concerned. It also ships with an impressive set of documentation and supporting software, often omitted by other Intel OEMs, containing everything required to support not just the base hardware but optional implementations of Windows and Linux, as in our tests.

DETAILS

PRICE £13,751 (£11,703 ex VAT)
CONTACT Maxdata 01344 788 900
www.maxdata.co.uk

SPECIFICATIONS 4U rackmount chassis • Redundant power supplies and hot-swap fans • Quad 2GHz Xeon CPUs • 4GB PC266 ECC-registered DDR-SD-Ram • Dual-channel Ultra320 SCSI Raid controller • Four 36.7GB 15,000rpm Seagate disks • Integrated 10/100Mbps/sec and Gigabit Ethernet interfaces • 6 x 64bit/100MHz PCI-X slots (4 hot-plug) • 2 x 32bit/33MHz PCI slots • Integrated system monitoring and remote management
PROS High level of built-in redundancy; 4-way Xeon capable; 24GB of memory; five hot-swap internal drive bays; hot-swap PCI-X expansion; remote management
CONS Limited internal storage space; single Gigabit Ethernet interface as standard

VERDICT

A well specified and scalable server for back-end databases and other enterprise apps

PERFORMANCE ★★★★★
FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★

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The graphical Yast2 tool can be used to configure and manage Suse Linux Enterprise Server 8, with a companion utility for automatic distribution and installation on large networks



Suse Linux Enterprise Server 8

Just like Red Hat, Suse Linux is a well established and respected commercial Linux vendor with a strong portfolio of products, including an enterprise server distribution. It first introduced Suse Linux Enterprise Server, complete with bundled maintenance, in March 2001 and continues to develop the product. This latest implementation, Suse Linux Enterprise Server 8 (SLES 8) offers the widest platform support in the industry

Just like Red Hat, Suse has widespread industry support from other software vendors and agreements with leading server vendors, including HP, IBM and others who offer its software pre-installed on their hardware. Some, such as HP, also provide customer support. However, there the similarities end, as the German vendor has opted to take a quite different approach to the enterprise market to that of Red Hat.

United solution

One of the differences is that, despite its early entry, it's taken a while for Suse to fully get to grips with the needs of

customers in the enterprise market. The first release of its Enterprise Server, for example, was priced at less than £150 ex VAT, had few enhancements for use in the enterprise and only offered basic installation support and update notification. Indeed it was marketed more as a professional or small business solution. That was improved upon with the introduction of Enterprise Server 7, but it wasn't until the release of the first United Linux implementation, SLES 8 in November 2002, that the company was seen to be taking enterprise demands seriously.

For those unfamiliar with the term, United Linux claims to be a joint industry standard. However, that's not the case and in practice it's little more than a collaboration between Conectiva, SCO Group, Suse and Turbolinux, the aim of which is the development of a common distribution of Linux, referred to as the Linux Standard Base (LSB).

The United Linux initiative is also marked out by a desire to provide a business quality implementation of Linux with all the stability and standards

compliance required by enterprise customers. There are benefits, too, from the vendors' viewpoint as, by sharing the same core code, any software and hardware certification need only be performed once. The LSB software can also be leveraged by all the United Linux vendors who then add their own features on top.

Enterprise Server 8 is the first Suse product to be based on the United Linux LSB. It has the advantage of being based on a more advanced kernel than the Red Hat product and is – on paper at least – more scalable. That claim is not completely borne out in our tests, although the Suse software did perform better in many areas. In addition, the company has used the release of SLES 8 to introduce new maintenance and support services to rival those from Red Hat.

Pricing and support

Unsurprisingly, the level of maintenance and support you get from Suse depends on what you can afford and the number and type of servers involved, with different prices for different platforms. On the face

of it, the Suse x86 product we tested appears to be a lot cheaper than RHEL, but that's because the base price of £599 ex VAT per server only includes basic maintenance services and email-based support. If you want the kind of telephone support and problem escalation/resolution services offered by Red Hat you have to buy additional support contracts, and these more than level the playing field.

Standard support, for instance, starts at £650 ex VAT for an x86 server. For that, you get four-hour response by phone, fax or email, available on weekdays from 9am to 6pm. Premium support for the same platform then extends this to a 24/7 service with a two-hour response time. But that's a lot more expensive, starting at £1,450 ex VAT per server for the x86 platform.

There are no incident limits and, as with other Linux implementations, no client licences to pay for. However, unlike Red Hat, Suse doesn't differentiate an enterprise-level workstation product or offer a support service tailored specifically to the needs of

companies running its Linux desktop software.

Installation, configuration and production problems are all covered by the Suse support services. The company also offers a common portal giving online access to its knowledgebase and online updates with a graphical update tool to help apply them. It doesn't quite measure up to the Red Hat Network service, which remains a role model for this type of support service.

Similarly, although it's possible to purchase support for Suse software from selected hardware partners and third parties, coverage isn't as extensive as for Red Hat.

Functionality

The SLES product is designed to be a lot more stable than the consumer offerings, with a development cycle of around 24 months depending on United Linux timelines. So, if you want state of the art, SLES 8 is the wrong product to go for. That said, the basic specification turns out to be a lot more advanced than you might expect and, compared to the older Red Hat product, a deal more scalable.

To begin with, it's possible to get the Suse software for a wide range of platforms. As well as x86 and Intel Itanium implementations, the company also boasts a 64bit AMD port and support for most of the I Series, P Series, Z Series and OS/390 IBM platforms. This is a boast that will only be matched by Red Hat with the next release of its enterprise code.

The kernel used is also a recent release and features many performance tweaks including asynchronous I/O, multipathing memory access and scheduler enhancements. There's also specific support for Intel's Hyperthreading technology, plus the ability to support SMP deployments with up to 32 processors. Bear in mind, though, that the majority of servers in corporate data centres top out with four CPUs. So it's a good box to tick but not a feature many customers will use.

Large memory support, up to 64GB, is another key feature although, again, it's unlikely to be exploited. Plus you get IP load balancing and extremely scalable high availability clustering capabilities, with the Suse server, in theory, able to support clusters with up to 64 nodes. A choice of journalling file systems is another high-availability option, along with Sistina's LVM software for storage virtualisation. Suse also recently announced a technology agreement with Sistina to certify and support its GFS (Global File System) software for San deployments.

Graphical management using the Yast2 tool is yet another key feature of SLES 8, shared with other implementations of the Suse family, and there's an automated distribution and installation tool, Autoyast, which can be used to reduce installation times on large networks. Suse claims that these do away with the need for specialist knowledge, although that's not really the



An updated version of the Samba SMB/CIFS software is included in the Suse package for Windows interoperability

case. But then in a corporate environment Unix and command line expertise is unlikely to be so lacking that it's a major issue.

Elsewhere, IPsec VPN support comes as standard in SLES 8 together with Kerberos 5 authentication facilities. There's also an enhanced deployment of Samba and NFS file sharing. A full set of development tools is also included, however the Apache implementation is an older 1.3 release. And, just as with the Red Hat 2.1 product, that puts a cap on performance which can only be addressed by downloading and running the Apache 2.0 software (see our test results on page 196 for details). That, though, won't be supported under the current Suse arrangements.

The United Linux LSB that forms the base of SLES 8 is widely supported by software vendors in the enterprise space. As a result applications from the likes of IBM/Lotus, Oracle and SAP are readily available to run on the platform, the developers working with Suse to ensure compatibility. In addition, Suse has also implemented the new NGPT (Next Generation Posix Thread) model which, as well as enhancing application performance, makes it easier to port existing Unix applications to run under Linux.

That said, vendor support for the relatively new Suse software isn't as extensive as for the albeit less scalable, yet longer established Red Hat

enterprise solution. The Red Hat product also benefits from better online support services, especially when it comes to applying updates and patches, and the support infrastructure is better established and proven compared to the relatively new Suse setup. That doesn't mean Suse can't deliver the goods, and there are plenty of satisfied customers to testify otherwise. It's just that the Red Hat alternative has been around longer, is available via more sources, and is known to provide what's needed. Only time will tell if Suse can match it.

DETAILS

PRICE £703.83 (£599 ex VAT) for a single x86 server, including one year of maintenance

CONTACT Suse Linux 020 8846 3918 www.suse.co.uk

PROS United Linux LSB core; wide multiplatform support; highly scalable with large memory support; graphical deployment and management tools

CONS Apache 1.3 Web Server; maintenance offering very basic; limited online update/patching facilities

VERDICT

The first tangible United Linux product, with the performance and availability features required of an enterprise solution. But not as well supported as the Red Hat product

FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
EASE OF USE	★★★★★
OVERALL	★★★★★



Access to the Suse portal is included as part of SLES 8, enabling updates and patches to be retrieved and installed online

Supports you right?

Linux vendors are fighting to win the hearts and minds of enterprise customers on a number of fronts. They are starting with price, where they win hands down due, primarily, to the open-source model which reduces development overheads and helps slash acquisition costs compared to both traditional proprietary Unix solutions and Windows alternatives. Support for industry-standard hardware also helps here but, unlike Windows, which has similar advantages, enterprise versions of Linux can run on other platforms, such as IBM I Series and Z Series mainframes, still much used in corporate data centres.

Linux also beats Windows in the enterprise space in that existing Unix skills are easily transferred and capitalised on. Similarly it's a lot easier to port in-house Unix developments to run on Linux servers than Windows boxes.

The performance arguments have been proven too, and there's widespread acceptance of the availability and security claims made for the Linux platform. Which just leaves maintenance and support as the only remaining bar to total world domination, or the software equivalent in the enterprise market.

The Microsoft approach

Support is an area where Microsoft has had a lot more practice and, of late, has further fine-tuned its support offerings to match enterprise requirements. For instance it no longer bundles much one-to-one support into packaged Windows server products, as is now the case with the enterprise Linux implementations. There is just the ability to have up to two incidents

dealt with for free, typically of the 'I'm having trouble with installation' variety. Neither are there any firm guarantees in terms of response time or support availability, a reflection of the fact that enterprise customers rarely buy software off the shelf.

Indeed packaged solutions are mainly bought by smaller companies looking for low-cost hand-holding solutions, primarily at the start of the acquisition cycle. As such, the emphasis with the packaged products is very much on self-service support with, for example, Microsoft recently extending its online automatic update service to work with the latest Windows Server 2003 software as well as XP desktops.

Enterprise customers can also use this service. They can purchase additional levels of support, starting with basic software assurance which is included as standard where perpetual licences are bought. Software assurance provides access to Microsoft's Technet support service delivered on CD-Rom and online, both via a website and interactive newsgroups.

Again this is largely a self-help approach, while customers looking for more can purchase varying levels of Microsoft Essential and Premier support services to provide, if needed, 24/7 telephone assistance with one- to four-hour response guarantees. What you get with these support agreements depends on what you're prepared to pay, with a range of options on offer right up to the provision of an on-site Microsoft support manager. It's also possible to get coverage for the whole network environment, not just the Microsoft components.

All Microsoft's support offerings are available via a network of partners including server vendors, system integrators and specialist resellers. The Linux vendors, too, are adopting this approach, which can provide real advantages in the enterprise market. For instance, companies are much more likely to implement Linux on an I Series server if they can get software support from their IBM hardware vendor.

Because levels and quality of support vary so much it's not possible to make specific comparisons between what the Linux vendors are offering and either traditional Unix solutions or those from the Microsoft camp. That said, open source has always benefited from a huge developer base with access to source code, so that if a problem arises a fix will inevitably be created somewhere pretty quickly. Corporate customers, however,



One advantage of Linux over Windows is that the open-source operating system has been ported to run on a range of platforms, including mid-range I Series systems from IBM (above)

want more than that in terms of service-level guarantees, managed services and user training – services which commercial Linux vendors are at last starting to offer, as outlined in this feature, and which are bound to improve with time.

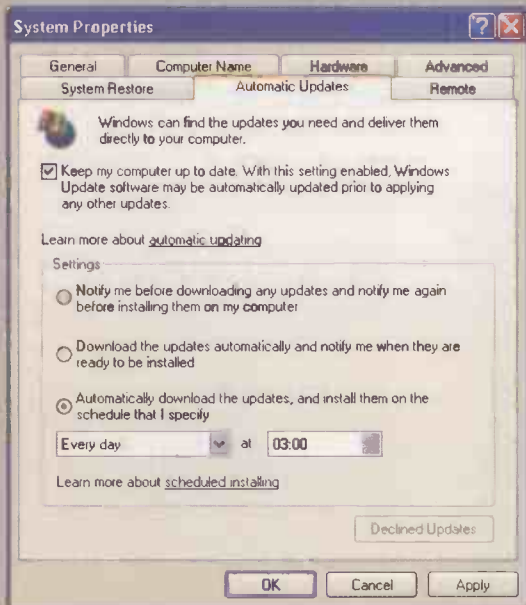
A question of security

One final consideration, linked to support, is the security, or otherwise, of the Linux platform. This needs careful consideration, not least because there's a widely held belief that Linux is immune from both viruses and attempts by hackers to plant trojans and other nasties on remote systems. Unfortunately that's far from true.

You can argue that Linux and Unix are better equipped to deal with such problems than Windows alternatives. For example, it's a lot harder for rogue code to acquire root privileges on a Linux/Unix system than it is to get administrative rights on a Windows machine. But with its source code in the public domain you could equally argue that it's easier for hackers and virus writers to find and exploit OS weaknesses.

Vulnerabilities are just as likely to be found in Linux as Windows. Likewise, there are plenty of viruses and trojans that can infect Linux servers. If everyone were to switch from Windows to Linux servers there would be an up-swing in the number of threats, as it's the universality of Windows that makes it such a popular target.

The bottom line is that it's just as important to pay attention to security on a Linux server as it is on one running Windows. Patches need to be applied when they become available, hence the enterprise products are differentiated with proper support services. The open-source community may be quick to fix problems, but finding out what's available and from whom can be a problem. Customers need to protect themselves using the same firewall and anti-virus tools they would for Windows. After all, you may be running Linux servers and an open-source mail server but, by themselves, these won't stop mail-borne viruses reaching Windows clients.



The Automatic Update facility introduced in Windows XP has been extended to the Windows Server 2003 product to keep the server software secure and up to date

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Table of features

			
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PRODUCT	ENTERPRISE LINUX AS V2.1	ENTERPRISE SERVER 8	WINDOWS SERVER 2003 ENTERPRISE EDITION
Price per server (ex VAT) including basic maintenance	£1,225 per year	£599 per year	£2,649 for 25 users
Client licensing model	N/A	N/A	Per user/device
URL	www.europe.redhat.com	www.suse.co.uk	www.microsoft.com
CORE OPERATING SYSTEM			
Kernel revision	2.4.9	2.4.19	N/A
Graphical support	XFree86	XFree86	Windows
HARDWARE SUPPORT			
x86	✓	✓	✓
Intel 64bit/AMD 64bit	✓/x	✓/✓	✓/x
Sparc	x	✓	x
PowerPC	x	✓	x
Other	x	IBM I Series, P Series and Z Series	x
Maximum SMP support	8-way	32-way	8-way
Maximum memory	16GB	64GB	32GB (64GB for Itanium)
CLUSTERING			
Max nodes	2	64	8
IP load balancing	✓	✓	✓
Graphical install/automated install	✓/✓	✓/✓	✓/✓
BUNDLED APPLICATIONS			
Directory services	OpenLdap 2.0	OpenLdap 2.1	Active Directory
Web server	Apache 1.3	Apache 1.3	IIS 6.0
FTP server	✓	✓	✓
Database	✓	✓	x
DNS	✓	✓	✓
Firewall	✓	✓	✓
SMTP email	✓	✓	✓
Proxy server	✓	✓	✓
STORAGE SUPPORT			
SMB/CIFS	✓ (Samba 2.2.1)	✓ (Samba 2.2.5)	✓
NTFS	x	x	✓
Ext2/Ext3	✓/✓	✓/✓	x/x
JFS	✓	✓	x
Reiserfs	x	✓	x
NFS	✓	✓	x
Storage virtualisation	x	✓	✓
CONSOLE INTERFACE			
Gnome	✓	✓	x
KDE	✓	✓	x
Command line	✓	✓	✓
MANAGEMENT TOOLS			
Yast	x	✓	x
Webmin	x	x	x
Swat	x	x	x
Web-based management	✓	✓	✓
SOFTWARE SUPPORT			
Installation support	✓	✓	Chargeable
Online software updates	✓	✓	✓
Automatic patching	✓	x	✓
Operational support	✓	Chargeable	Chargeable
Extended support options	✓	✓	✓

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SL-K8AV2-RL

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Socket 754

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- 2 DDR 400/333 SDRAM
- Supports AGP 8X/4X
- Supports UATA-133/100 & Serial ATA RAID
- Integrated LAN
- Integrated 6-Channel AC'97 Audio
- 8 x USB 2.0
- BIOS Vcore Setting & FSB Setting
- BIOS AGP & DIMM Voltage Setting

SL-K8AN-RL

NVIDIA® Crush K8
Socket 754

- Supports HyperTransport
- 2 DDR 400/333 SDRAM
- Supports AGP 8X/4X
- Supports UATA-133/100 & Serial ATA RAID
- Integrated LAN
- Integrated 6-Channel AC'97 Audio
- 6 x USB 2.0
- BIOS Vcore Setting & FSB Setting
- BIOS AGP & DIMM Voltage Setting
- SL-K8AN-R is w/o LAN

The specification and pictures are subject to change without notice.

NVIDIA® nForce2 Ultra 400+ MCP

Socket A

SL-75FRN2-L

- FSB 400/333MHz
- 3 Dual Channel DDR 400/333 SDRAM
- Supports AGP 8X/4X
- Supports UATA-133/100
- Integrated LAN
- Integrated 6-Channel AC'97 Audio
- 6 x USB 2.0
- Chipset Voltage Adjustable
- BIOS Vcore Setting & FSB Setting
- BIOS AGP & DIMM Voltage Setting
- ABSII CPU Protection

NVIDIA® nForce2 400+ MCP

Socket A

SL-NV400-L64

- FSB 400/333MHz
- 2 DDR 400/333 SDRAM
- Supports AGP 8X/4X
- Supports UATA-133/100
- Integrated LAN
- Integrated 6-Channel AC'97 Audio
- 6 x USB 2.0
- Chipset Voltage Adjustable
- BIOS Vcore Setting & FSB Setting
- BIOS AGP & DIMM Voltage Setting
- ABSII CPU Protection

VGA CARDS

GeForce™ FX5900
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- > Supports AGP 8X
- > 400MHz RAMDACs
- > DirectX9
- > OpenGL 1.4
- > Dual-Fan
- > DVI output for digital flat-panel displays
- > TV-Out S-Video Connector
- > 128MB/256 bit DDR Memory



Intel® 865PE + ICH5

Socket 478

SL-865-GR

- FSB 1200/800MHz (Overclocking)
- 4 Dual Channel DDR 400/333 SDRAM
- AGP 8X/4X
- UATA-133/100 & Serial ATA RAID
- Gigabit Ethernet
- Integrated 6-Channel AC'97 Audio
- 8 x USB 2.0
- BIOS Vcore Setting & FSB Setting
- BIOS AGP & DIMM Voltage Setting
- Hyper Threading Technology
- Soltek UV8 MBA Technology

FSB 1200
Capable

Intel® 848P+ICH5

Socket 478

SL-848P-L

- FSB 800/533MHz
- 2 DDR 400/333 SDRAM
- AGP 8X/4X
- UATA-100/66 & Serial ATA
- Integrated LAN
- Integrated 6-Channel AC'97 Audio
- 8 x USB 2.0
- BIOS Vcore Setting & FSB Setting
- BIOS AGP & DIMM Voltage Setting
- Hyper Threading Technology
- Soltek UV Technology



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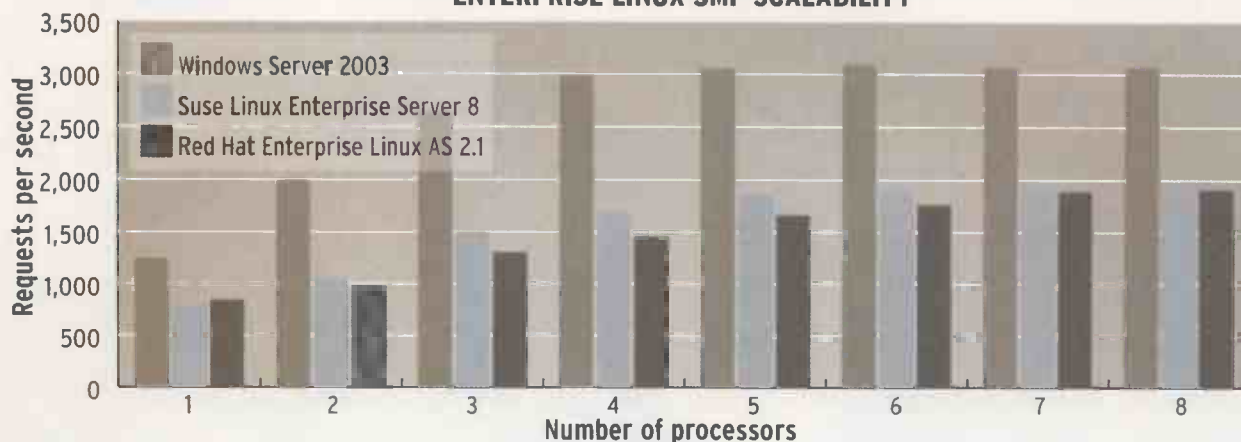


Lab results



FIG 1

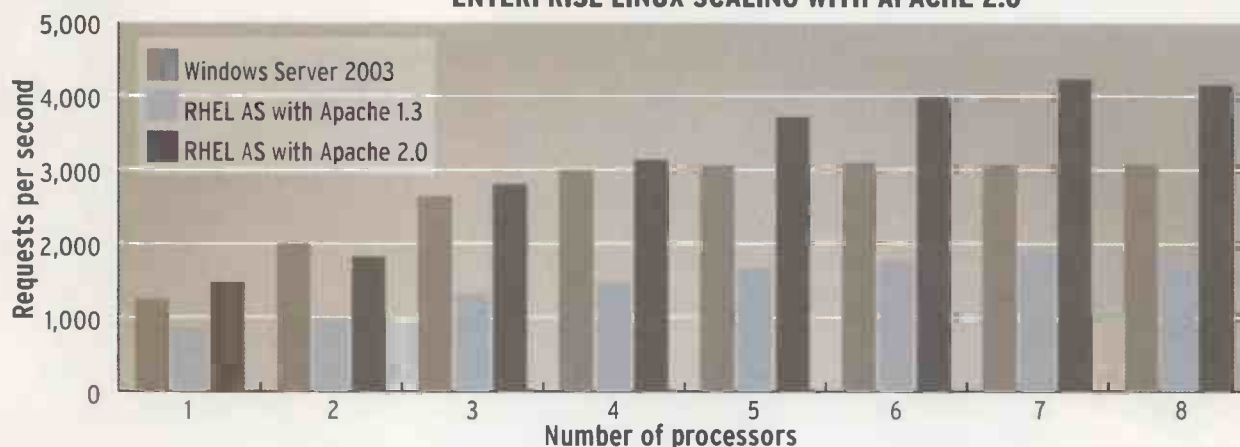
ENTERPRISE LINUX SMP SCALABILITY



Both versions of Linux scaled well, with the Suse Linux server having the edge until the maximum number of processors was configured, where there was little between the two. Both, however, were outperformed by the latest Windows Server 2003 product

FIG 2

ENTERPRISE LINUX SCALING WITH APACHE 2.0

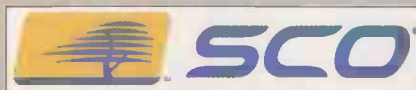


The lack of performance compared to Windows Server 2003 was mainly due to the inclusion of the older 1.3 Apache Web Server in the Linux products. When we installed Apache 2.0 the roles were reversed, with the best results with a full set of CPUs configured

Litigation corner

One thorn in the side of companies looking to deploy open-source Linux is a threat of litigation from the SCO group. In a lawsuit against IBM, SCO claimed the company illegally contributed some of SCO's Unix System V code to the open-source project. It has issued a warning to any organisation using v2.4 and 2.5 of the Linux kernel.

According to the SCO press release, anyone using such versions of Linux is breaching its intellectual property rights and should pay a licensing fee. The company will be offering an introductory licence priced at \$699 (£470) for single-CPU systems, with multiprocessor licences, single CPU add-ons, desktop and



embedded systems available. It has even set up a new Intellectual property division, SCOSource (www.sco.com/scosource) to handle applications.

This goes against the whole open-source ethos behind Linux and is being strongly contested by the vendors affected. Red Hat, for one, has filed a complaint against SCO and pledged money to help cover the legal costs of developers affected by any future infringement cases. In another twist, SCO has also stopped selling its own Linux products, but continues to offer support,

remains a member of the United Linux consortium and says the licensing requirements don't apply to users of SCO products. At the time of writing, the company wouldn't be drawn on whether that exemption also applied to customers of other vendors of United Linux code, such as Suse Linux and Enterprise Server 8.

Threatened litigation of this kind is of concern to corporate customers looking to stay within the law. However, the general consensus among independent analysts and observers is to refrain from complying with the SCO licensing demands at present. There's more than a hint of a marketing ploy in this furore and it could well be settled soon, at no cost to end users.

How we tested

In order to evaluate the two enterprise versions of Linux featured here, we were loaned a Platinum 7200R server by Maxdata. A full review of this four-way Xeon system can be found on page 188, but suffice it to say that it's a typical back-end enterprise product, like those commonly found in corporate data centres and used to host large databases and other mission-critical applications.

Another benefit is that, based on industry-standard Intel components, the Maxdata server is certified and widely available with both Red Hat and Suse Linux software pre-loaded. It is also sold as a Windows platform and makes an ideal testbed on which to check out the performance of the products featured here.

The Maxdata server came equipped with four processors to enable us to test the SMP scalability of each product. These we installed ourselves and, as well as Red Hat Enterprise Linux AS and the Suse Linux Enterprise Server 8 software, we ran tests using the latest Windows Server 2003 software for comparison purposes.

Testing started with some initial file sharing evaluations which showed little difference between the packages so the results haven't been reproduced here. In practice this type of system is more likely to be used as an application platform than

as a general-purpose file and print server. The bulk of the testing, therefore, was done using Web Bench with the server configured to handle active page requests from the web clients configured, requiring real processing work at the server end.

The tests were run with Hyperthreading enabled on the Xeon processors and in each case we installed the host OS on a Raid 5 storage array. The server was connected to the VNU Labs test network using Gigabit Ethernet and benchmarks taken using an array of Windows 2000 workstation clients.

Figure 1 (top left on the opposite page) shows how the different OSs fared as we increased the number of available processors. In each case the server was subjected to a full client load and, because we tested with Hyperthreading enabled (effectively doubling the number of virtual CPUs seen by SMP OSs) the results show scaling for up to eight processors.

As the results show, performance scales well for each of the two products as the number of processors increases, with the biggest gains at the low end between one and six CPUs. The later Suse Linux software was faster than the Red Hat product on most of the setups. However, the two were evenly matched at the top end and both were outclassed by Windows Server 2003 which gave consistently high scores across the board.

These figures need to be put into context. The comparison with Windows Server 2003 is valid in that the Microsoft software is aimed at the same enterprise server market, but it's a little unfair in that the Windows server is a brand new implementation with all the latest performance bells and whistles Microsoft has to offer. The two Linux servers, on the other hand, are much older and limited in these tests by the use of Apache 1.3 Web Server software.

Customers who are looking for maximum performance can easily install the new Apache 2.0 code, as we did, and get much better throughput. Indeed, as you can see in figure 2 on the opposite page, the use of the Apache 2.0 Web Server lifted the Red Hat performance above that of Windows and its IIS 6.0 software. Similar results can be obtained on the Suse platform too, although for clarity the SLES 8 figures aren't shown here.

Apache 2.0 has been fully available for over a year and is a stable web server platform used to host an increasing number of production sites. Most plug-ins have now been ported to Apache 2.0 and it will be included in Red Hat Enterprise Linux 3, scheduled for release in October/November this year. It will also be added to the United Linux LSB software in the Suse product next year.

Our verdict

Enterprise Linux products have come on a long way since they first started to appear, just over two years ago, and now have a lot going for them. For example, as we've demonstrated in our lab tests they can be configured to match the latest Windows alternative in terms of performance and scalability. More than that, given suitable hardware, independent tests run by leading industry-standard server vendors have shown them able to outperform proprietary Unix platforms at a much lower cost.

Red Hat and Suse are the two leading protagonists in this market and there's very little to choose between their products. Suse does have a small lead when it comes to functionality, but that will be lost by the time Red Hat Enterprise Linux 3 ships. Both products also feature a range of high-availability options and as a result, we can't really make any recommendations based on performance or functionality considerations.

There are, however, differences when it comes to distribution, maintenance and



'Enterprise Linux products can match Windows alternatives'

support. The commercial Linux vendors are all starting to take maintenance and support seriously, but Red Hat is the one with the most polished offering. Rather than simply banging its own drum Red Hat has garnered an impressive line-up of allies, partnering with all the leading server manufacturers and ISVs (independent software vendors) to deliver and support its platform. These relationships help spread the support burden and make it more effective. Plus they give enterprise customers the option of one-stop shopping with trusted suppliers, just as with traditional Unix systems.

Of the two offerings, therefore, the balance looks to be firmly tipped in favour of Red Hat when it comes to its distribution, service and support. However, as we can't put that to the test we can't apportion a PCW award on these criteria either. What we can recommend is that companies looking to replace proprietary Unix systems take a long hard look at the Linux alternatives to Windows, as Microsoft isn't the only company with a good story to tell in this market.

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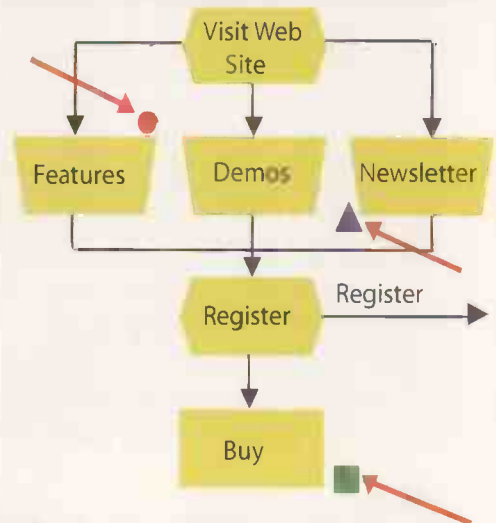
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Find out about programming in Flash MX 2004



PAGE 204

This month's Hardware section will appeal to anyone who wants to run Dos-based arcade games



PAGE 222

Find out how to add chapter marks to your DVDs in the Digital Imaging and video section



PAGE 230

We share some valuable tips on how to mix your own home cinema surround sound

Welcome to December's Hands on

section, packed with plenty of things to keep you busy inside avoiding the cold winter weather. If you've been following Barry Shilliday's Linux columns, you'll have seen plenty of tips already to help you make the move from Windows. This month he tackles printing – traditionally tricky under Linux but now much simpler, so if you want to switch, take a look.

For those who are going wireless, Guy Kewney looks at power over Ethernet, with a view to siting his access point on the ceiling aided only by one cable and no safety net, while over in Hands on Networks, Alan Stevens continues his look at setting up a mail server with a discussion about firewalls.

If you're feeling creative, Niall Magennis explains how to mix your own surround sound, while in Hands on Digital imaging Ken McMahon shows how to create highlight menu buttons for your DVDs, giving them a more polished and professional look.

In the world of Windows, we've a look at the Indexing system in XP, and Tim Nott muses on the future for the operating system, looks at the best ways to organise your media files and revisits the mystery of the disappearing Microsoft Core Fonts. Meanwhile, Terence Green is on hand with information for Windows 2000 users, including a look at the temporary files that can clutter up your disk, and an explanation of where memory dumps come from.

Office workers will find Stephen Wells offering a guide to using dropdown menu boxes in your spreadsheets and looking at weighted averages, while in Databases Mark Whitehorn looks at organising names and trimming extra spaces from them. Word users can find hints on organising fonts and styles, to make sure that a new document looks how you want it to look.

In Hands on Web development, we've a look at the importance of planning before you start to create your web application, and how you create pages that will appear differently to clients and staff, while visual programmers can find out what's new in the latest version of Macromedia's Flash MX in Tim Anderson's column.

And if all that's worn you out, turn to Gordon Laing in Hands on Hardware to find out how you can make a diskless computer and load it up with classic arcade games. With Christmas approaching, it could be just the thing to keep the kids quiet!

Nigel Whitfield





Advice from our experts

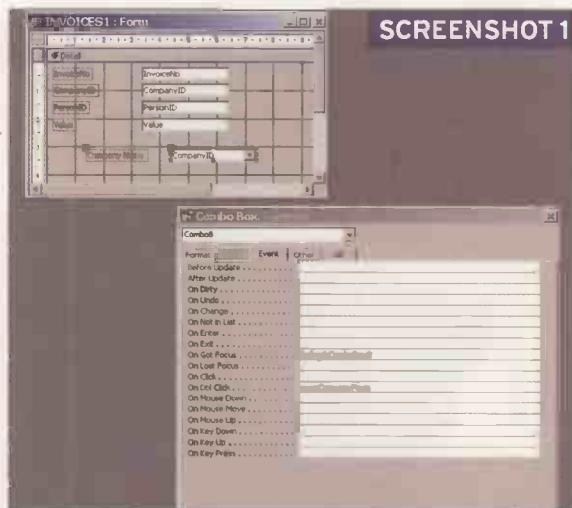
Our Hands on experts answer your questions and solve your problems

Databases

Q A form I have designed has some combo boxes to select data from a list that has been predefined. The combo boxes are set 'limit to list', however I can add new records by double-clicking the combo-box field to launch a sub-form to add data to the table from which the list is formed. When I close the sub-form and then select the combo-box, my new data is not present immediately. If I close my form altogether and then re-open it, the new data is there.

How do I make my new data available immediately within the combo-box without having to close the entire form and then re-open it?

Darren Norris



Attach the macro to the 'On Got Focus' property of the combo-box

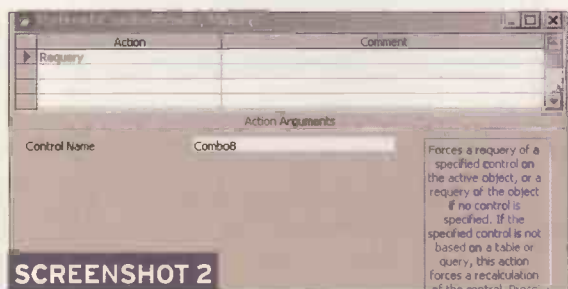
not being connected to the right motherboard header.

Q I'm building a new PC mainly for Cad work. What kind of graphics card would you recommend?

Derek G Lewis

A Cad requires decent 2D quality and performance, which thankfully most graphics cards deliver today. Some Cad programs may exploit 3D acceleration, but nowhere in the same league as a modern game, so there's no need to go for the fastest graphics card on the block. Instead you may want to consider additional capabilities, such as dual monitor support, where you could keep all your palettes on one (perhaps lower quality) screen, leaving the second high-resolution monitor to display your drawing without any clutter. Such a configuration is also useful to those working with video, audio and photo editors. Again, most modern cards support dual monitors, but the undisputed king in this respect remains Matrox, which offers cards with dual, tri or even quad display outputs. Consider the company's

The macro simply re-queries the combo-box itself



recent Millennium P650 for £117 ex VAT.

Q I have a desktop PC with a broadband connection on one floor of my home. On the second floor is a notebook. How can I share the broadband connection with the notebook? Both are running Windows XP Professional.

Nitin Singhal

A The cheapest way to do this is to activate Internet Connection Sharing on the broadband connection on your desktop, and leave this system powered-on. You'll then need to connect your notebook to your desktop using Ethernet – the cheapest way is simply to use a length of crossover cable. If you don't want to trail a cable, go for a wireless link by equipping each computer with a wireless Ethernet adaptor; a pair of USB Wifi adaptors should cost about £100. A more powerful solution is to buy a broadband router, which will share your connection to multiple machines automatically. Most have four Ethernet ports and some even sport built-in wireless access points. Different routers are available depending on whether you've got cable or ADSL; numerous models are available from Netgear, Buffalo, Linksys and D-Link.

Spreadsheets

Q Quattro Pro has been my spreadsheet for many years and one function that I frequently use is @lastvalue. As Excel is now the industry standard I have also been using Excel XP Pro lately, not as my default spreadsheet, but as a means of receiving data from a number of charities for which I provide services. Is there a macro in Excel that will find the last value in a column?

Ron Bates

A Try this macro:

```
Sub LastCell()  
ActiveSheet.Range("L1").  
End(xlDown).Copy  
ActiveSheet.Range("A1").  
PasteSpecial  
Paste:=xlValues  
Application.CutCopyMode  
= False  
End Sub
```

(Key: ✓ code string continues)

Hardware

Q Whenever I start my PC, I get the following message 'error hardware monitor'. What's going on?

F Farjad

A This is a problem often associated with your PC's internal power supply becoming overloaded or not kept sufficiently cool by its fans. All power supplies have their limits and your particular combination of processor, drives and graphics could be pushing it over the edge. Fortunately new power supplies are both affordable and easy to fit, with just four screws normally holding them in place in your case – consider a more powerful Enermax model from www.overclockers.co.uk. Alternatively, the error message could be due to a processor being overclocked or fed too high a voltage – if you've been experimenting, enter your Bios or use onboard jumpers to return to your default processor settings. Finally, the error can also be due to another cooling fan not doing its job properly. This could be due to clogging dust or



It transfers the value in the last active cell in column L to the cell A1 and obviously you can change that column and cell to suit.

Q In the August issue you explained how to insert the tab name into a cell using a macro. Can you do the reverse? I produce lots of worksheets in Excel that have the same format and I would like to have the identity of that sheet, always named in cell D4, automatically show on the tab.

Paul Jackman

A This macro will do it:

```
Sub MySheet()  
ActiveSheet.Name =  
Range("D4")  
End Sub
```

Q Is there any way in Excel of discouraging a user from leaving blank rows when filling a list?

Syeda Irtizali

A Let's say the first field of a new record they fill in is the date. To try out this approach, clear the range A1 to A20. Enter DATE in cell A1. Leave A2 blank. Highlight the range A3 to A20. On the Data menu choose Validation. In the Allow box under the Settings tab, choose Custom. Remove the checkmark from the Ignore blank box. In the Formula box enter =LEN(A2)<>0 (see screenshot 3). Click the Error Alert tab. In the Error message box enter your request, for example, such as Please use cell above. Click OK. Click on the worksheet to remove the highlight. Now the user is prevented from leaving blanks in the defined range.

Q Starting in cell E2 on an Excel worksheet and going down the column, I have a list of filenames like SL2003 and PL2003, P&L2003 and so on. Is there a fast way of turning these entries into links to those files?

Darren Wheeler

A Yes there is, enter this macro in your workbook:

```
Sub NewPages()  
Dim Linkname As String  
Range("E2").Select  
Do Until ActiveCell.Value = ""  
Linkname =  
ActiveCell.Value  
LinkToDocName =  
Linkname + ".xls"  
  
ActiveSheet.Hyperlinks.  
Add Anchor:=Selection,  
Address:=LinkToDocName
```

```
ActiveCell.Offset(1,  
0).Select  
Loop  
End Sub
```

When you run the macro your cell entries will turn into links. Assuming the other workbooks are in the same folder, click on any of the cell entries and you'll immediately open the file of the same name (see screenshot 4).

Q How do I display the minimum value in an Excel column which includes zeros?

Rex Gooch

A Another way of putting it is that you would like Excel to use an array formula to examine each value in a range and then only include that cell in your calculation if the value is more than zero. Logically, Excel will understand that if you use =MIN(IF(A1:A8>0,A1:A8)). To enter it as an array formula use Ctrl & Shift & Enter instead of Enter. Excel will add curly brackets like this to acknowledge your request: {=MIN(IF(A1:A8>0,A1:A8))}.

Q Autocalculate will display the mean average of a range but how can I quickly calculate the median?

Clem Pavey

A Click the cell where you want the answer and then the dropdown arrow next to the AutoSum tool. Choose More Functions and then MEDIAN. For the Number 1 box, highlight your range and then OK out.

Q Is the name of the last user of an Excel file hidden in its code?

Rory McCarthy

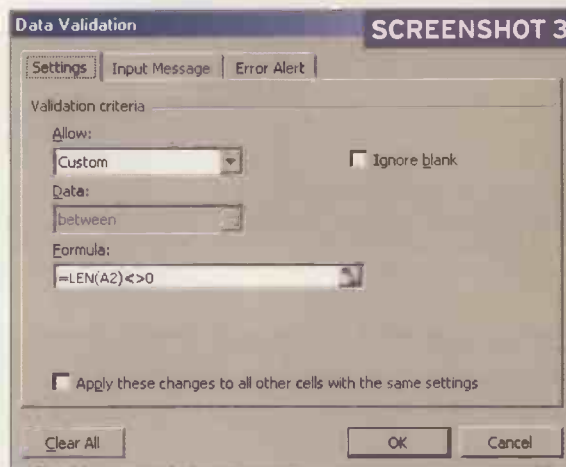
A On the contrary. If you open an Excel file in Notepad you'll see it sticks out from among all the binary code (see screenshot 5). You can also see the last user by choosing Properties, Statistics on the File menu.

Windows

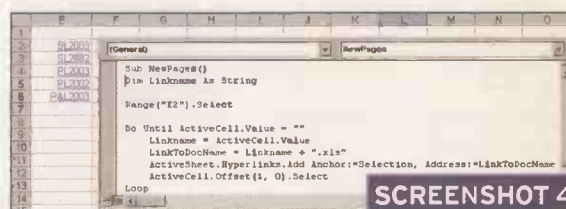
Q When I open XP's Control Panel, I get a normal Explorer folder tree in the left pane and 'Pick a category' in the right. How do I get back to the normal view of all Control Panel icons?

Andy Watson

A If you go to the View menu, select 'Explorer bar' then click on the ticked 'Folders' item this will then revert to the 'Common tasks' view, where you'll see the option to 'Switch to Classic view'. If you don't see this option, then click on the 'Control Panel' heading to expand it (see screenshot 6).



Preventing a user from leaving a blank record in a list



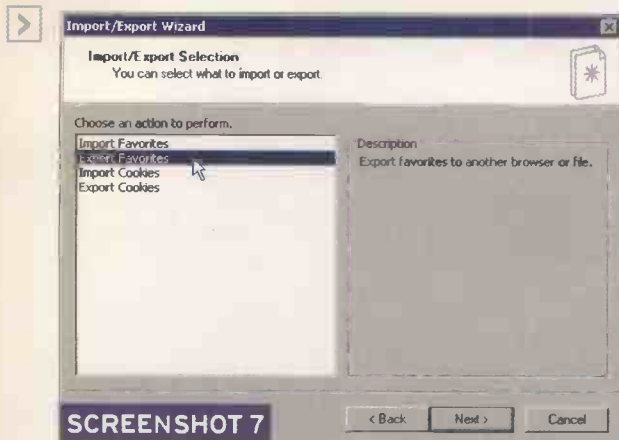
One macro creates a lot of links



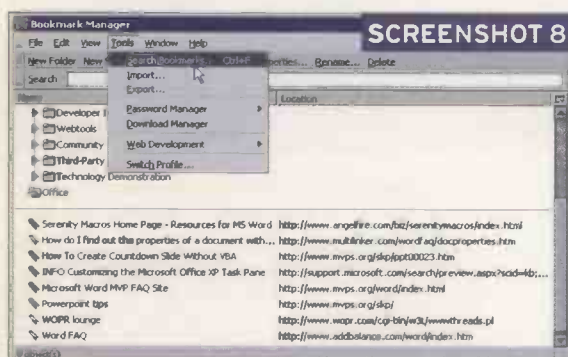
It's OK. It's only me



See all of XP Control Panel by switching to Classic View



Getting favourites out of IE...



...and into Mozilla

Q I have XP SP1 and want to install a third-party firewall. I have been into my current connection settings to disable the Windows firewall, but the advanced tab is not there so I can't take off the Windows firewall. Is there a setting somewhere that will enable the advanced tab to return?

Ian Dickinson

A It sounds as if a restriction is in force. Having taken the customary Registry backup or System Restore precautions, run Regedit.exe. Go to HKEY_CURRENT_USER\Software\Policies\Microsoft\Windows\Network Connections and look for a value named 'NC_AdvancedSettings'. Delete this value, close Regedit and restart the PC.

Q How can I import my Internet Explorer 'Favorites' into Mozilla? Each time I try this and select an IE 'Favorite' in Mozilla, nothing appears to happen.

Gareth Wilson

A You need to do this in two stages. First from Internet Explorer, go to File, Import/Export. Follow the instructions in the Wizard and choose 'Export Favorites' (see screenshot 7). If you don't want to export the entire Favorites folder, you can select a subfolder. In the next screen, browse to a location to save the file if you don't want the default of 'My Documents'. Finish the Wizard and you will find you have a file named 'bookmark.htm' at the chosen location. If you double-click on this it will open in your default browser showing each 'Favorite' or bookmarked site, as a separate link. Close this, then in Mozilla go to Bookmarks, Manage Bookmarks. This will open the Bookmark Manager in a new window. From the Tools menu of this, select Import (see screenshot 8), then browse to the file you created with IE, and click on 'Open'. This will add the contents to the Mozilla Bookmarks.

Q I have a persistent problem with my Windows ME PC. Every time I start up the PC I get the Dialup 'Connect To' window and have to cancel it. Using msconfig and a selective startup I have narrowed it down to any of the three following. Windowsmgm (winmgm32.exe), Msmgs (msmsgs.exe) or System Tray (mscnc32.exe). If I allow any of them to start I get the Dialup window.

Steve Bereton

A First the good news. MSMSGs is the Windows Instant Messaging

client - obviously you need to be connected to send and receive messages. As we mentioned in November's Hands on XP, you can stop it loading by going to Tools, Options, General in Outlook Express and unticking 'Automatically log on...', and then Tools, Windows (or MSN) Messenger, Options, Preferences to stop it loading at start-up.

The bad news is that the other two files you mention are put there by variants of the Sobig worm. If you go to www.bitdefender.com/html/virusinfo.php?menu_id=1&v_id=86 you'll find the full gory details and a removal tool available for download.

Q Having used the Help And Support feature of Windows XP and downloaded various 'Critical Updates' I checked on the Installation History. I thought it would be useful to print off a copy, but there doesn't appear to be any way to do so. Any advice?

Mick Penn

A Click in the Installation History pane to give it the focus, then press Ctrl & A, then Ctrl & C. This will select and copy the contents, which you can then paste into the text editor or word processor of your choice for printing.

Windows 2000

Q Is there any way of retrieving my password from the Windows 2000 system itself if I forget it, or do I have to use password-cracking software?

Gregory Tomokita

A The quickest and cheapest solution depends on whether the computer is your own or part of a centrally administered network. If the computer is part of a network ask the network supervisor to reset your user password.

If the computer is yours or you are authorised to administer it, deleting the Security Hive which is stored in a file called 'SAM' (stored in \WINNT\System32\Config) will delete all user accounts and reset the administrator password to a blank password. Data stored by users won't be deleted but the accounts will no longer exist, so they'll have to be recreated. Boot from a Dos boot floppy to delete SAM if the file system is Fat32. If it's NTFS, install a second copy of Windows 2000 in a separate partition and boot that to delete SAM.

Or you can boot into Linux from a floppy and reset account passwords without deleting user accounts. The boot disk from <http://home.eunet.no/>



~pnordahl/ntpsswd/ is one way to do it. Follow the links on this page to 'Other ways...' for yet another twist which involves manipulating the Logon screensaver. That this information is readily available should be a reminder to anyone storing confidential information in Windows NT/2000/XP. Don't rely on passwords alone, or indeed on Microsoft SYSKEY which encrypts passwords – it can be bypassed. Security is a process which should include both physical and logical barriers such as PC boot passwords, Bios passwords, disabling floppy booting, removing floppy drives, locking the PC case, locking sensitive PCs away and encrypting data or drives (see screenshot 9).

Word processing

Q In September's Question time you printed a reply to Alex Wood to enable him to insert a 'date created' field in a Word document template. I would like to do the same for the document filename. However, embedding a field in the template using the Insert Field, Document Information Filename facility produces letters with a reference of 'Document' (or another default name). What is required is the name the document is given when it is saved. Can you help?

Bryan Bagust

A Once you have saved the file, you need to update the Filename field. Certain actions will do this, or you can select the field and press F9 to update it manually. It will then show the correct name.

Q I would like to know how to create text upside down in a Microsoft Word document.

Ubbo Wiersema

A There are two ways. First you can create a Wordart object, using the simplest formatting style, then rotate through 180 degrees. A more cunning method is to create two text boxes using the text box toolbar to set the text in one to run top-to-bottom and the other bottom-to-top. You can then set that page to print in landscape format (see screenshot 10).

Q I'm updating some old Word for Windows files where the original author used the space bar to do things like indent the first line of paragraphs. Is there an easy way to get rid of these extraneous spaces? I'm reluctant to use 'Autoformat' as this seems to create more problems.

Kathy Field

A You can use the ^w wildcard in Find and Replace to find 'white space', but there's a quick way to get rid of spaces at the beginning of lines. Select the text to be cleaned, then click on the 'Centre' button (or press Control & E). With the text selected press the 'Align Left' button (or Control & L). The spaces will disappear.

Q In the August edition of PCW you gave a tip that has solved one of the major frustrations my PC life – how to prevent inadvertent use of the Insert button when using Word. This has been a major problem for me since the PC makers changed the layout of the laptop keyboard. Anyway I'm delighted with the fix but how can I get the same to work in Outlook Express?

Peter Tottman

A Unfortunately there is no option to change this behaviour in Outlook Express. If you are using Windows XP or 2000 then it's possible to remap the keyboard to disable or change the behaviour of any key on a global basis – see October's Hands on XP for details. For other versions of Windows there are several shareware keyboard-remapping utilities, such as that from www.dev-labs.com/kr/keyboards.html.

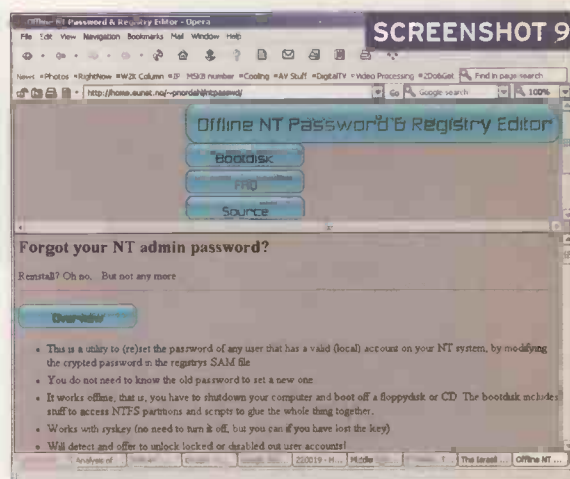
Digital imaging

Q I've tried to transfer video from tape to DVD to achieve better security against damage or corruption. I used my camcorder to get the image onto my PC hard drive and Pinnacle Studio 8 for editing. Unfortunately I ran into a problem with the picture and sound getting out of sync. What is the likely cause and how can I correct/avoid this in future?

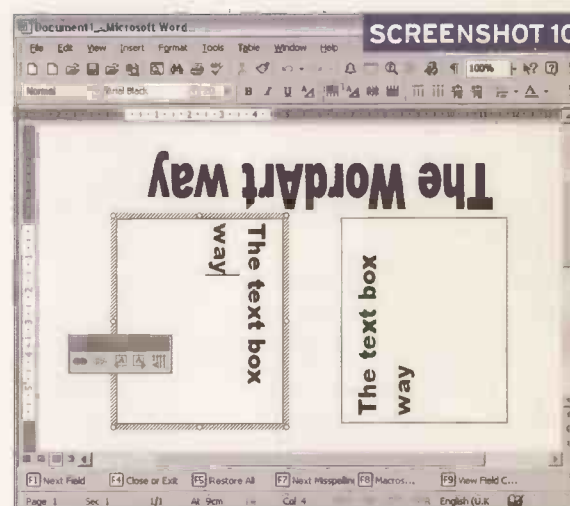
Peter Ellis

A Assuming you are capturing the video using Studio 8 with an analogue capture card, you wouldn't be the first to suffer. Synchronisation problems often occur, and get worse the longer the clip you are trying to capture, so limiting your clips to five minutes may provide a workaround. Technical support on www.pinnaclesys.com doesn't provide any clues, but there seems to be a consensus among users that attempting analogue capture in Studio with anything other than a Pinnacle card will be problematic.

If you don't want to change your hardware, an alternative would be to use different capture software such as virtualdub, which you can download for free from www.virtualdub.org.



How to get into Windows 2000/NT/XP/2003 when you don't know the password



Two ways to turn things upside down

CONTACTS

All of our experts welcome your queries, simply respond to the appropriate address below:

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Digital imaging & video:	digitalimaging@pcw.co.uk
Hardware:	hardware@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

Dump your disk with the help of CF

How to boot an OS from a memory card and relive some of the old Dos arcade games

A recurring enquiry to the Hands on Hardware mailbag is whether it's possible to dispense with a hard disk and run Windows or some other operating system from a solid-state memory card instead. The advantages are small size, low power consumption and silent operation, along with fast performance, potentially low cost and, of course, the cards can be removed easily.

That's the theory anyway. This month we're exploring the reality of booting an operating system from a memory card and looking at the sort of applications and environments for which it's best suited.

The theory

The most appropriate memory card format for diskless PC systems is Compact Flash (CF). It was designed from the outset to be fully compatible with the IDE specification, which means a PC and its OS should treat it exactly like a normal hard disk. Of all the memory card formats, it's also the cheapest and is available in the largest capacities.

To be treated exactly like a bootable hard disk, though, a CF card must be directly connected to the conventional IDE controller on the motherboard. To do this you'll need a CF-to-IDE adaptor. Four different models are available from the appropriately named cfide website at www.cfide.co.uk; they cost £19.99 inc VAT each – delivery on a single item works out at £2.

The first model is a small circuit board which takes the CF card and inserts vertically into the IDE connector, thereby eliminating the need for cables or mounting, but obviously requiring greater vertical clearance in the case. The second and third are circuit boards designed to be connected using a cable and mounted like a normal hard disk. One uses a floppy drive power cable, while the other requires a standard larger drive power plug. The fourth is a 44pin IDE adaptor, designed for slipping into the space reserved for a 2.5in hard disk inside a notebook. We tried the second, 'cfidefdd' model which uses an IDE cable and is powered by a floppy drive power plug.



Our tests were done with a Crucial 128MB Compact Flash card (right). In the end, our project involving Dos and the Multiple Arcade Machine Emulator required a footprint of just 13MB



CF cards are available from many companies; we opted for Crucial Technology, which sells 64, 128, 256, 512MB and 1GB models for £16.99, £25.99, £39.99, £79.99 and £158.99 respectively, all excluding VAT from www.crucial.com/uk. For our project described later, we used Crucial's 128MB card.

CF-based issues

The most obvious issue facing a system booting from CF is sheer capacity. Today you can buy a 160GB hard disk for around £100, whereas the largest CF card we're aware of measures just 4GB and costs over £1,000. Considering that Windows XP requires a minimum of 2GB installation alone and plenty more besides to breathe, CF is clearly not appropriate as the main storage medium for a traditional PC environment.

There's an additional technical issue to be aware of though. Unlike hard disks which are designed for almost constant access, traditional

To boot from a CF card you'll need an adaptor to connect it directly to a conventional IDE controller. We used a model from www.cfide.co.uk, which is physically mounted like a normal hard disk and powered by a floppy drive power plug; it cost £19.99 inc VAT. Once connected, the PC and operating system should treat the card as if it were a normal hard disk

CF cards allow considerably fewer writes before calling it a day. Their lifespan will almost never be an issue when used in a digital camera or MP3 player, but running operating systems can pose a serious threat to a normal CF card. The constant punishment of an average Windows swap file, for example, could see many CF cards into an early grave.

The ideal OS

The ideal OS for a CF-based system is therefore one which requires a small amount of storage and makes as few write-calls during day-to-day operation as possible. As discussed earlier, Windows is out, due to its virtual memory calls, which is a shame, as older versions could feasibly be accommodated on even relatively modest-sized CF cards.

Embedded operating systems such as Windows CE.Net are the most appropriate for PCs booting from CF cards, but annoyingly for enthusiasts these are normally only available to developers. Before giving up on the idea of booting from CF, though, there are a number of options remaining for the enthusiast.

You could, for example, boot a basic Linux distribution from CF and use it to build a simple router or firewall. For more information, check out www.freesco.org, www.itsp.org, www.locustworld.com and www.linuxrouter.org, although sadly the latter project has recently been discontinued.

An interesting alternative is the Movix project, a tiny Linux distribution containing everything you need to boot and execute a media player. While originally designed to boot from a CD, leaving the rest of the disc for media files, there's no reason it couldn't boot from a CF card instead. As far as we understand it, though, Movix can't

The largest CF card around is a 4GB, £1,000 Lexar Media card, designed for digital photographers who could enjoy a whole day's shooting at high resolution without changing cards





SCREENSHOT 1



SCREENSHOT 2



SCREENSHOT 3

stream files over a network yet, which means you'll still need a fair amount of local storage for media files. It's an interesting project anyway, and you can find out more at <http://movix.sourceforge.net>.

You could go retro and install Dos. The last standalone version 6.22 was distributed on just three 1.4MB floppies, had minimal system requirements and ran entirely out of Ram without virtual memory – perfect for CF. We dusted down our old disks and set to work.

Installing Dos

Like other operating systems, Dos needs to be installed on an active partition in order to boot by itself. Preparing a CF card for Dos is exactly the same as for a hard disk, although you should be aware the OS will treat it as a non-removeable drive. Do not under any circumstances remove or insert the CF card while the system is switched on.

The first step is to create an active partition on the CF card using Fdisk. Boot from the first Dos floppy, exit the setup, then run Fdisk from the command prompt. After rebooting, you'll need to format the disk, so boot from the first Dos floppy and exit its setup again, then type format c: /s, where the S will make the card bootable. You can now restart and boot from the first Dos floppy again, but follow through with the full installation. Three floppies later and you'll have an operating system installed on your CF card and it should happily boot.

Since Dos was designed to run on modest hardware, you could use almost any PC for this kind of project – indeed it's perfect for anyone with an old 486 or original Pentium lying around gathering dust. We wanted as small a system as possible though, so we built ours around a Via Epia M10000 motherboard, tested in October's Hardware column.

Most descriptions of the Via Epia boards begin with an admission that they're not as quick as modern

Pentium or Athlons, but obviously for this project they've got more than enough power. Indeed had we been starting from scratch we'd have gone for one of Via's slower, but cheaper and silent Eden-based Epias; these start from just £65 ex VAT from www.mini-itx.com.

While you could also fit a floppy or CD drive to install applications, we preferred simply inserting the CF card into the reader of a nearby Windows desktop and copying the required files across. This made for a very simple and potentially cheap system. Remember to power down the CF system before removing and re-inserting the card though.

What to run?

So you've got Dos installed, but what programs can you run? While there may be people out there with a retro desire for running the Dos-based versions of Wordperfect or Lotus 1-2-3, we preferred the idea of gaming. There were plenty of decent Dos-based games which could feasibly run from a CF-based system, including the classic Doom and Doom 2. We copied both onto our CF card, and they ran absolutely fine on our system.

As far as we're concerned though, the ultimate retro entertainment comes from emulating classic arcade machines. To do this you'll need a copy of Nicola Salmoria's wonderful Multiple Arcade Machine Emulator (Mame), which is available for many platforms, including (rather conveniently for us) Dos. Its enormous popularity has also seen Mame ported to a huge number of platforms even including the X-box, and modifications like those described in last month's edition allow you to install and execute it.

Like other emulators, Mame essentially makes the device it's running on believe it's actually ancient

They don't make 'em like they used to, but you can relive the best arcade games of the 1970s and 1980s using the Multiple Arcade Machine Emulator

Arcade OS allows you to launch various emulator games without typing lengthy commands. You can also configure it for arcade controls and numerous display options, including vertical, seen here



SCREENSHOT 4

arcade hardware, hence allowing it to execute original gaming programs. The original game code is copied into a Rom file, which Mame can then run. Mame is freely available to download from www.mame.net, but obtaining Roms can be trickier as most games remain under copyright and hence it is illegal to distribute and use them without permission. We can't advise on where to find Roms, although newsgroups are usually a better bet than websites. There are, though, some legally available Roms on the Mame website to get you started.

It's worth noting that the Dos version of Mame runs in Protected Mode to access greater resources so, unless you're running from a Windows-based command prompt, you'll also need to install a Dos Protected Mode Interface (DPMI); we used Charles W Sandmann's widely distributed CWSDPMI, which can be found on Google searches.

To start a game, you'll need to type the name of the Mame executable and desired Rom followed by any additional instructions; you'll then be asked to press a key to acknowledge the copyright. Interestingly, before allowing you to play, most Roms briefly run through the same diagnostics that the original arcade machine would upon cold startup.

Improved interface

Executing Mame from the command line is all very well, but after a while you wish there was an easier way. Fortunately there are a number of Dos-based front-ends for emulators like Mame, which automatically list the Roms and execute them with a press of a button. One of the best is Arcade OS, which additionally offers many display and control options, essential for anyone building a console with a proper arcade screen and controls. Find out more at www.mameworld.net/pc2jamma.

Building from scratch

Mame was a great project for a CF-based PC running Dos, and proves how cheaply and easily you can put together a silent diskless system without access to development tools. For the record, our installation of Dos 6.22, Mame, Arcade OS and several Roms came to just 13MB, with another 15MB for Doom 2. We may have used a 128MB CF card, but could have got away with something even smaller still.

Dos also proved to be a perfect OS for CF-based systems, although



obviously it's only appropriate if it'll run the applications you're after. Probably most exciting of all though was building a PC system consisting of just five affordable and relatively tiny components: the Via motherboard, a stick of Ram, the CF card, IDE adaptor and a power supply. That's a pretty compact and basic system in anyone's book, but one that's perfectly adequate for running modest applications such as an arcade emulator.

Future refinements

We had so much fun playing old arcade games on our compact and affordable CF-based PC that we're planning on building a dedicated system designed exclusively for Mame. It turns out we're not alone, with countless arcade-junkies also reliving their misspent childhoods (or indeed adulthoods) by constructing large cabinets into which they fit their Mame-running PCs. If this sounds like your kind of thing, head over to the many resources and links at www.mameworld.net. As far as our own PC-based arcade machine project is concerned, we've identified several key goals and considerations for each.

The first goal is fitting proper arcade-style controls, and these are readily available either as separate buttons and joysticks or complete consoles with USB or PS/2 connectivity. In either case, the action of various buttons and joysticks are mapped to keyboard presses, allowing game control. Keyboard mapping from Arcade OS can then ensure every game is operated by the same controls.

Before plumping for the best-looking parts though, you should consider what games you'll be playing, as many involve more than just a four-way joystick and one or two fire buttons. Fans of Defender, for example, will remember it having a plethora of buttons, while tank games like Battlezone used a joystick for each track.

The display is obviously a key component of any arcade machine and, while you could use a PC monitor, you'll get a much more authentic result with a TV or dedicated arcade monitor. With these you'll also need specific video timings, but these can be generated by Mame or Arcade OS. You should also ensure you're getting the best connectivity, and in the case of a

modern TV, that's an RGB input on the Scart. Most TV outputs on PCs offer either Composite or S-Video, but with a little circuit building you can make an RGB Scart adaptor which connects to a conventional 15pin VGA output. We'll describe how to

build one of these in a future Hands On column, as they're equally useful for those playing videos or photos from your PC.

Then there's the question of display orientation. Many old arcade classics were designed to play on a screen turned 90 degrees into a vertical portrait aspect. While Mame and Arcade OS can rotate vertical games to play on conventional landscape displays, the truly dedicated enthusiast will want a vertical display.

This may not be as simple as tipping a monitor on its side, though, as many CRTs aren't designed to be used in this configuration and can in fact be damaged. If you want a vertical display, or one facing upwards for a cocktail table cabinet, ensure this configuration is supported by its specifications; a safer alternative is to use an LCD monitor. Also remember more recent arcade games used landscape displays, so only choose vertical if it supports the games you want.

Perhaps most important of all is the cabinet. You could build a vertically standing machine, a cocktail cabinet, a sit-down cockpit or your own custom design. For inspiration head over to www.mameroom.com where you'll find numerous cabinets including links to plans for sale. A neat advantage of the cocktail design is being able to incorporate controls along three sides of the screen, thereby supporting two players and both landscape and portrait games.

Complementing the visual side of things you'll want a decent speaker system. You could use speakers and amplifiers designed for a PC, small

hi-fi or even in-car use. Finally, the Mame websites listed in this feature also have large collections of original artwork and logos which can be printed and applied to your cabinet. There's certainly plenty to consider, but also an equal amount of fun to be had building a PC-based arcade machine, not to mention playing with it. We'll follow up this project in the future, but would love to hear from anyone who's built their own arcade machine or CF-based system.

And finally

Thanks to everyone who contacted us following our recent articles on upgrading notebook hard disks. It seems there are more people out there willing to prise open their portables and fit larger drives than we first anticipated.

Among the many emails we received were several with tips on alternative tools and suppliers. Hugh Dixon suggested Maplin Electronics as a source for 2.5in to 3.5in IDE adaptors; David Riddles works at Maplin and told us the stock code was ZV01. Jason Noone pointed out that similar adaptors are also available from www.cpc.co.uk for just £2.45 ex VAT, under order code CS0129866. Returning briefly to Maplin, Chris Mayor picked up a USB to IDE adaptor there which he's used to connect external disks to his desktop machine.

The goal of our article was to expand the storage of an older notebook, and interestingly several people emailed to suggest using external disk enclosures as an easy alternative; these could also be used to get data onto the disk from a desktop without opening the PC and fiddling with cables. Disk enclosures are simply small boxes that house a 2.5in or 3.5in disk, and provide a USB or Firewire interface for easy external connectivity.

Bob Bao and Graham Mayor both suggested external enclosures, and Graham added that 5.25in enclosures are also a cheap way of building an external CD/DVD drive for use with notebooks, rather than going for the manufacturer's own expensive model; it also allows you to fit exactly the optical drive you need.

Thanks again to everyone who wrote in and, as always, we'd love to hear about your hardware upgrading experiences, notebook or otherwise.

CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Email him at: hardware@pcw.co.uk. Please do not send unsolicited file attachments.



The ultimate conclusion to a Mame obsession is to build an arcade cabinet to house your PC, monitor and controls

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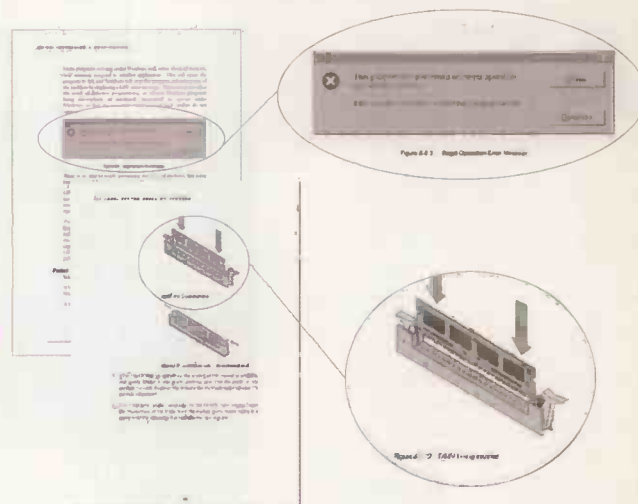
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**Tim Nott**

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Trouble with music and digital rights

How the next version of Windows may look, and why digital rights will affect our lives

As I mentioned last month, Windows 98 has fallen off the official support bandwagon, and the bell is also starting to toll for Windows ME – it will cease to be available as a retail product at the end of 2003, although system builders will be able to get it until December 2004, when it enters the 'non-supported' stage of its lifecycle. On a more positive note, it isn't susceptible to the Blaster worm. Ironically on the MS Blaster worm web page (www.microsoft.com/security/incident/blast.asp), you'll find this: 'Windows 98, Windows 98 Second Edition (SE), and Windows 95 also are not affected by this issue. However, these products are no longer supported. Users of these products are strongly encouraged to upgrade to later versions.' Presumably so that they, too, can join in the Blaster fun.

So what's in store for the future? Really, not a great deal to get excited about just yet. The next service pack for Windows XP – SP2 – won't arrive until mid-2004, according to Microsoft, so XP users will have to carry on downloading individual patches for a while yet. Windows Server 2003 has its first service pack scheduled for the first quarter of 2004.

The next new version of Windows, codenamed Longhorn, is even further away. Back at the Windows Hardware Engineering Conference in New Orleans last May, Microsoft announced that it would be released in 2005, with beta versions being available in 2004. But Longhorn has long been a moveable feast. When I wrote about Longhorn for our sister magazine, *Computeractive*, in November 2002, the release date had already oscillated between 2001 and 2005, with a then-current date of 2003. Analysts such as Jupiter's Joe Wilcox are putting their money on 2006, so it's really anyone's guess.

Incidentally, the name Longhorn comes from a bar in the skiing resort of Whistler, at the foot of Whistler Mountain in the Canadian Rockies. And Whistler, you may remember, was the codename of the operating system that finally appeared as XP (see screenshot 1).

So what's it going to be like and what will be in it? Once again this is a subject rife with rumour, and when



The Longhorn Saloon in Whistler has given its name to Microsoft's next operating system

PCW previewed the alpha code back in August we did say 'a lot is bound to change'. There's been much discussion of the 'Sidebar' – a sort of supercharged cross between the Active Desktop and the Taskbar, and in May we looked at an alleged look-alike called Dashboard, which since appears to have fallen by the wayside. What's probably more useful is to concentrate on the technologies Microsoft has been working on.

'When you migrate your licences you send information to Microsoft'

A new display engine is highly likely: the Desktop Composition Engine (DCE) is set to replace the Graphics Device Interface (GDI) and will keep pace with hardware technology, offering higher dot-density and wide aspect displays. A new file system is also expected. Or maybe not. Depending on who you



Sorting your media by genre

listen to, Windows Future Storage (WinFS) will either replace NTFS and Fat32 or be a layer sitting on top of NTFS. WinFS is modelled on the relational database of SQL Server, and for the end user means we will be looking at a more info-centric view of our files – grouping them by author, content, and so on, rather than the traditional drive letter and directory structure.

The third piece of technology is Next-Generation Secure Computing Base (NGSCB), previously known as Palladium. This is a combination of a hardware chip and a software component or 'nexus' which provides encryption unique to each PC. Proponents say this will bring us safer computing, increased privacy and more secure online transactions, and it can be used to enforce Digital Rights Management (DRM) on copyright material. Opponents say that it will open the way for 'Big Brother' to snoop and control what we do with our computers.

Media muddle

Technologies that mean you don't know where files are located on your hard disk, and can't do what you like with them, are already with us though. Look no further than the Windows Media Player (WMP) version 7 or later, and the Windows Media Audio (wma) file format, which have been with us since Windows ME launched. To take the question of file locations first, you may have noticed that it is profoundly difficult to access your hard disk from WMP. If you go to 'File Open' you can only play one file at a time – each new file replaces that currently playing. I usually cheat by dragging files from Explorer into the 'Now playing' list, but this isn't really entering into the spirit of things. For the Total Media Solution, you need to let Media Player organise your media library, which, you may have noticed, it seems overwhelmingly eager to do.

Let it do this, and you'll have a load of new and exciting ways to view your media files – by artist, album or genre. If you've copied music CDs to your hard disk in the wma format, then it will get this information – as well as track listings – from an online CD database (CDDb). I am pleased to say that the

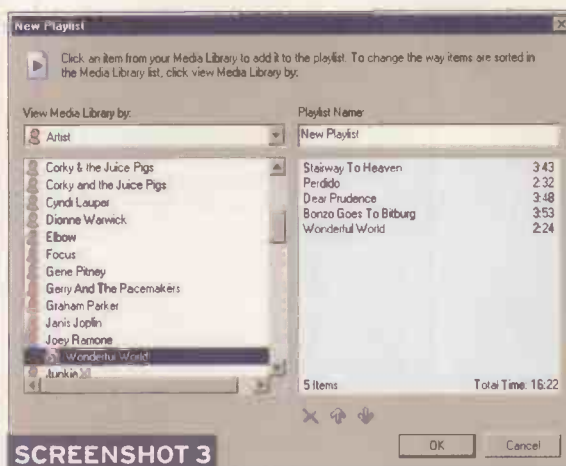


accuracy of this has improved greatly since February 2002, when I reported that every track on the Sony three-CD collection of *Great Moments in Jazz* was attributed to Charles Aznavour and that it hadn't heard that Mozart had written a Requiem. If you've got media files that you've downloaded from the Internet, then it will take the information from each file's 'tag' – which may yield some unusual results, particularly in terms of genre (see screenshot 2).

If you like this sort of thing then it's worth getting the latest version of Media Player – version 9. In Media Player, go to Help, Check for Updates. If you're using the original version 7 that shipped with Windows ME, then you'll need to do this twice: the first visit installs an updated setup routine, and the second visit installs Media Player 9 itself. This version has all sorts of extra organisational goodies. It can monitor selected folders to automatically add new items to the library (sorry, XP only), and create playlists automatically. Sample playlists include 'Favourites', 'Music for weekdays/weekends', and (I'm still trying to make sense of this one) 'Music tracks I dislike'. Although you still can't browse the way most of us are used to – by folder – you can see the location of each track if you scroll the right-hand pane horizontally. You can also re-order the columns by dragging their headings.

Playing a selection of tracks can still be something of a challenge. The first thing to do is to create a new playlist, either from the File menu or from the Playlists button. This opens a new Window where you can give your playlist a name and add tracks to it (see screenshot 3). You can click on the 'View Media Library by' button to choose how you want the library displayed, and when you click on an individual track, it will be added to the list.

So far, very simple. But you'll probably want your list to start playing while you add to it – like a real-world jukebox. So, open your playlist in the Media Library tree and click the Play button to start it. There are now several methods of adding extra items. If you browse through the Media Library and double-click on an item, you'll find it will play immediately, and ditch the rest of the current playlist. If you right-click, then Play, the same thing happens. Right-click, 'Play in Playlist' looks promising, but as far as I can tell this also ditches the current playlist. What you need to do is right-click, then 'Add to Playlist...', then specify the playlist you have just created. If you're not



bothered about saving the playlist, then you can right-click, then 'Queue-It-Up' which will add the file temporarily. It's a perfectly hideous piece of interface design, but one small mercy is that the same right-click commands are available in Explorer.

DRM and big brother

Moving on to DRM, this was brought home to me somewhat forcefully recently. While browsing an apparently legal and respectable music site, I saw that a featured artiste had 'kindly made three samples available' for download, in wma format. So, I duly downloaded one and double-clicked on it. It loaded into WMP, and then I was suddenly confronted with an Internet Explorer window titled 'Welcome to Windows Media Personal License Migration Service'. This informed me that I had 'reached this page because you are attempting to do one of the following with content that was copied from CDs: Restore the content on a computer or operating system that has been upgraded, or use existing content on another one of your computers.' Seeing as the only way forward was to press the 'Migrate' button I did so, and was informed that 'This content has been shared by multiple users on multiple machines and cannot proceed with further migration'.

I tried the file in another player, Ultraplaser. It would not play. Just for the sake of cussedness, I fed it into two different wma to MP3 converters – both failed. Right-clicking on the file then selecting the License tab of the properties revealed 'Restricted Content'. From the nature of the site, it seems that this instance was the result of a foul-up rather than deliberate piracy, but I decided to do some investigation.

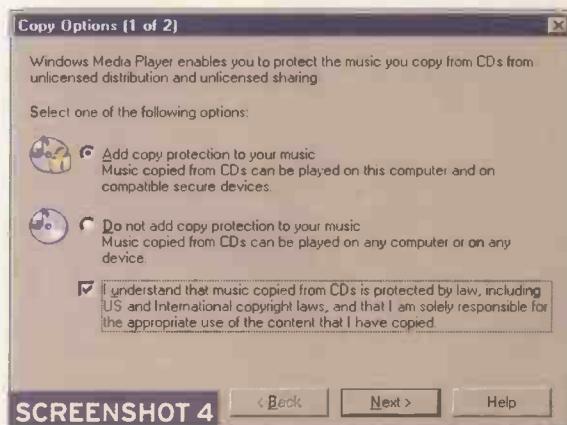
If you use Media Player 9 to copy tracks from an audio CD to wma files

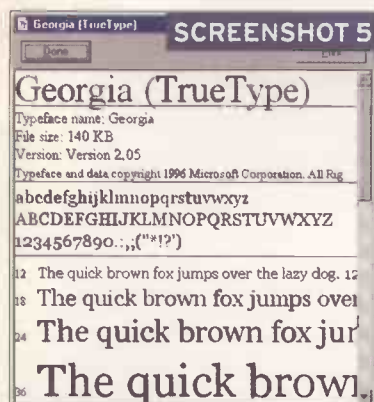
Creating a new playlist before you listen to your music in Media Player 9

Copy protection is optional when converting CD tracks, but understanding is compulsory

on your hard disk, you will have to pass through a screen offering you the option of copy protection. You also have to tick a box admitting responsibility for the 'appropriate use of the content' (see screenshot 4). So I did, and created a copy-protected wma file. Its properties showed that it was 'Protected content' and that 'Copy to a SDMI-compliant player [was] not allowed'. The latter isn't too much of a restriction as SDMI (Secure Digital Music Initiative) is pretty much a dead duck and the WMP help file says that 'The licenses for copied CD tracks allow you to play the tracks on your computer, (and) transfer the tracks to a non-SDMI-compliant device'. I then copied the file to another computer on the network. As expected, up came the 'Migration' window in Internet Explorer, when I tried to play it. Clicking the Migrate button this time resulted in a successful transfer, with the message 'The License for your CD copied content has been successfully delivered'. I then copied the file to a third computer, with the same result. Following that, I deleted the original from both the library and the hard disk. Copying it back from one of the other computers, I found it was still playable and didn't whisk me off to the Migration site. I then deleted all the copies of the file and went for a lie down.

Irrespective of one's views on copyright, two things become apparent. First, Microsoft's DRM does not seem to be working as intended. And second, the continuing dominance of MP3 over wma – not to mention the popularity of third-party players – is hardly surprising. And getting back to that 'Big Brother' point, the 'Privacy Policy' link on the Migration page tells us, 'When you migrate your licenses, you are sending some information to Microsoft that uniquely identifies your computer for internal tracking purposes. We store this unique





Georgian elegance
– freely available,
but not from
Microsoft

computer identifier in a database and count the number of times you attempt to migrate a license. We do not share this unique computer identifier with any other services, either internal or external to Microsoft'. Which still strikes me as rather spooky. Does the word 'subpoena' ring any bells?

Cache crop

Have you ever tried to save a jpeg or gif image from a web page in Internet Explorer only to be offered bmp – or something more obscure – as a format for the saved file? This could have a number of causes. Three relate to the web page or image itself: if the page is encrypted, you need to untick 'Do not save encrypted pages to disk' from Tools, Options, Advanced. If the web page has an address of the form <http://username:password@site/page.htm>, you need to find it in your Temporary Internet Files folder. You can then right-click and Open to load just the picture into IE – you'll then be able to save it as normal. There's another bug if the filename contains more than one full stop, as IE will only recognise the first – so 'thisisa.pic.jpg' will appear in the 'Save As...' dialogue as 'thisisa.pic'. In this case you can just edit the filename to give the correct extension.

All these occurrences are likely to be fairly rare, and the most common cause of this behaviour is that your Temporary Internet Files cache is full. Go to Tools, (Internet) Options, General, and hit the 'Delete Files' button in the 'Temporary Internet Files' section. Another strange manifestation of a full cache is that the View, Source command may cease to function – again clearing the cache should restore this functionality.

Soft core

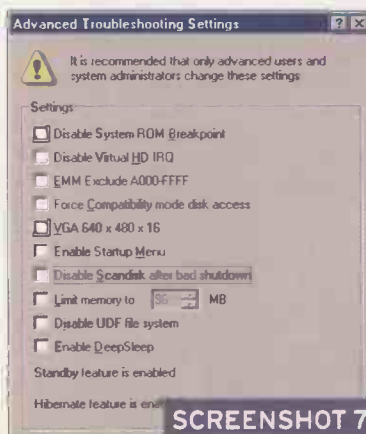
A year ago, I reported that Microsoft had withdrawn its free 'core fonts' from its typography website. Although many of these, such as

Comic Sans and various styles of Lucida ship with Windows 98SE and ME, others, such as Georgia and Andale Mono (which also came with the IE4 and IE5 updates), are no longer available. This is a shame, as the former (which does ship with Windows 2000 and XP) is an elegant serif font with 'old style' numbers that extend below the baseline (see screenshot 5), and it makes a pleasant change from the ubiquitous Times New Roman. The latter, as its name suggests, is a monospaced font. This became a firm favourite with those who need to use monospaced fonts – such as programmers – and also has some elegant touches, such as a quirky lower case l and a dotted zero that is easily distinguishable from an upper case O (see screenshot 6).

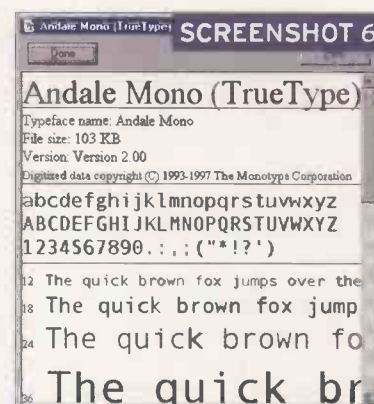
Microsoft withdrew the fonts from its own download site, because they were 'being abused – repackaged, modified and shipped with commercial products in violation of the... licensing agreement.' Having passed through the rumour mill, this was generally taken to be a swipe at Linux users. However, the End User License Agreement makes interesting

'According to the EULA I have the right to distribute the fonts in unaltered form'

reading. It appears that this states that 'You may reproduce and distribute an unlimited number of copies of the SOFTWARE PRODUCT; provided that each copy shall be a true and complete copy, including all copyright and trademark notices, and shall be accompanied by a copy of this EULA. Copies of the SOFTWARE PRODUCT may not be distributed for profit either on a standalone basis or included as part of your own product.' Which seems pretty clear to me, as it does to Daniel Resare at <http://corefonts.sourceforge.net>,



An easier way
to enable or
disable Scandisk



A coder's favourite – Andale

who states: '02-08-15 Microsoft pulls their fonts from their site. Fortunately, according to the End User License Agreement and the faq, I have the right to redistribute the fonts in unaltered form. This right I intend to exercise.' Although Sourceforge.net is primarily aimed at the Linux community, you'll find a link on that page to download what is claimed are the original Microsoft .exe files that contain the fonts, the installer and the EULA. On a related matter, if you want to trace a font that came with a Microsoft product, then there's a useful web page dedicated to this: www.microsoft.com/typography/fonts/default.asp.

Readers' tips

We've mentioned the problem of 'losing that number' – the CD Product Key that you need to install Microsoft and other software. Although not strictly a Windows solution, here's a cunning tip from Sarah Birkin. 'Whenever I acquire any CD which has a product key on the jewel case or sleeve, I use a fine-point waterproof felt-tip to write the key onto the printed side of the CD. This has saved me from trouble on several occasions.' To which I would add: invest in a purpose-made CD-labelling pen.

Chris Hallwood wrote with an easier way to disable or enable Scandisk after a bad shutdown (September's Question time). Rather than edit the msdos.sys file, Windows 98 and ME users can run msconfig.exe, then hit the Advanced button on the General tab. This will reveal an option to 'Disable Scandisk after bad shutdown' (see screenshot 7).

CONTACTS

Tim Nott welcomes your comments on the Windows column.
Email him at: win@pcw.co.uk.
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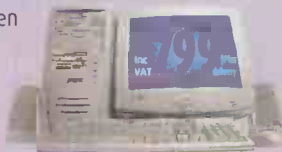
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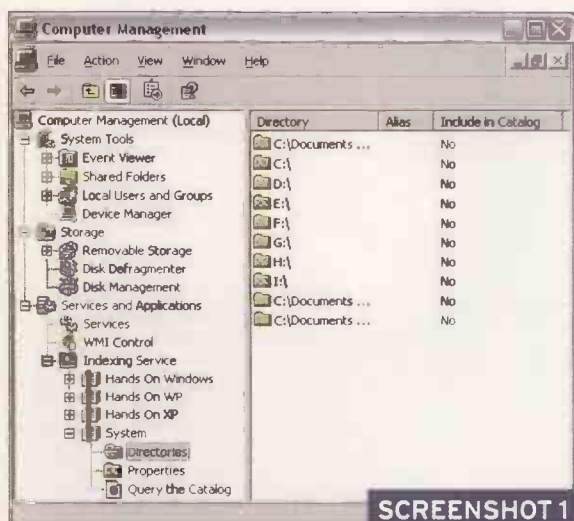
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**Tim Nott**

Is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family

The ins and outs of indexing

Show XP Indexing who's boss and improve the speed and relevance of your searches

**SCREENSHOT 1**

It's a strange world where it's actually quicker – and more flexible – to search the entire web than it is to search your hard disk. The XP Indexing service, like the Microsoft Office 'Find Fast', which has been around a lot longer, has a bad reputation, being blamed for everything from slowing down the system to preventing Explorer from saving its settings. Should you do a web search on It, you'll find most hits contain information on how to disable it. In fact it's not that bad, provided you show it who is boss, and it provides far greater capabilities than the standard Windows search or the Office version. It does, however, have the interface from hell, so here's a brief guide to getting started.

First, if you have partitions formatted as NTFS, right-click on each in Explorer and make sure that 'Allow Indexing service...' is checked on the General tab. Second, don't enable Indexing until you've configured it. You'll see why in a minute. To configure the Indexing Service you need be logged on with administrator rights, then go to Administrative tools, Computer Management. Dig down the tree on the left pane (if you only see one pane click on the Show/Hide Console Tree button) through Services and Applications to Indexing Service. Right-click on this, choose 'Properties' and clear the two checkboxes for 'Index files with unknown extensions' and 'Create abstracts'. This will speed up indexing and help keep the size down. The Indexing Service works

The default catalog will index every partition and folder

with 'Catalogs'. A catalog is a collection of folders – or directories, as they are called by the indexer. The folders don't have to be nested or even on the same partition. You'll see that there's already a 'System' catalog set up. Expand this, click on 'Directories' and you'll see that it is ready to index the contents of every partition and folder on your system (see screenshot 1). You really do not want this to happen, so double-click on each entry or drive letter, and in the dialogue check the 'No' button under 'Include in Index'.

Having done this, select 'Indexing Service' in the left pane and, from the Action menu, choose New, Catalog. Give this a name and specify a location where the index is to be stored – this can be anywhere on your PC. This action will create a new catalog – that is, a branch under Indexing Services, with sub-branches for Directories, Properties and Query the Catalog. Open the Directories branch – it will be empty, so right-click in it (or go to the Actions menu) and choose New, Directory. Browse to the folder you want to add and click OK. By default, all subfolders are included. If you want to exclude a subfolder, then add it explicitly to the catalog, with the 'No' button checked under 'Include in Index'. By default, the content of text files, MS Office files, HTML documents, email and newsgroups are indexed – you can also get 'filters' for other file types, such as Adobe Acrobat or jpeg – go to www.adobe.com/support/downloads/detail.jsp?ftpID=1276 or www.aimingtech.com/jpeg_ifilter/.

Having created and populated one or more catalogs (see screenshot 2), you then need to create the indices. If you just close the Computer

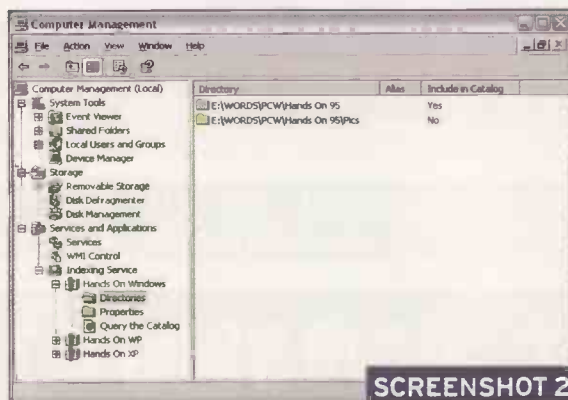
Creating a new, more selective, catalog

Management window, and enable the Indexing Service from 'Change Preferences' in Windows XP Search, then XP will create the index at its convenience. It is fairly circumspect about this and will pause indexing if there is a lot of user input or disk activity. So unless you've created very large catalogs, you shouldn't notice much of a performance hit. If you are feeling impatient, you can force the indexer into action by highlighting a folder in the 'Directories' list, then going to Actions, All Tasks, Rescan.

Be prepared to sacrifice some disk space. According to the Help file: 'The size of the index, which accounts for most of the size of a catalog, is about 15 to 30 per cent of the total size of the documents that were indexed.' My experiments would put this figure higher, and each index also creates two 4MB document property files named 'Propstor.bkn'.

In addition, each catalog requires a separate instance of the Cidaemon.exe process running – you can see this on the Processes pane of the Windows Task Manager (press Control & Alt & Del to summon this) (see screenshot 3). Although these processes are set to the lowest priority and don't consume much in the way of memory or processor time on a desktop PC, I did notice that even though the System Catalog had all its directories excluded from indexing, it still ran an instance of Cidaemon.exe, and still created empty index files including the two large 'Propstor' files. So, if you don't need this catalog as an example any more, you can delete it. However, you can't delete a catalog when the indexing service is running, so you first need to right-click on Indexing Service in the left pane of the Computer Management Console, choose All Tasks, then Stop. You'll see that all the Cidaemon.exe entries disappear from Task Manager, Processes. You can also Stop or Pause indexing on a per-catalog basis by right-clicking on them.

So, having stopped all Indexing, right-click on System, and choose delete – this will also get rid of all the index files. When you restart the indexing service there will be one less Cidaemon.exe in Task Manager. There is a huge variety of performance-tuning and other

**SCREENSHOT 2**



options available, which are comprehensively covered in the online help file. If you open Help and Support, search for 'Indexing Service', then click on 'Indexing Service' in the Results pane, you should find a link on the right to 'Open Indexing Service Help'. If you have trouble finding this, open the file named 'isconcepts.chm' in the Windows\Help folder.

Searching indexes

Having created indexes, we can turn our attention to searching them. First, we need a more convenient way of getting to the index. We'll look into some slicker ways of using the Management Console in a future column, but for now, the easiest way is to find the file Ciadv.msc, which should be in Windows\System32, and create a shortcut to it in the Start Menu or Quicklaunch toolbar. Be very careful here, as the default drag-and-drop action is to move the file rather than create a shortcut, so either right-drag to get the 'Create Shortcut' option or go via the 'New Shortcut' route (see screenshot 4). This will give you a distinctive icon that starts the Management Console with just the Indexing Service. It doesn't appear to be possible to save the settings of this window, so you'll need to click on the 'Show Console Tree' button to get a two-paneled view.

Expand the Catalog you want to search, then click on 'Query the Catalog'. This will produce the Indexing Service Query Form. This rather ungainly looking interface has two ways of searching – Standard (free text) and Advanced. Unless you are searching for a single word, then the Standard query is fairly useless as it searches for files containing any of the words entered. If you want to search *à la* Google, for a phrase or multiple words, check the Advanced query option. Once again, the Query Language is eye-wateringly complex – you can, for example, 'weight' search criteria in order of importance or specify document properties – and once again I'll leave you alone with the Help file for this.

For less ambitious queries, you can operate in much the same way as a web search engine. If you enclose two or more words in double quotes, it will search for the exact phrase. You can also use Boolean operators – AND, NOT, OR or NEAR. Elvis AND cow AND volcano, finds files that contain all those words – in my case this scored just one hit with last August's Hands on Windows column (see screenshot 5). Elvis AND NOT Presley will find all files that include



SCREENSHOT 3

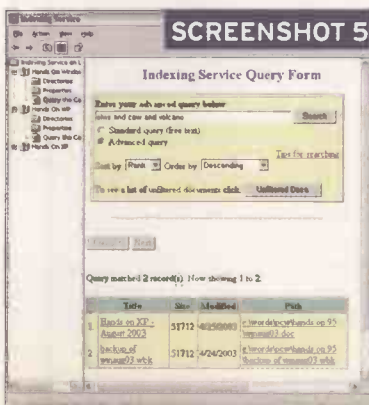
the first word but exclude the second. Note that you have to use AND NOT together, and, unlike Google, you can't use the plus and minus signs instead of AND or NOT – the query language uses different symbols. AND is &, OR is |, NOT is !, NEAR is ~, so, to lift an example from the Help file, 'red | dog &! (black-cat)' will find documents with the word 'red' or 'dog' and not the words 'black' and 'cat' if they are within 50 words of each other.

Although I've shown the operators in upper case this is just for clarity: you can type them in lower case.

Search results display the title (if an Office document), size, date and file name. Click on the title or filename and the file will open – in Internet Explorer. This can be rather disconcerting with Office documents, but you'll find that although the IE Toolbar remains, the menu structure contains the usual Office commands relevant to the document type.

Reader feedback

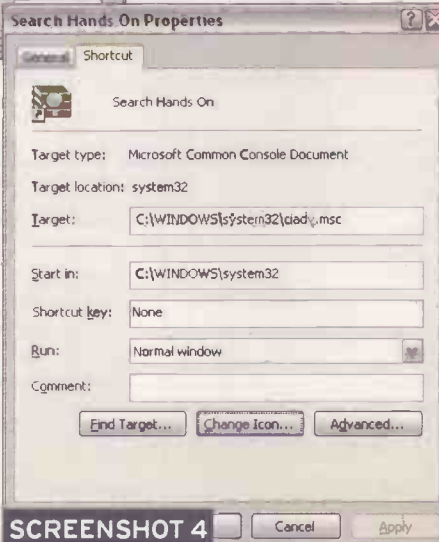
In the past few weeks I've had a flood of mails concerning the popping up of a message stating that the Remote



SCREENSHOT 5

Left: Each catalog runs its own process

Below: Creating a shortcut to the Indexing Service



SCREENSHOT 4

Procedure Call (RPC) has been terminated unexpectedly and that Windows will shut down – some also mention NT Authority\System. Hopefully, by the time you read this, the epidemic will have died down, but I'm sorry to say this is the Blaster worm in action. This website tells all <http://support.microsoft.com/default.aspx?kbid=826955>.

We also had an interesting insight from John Dickinson, on the subject of lost passwords (September's Hands

on Windows XP), who points out that in XP Home, if you restart in Safe Mode, you have access to an unprotected Administrator account, which 'makes the XP login password a complete waste of time'. Up to a point, John. As far as I can tell, without going through the installation of both XP Pro and XP Home again, the former prompts you to set a password for the hidden administrator account on installation, whereas the latter does not. However, if you log on to this unprotected Administrator account

from Safe Mode you can then go to Control Panel, User Accounts, and set a password for it – which will be required next time you log on to that account in Safe Mode.

Further to October's piece on the 'net send' command, Julian Bristow points out that you don't have to resort to the command-line interface to send a message – there is a GUI equivalent tucked away in the Management Console. Right-click My Computer and select 'Manage'. On the Shared Folders component of the tree on the left, right-click again and select 'All tasks' and then 'Send Console Message'. This opens a box with spaces for a message and a list of recipients, workgroups or domains.

Finally thanks to Gerry Mullen who points out that XP users have a much easier way of customising folder icons than the method described in October's 'Cracking Windows' feature. Right-click on the folder, choose Properties, turn to the Customise tab and you'll see a 'Change Icon' button.

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.

Left: Doing a Boolean search will reduce unwanted results



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

Dump the debris

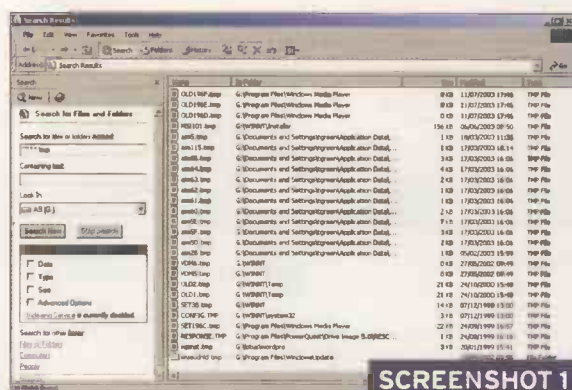
How to find and delete temporary files and memory dumps to free up disk space

While engaged in a spot of housekeeping, Simon Johnston discovered a file called ~pttest.dat which was over 260MB in size and wondered what it could possibly be. Simon found another large file, also around 260MB in size, called memory.dmp in the WINNT directory. 'Is it needed?' Simon wondered. Although Simon didn't specify where he found the ~pttest.dat file, the tilde (~) prefix is a good indication that it is a temporary file. The tilde character is used by convention in Windows, and many other applications, to indicate a file that is only required while a particular application or operating system process is active. When the application or process that creates the temporary file terminates it should delete its temporary files, but this doesn't always happen. If the application or process crashes or terminates unexpectedly when Windows crashes, its temporary files can be orphaned.

Simply deleting temporary files assumed to be orphans is a risky business, so it's best to rename or move them instead and then to wait for a while to see whether any other process or application complains. If so, you can then move the files back to their original location or restore their proper names. Obviously, you need to keep a note of the original name or folder. You could drag them into the Recycle Bin from where they can be restored later, but it's probably best to keep them separate. From a housekeeping perspective it's not a bad idea to clear out orphaned temporary files occasionally as they can take up quite a lot of space. Close all applications before doing this.

Windows won't allow you to delete temporary system files that are in use – you'll see an 'access denied' error message – but not all applications are so considerate. Use Start/Search/For Files or Folders with wild cards to locate potential candidates. If you enter '~*.~' and '*.tmp' without the quotes but leaving a space between the two expressions, search will find all files beginning with a tilde and all files with a tmp extension (see screenshot 1).

It's not always possible to confirm a file as an orphaned temporary file



Many small temporary files add up to lots of wasted space

so it's best to err on the cautious side. Temporary files often have a tmp extension but it's quite common to find temporary files with other extensions. Microsoft Word, for example, creates some temporary files with the tmp extension but when it opens an existing document for editing it prefixes the filename with a tilde and retains the original file extension (eg doc, rtf). If the file in question is located in a known temporary directory such as C:\TEMP that's a

'Simply deleting temporary files assumed to be orphans is a risky business'

fairly useful indication that it is a temporary file. By default Windows 2000 sets up a temporary directory for each user account, as well as a system-wide temporary directory. User temporary directories are created in the Documents and Settings directory hierarchy, and the system temporary directory in the system root folder, usually resulting in C:\WINNT\TEMP.

To determine where the current user's temporary folders are, enter SET in a Command Prompt window. This will list all the user environment variables including Temp and tmp (an alias which some programs may use instead of Temp). To see where system temporary files are stored, open the System Control Panel, select the Advanced tab and click on the Environment Variables button. The system temporary variable is listed in the lower window. The user temporary variables in the upper window are unique to each user

account. It can sometimes be useful to relocate temporary files.

For example, if space on the Windows system drive is tight and a particular program creates very large temporary files and does not provide a means for selecting where the files are created, you could relocate the temporary folder to another drive by editing the user or system variables. Don't delete the original system temporary directory (usually C:\WINNT\TEMP) as some applications may be hardcoded to use this.

While many applications use the default Temp directories, others set up their own temporary folders and yet others create temporary files all over the place. Applications which create their own temporary folders often enable the location to be changed from a preferences or options dialogue. Microsoft applications such as Word create temporary files in a variety of locations. Many are located in the standard Temp locations but when you open a document for editing, Word creates a temporary file in the directory where the document resides. Test this by copying a Word document onto the Desktop and then opening it in Word.

Memory dumps

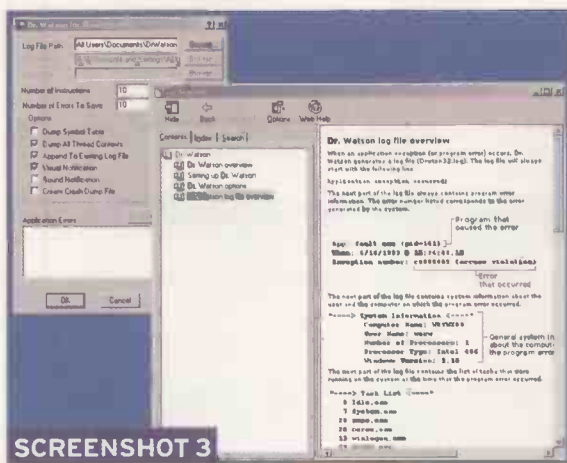
Simon's other problem file, memory.dmp, is less problematical. As the name suggests, it's a dump or copy of the contents of memory. In Simon's case, the size of the file is equal to the amount of physical memory – 256MB of Ram, in his computer. Memory dumps are created when Windows crashes. There are three types of memory dump – the complete dump, the kernel dump, (both called memory.dmp), and the small dump which is only 64KB. Each successive memory.dmp overwrites the previous one but the small dump option creates 'Mini Dumps' which are given unique names identifying the date and sequence number, eg mini022900-01.dmp. By default Windows 2000 Professional and XP are set to create small dumps and Windows 2000 server versions are set to create complete dumps (see screenshot 2).

All the dump selections can be accessed from the Startup & Recovery



button on the Advanced tab of the System control panel. You must log on with an admin account or start System with RunAs (hold Shift key down while right-clicking on System) to change the options. You'll notice a fourth option – None – which saves no dump and which home and small business users can safely select. If you didn't know what a dump was before you read this, you're not likely to ever need one, and if you ever do you'll have a recurring problem and be engaged in discussion with someone who will ask you to enable the dump option. While you have the Startup & Recovery dialogue open we recommend you deselect the 'Automatically Reboot' option. This is designed to restart Windows 2000 automatically in the event of a system crash, but it can have the undesired side effect of causing repeating crashes that get in the way of attempts to diagnose and fix the problem which is causing it.

In addition to system dumps, Windows 2000 also includes the Dr Watson utility drwtsn32.exe which detects program errors, logs diagnostic information to a file called drwtsn32.log, and creates memory dumps called user.dmp. It may also write an entry to the Event Log. Dr Watson is a debugging tool which starts automatically when it detects a programming error (see screenshot 3). You'll know this is happening when you see an error message saying a program has generated errors and will be closed by Windows. If this doesn't happen often you can ignore it. If it happens frequently the Dr. Watson log may offer some clue as to the source of the problem, and if you report the problem to Microsoft or the program supplier they may request a copy of the log and optionally of the user dump file. Simple inspection of the log file will identify the program that triggered Dr Watson. It will be named

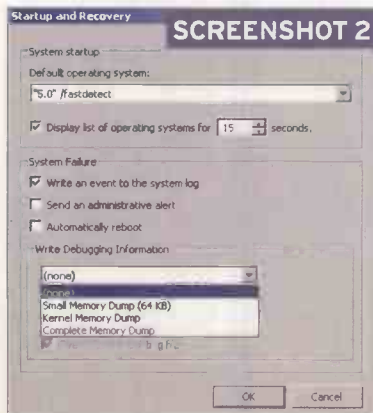


SCREENSHOT 3

at the top of the file with its PID (process ID). Sometimes only the PID is given, in which case scroll down the log to the task list to see which program corresponds to that PID.

The named program may not be the source of the problem. It may be reacting to or interacting with another process. For common problems such as 'Explorer has generated...' errors, a Google search may offer a more helpful diagnosis than Dr Watson. As a general rule, Dr Watson logs provide useful information but the program only really comes into play when a problem drives you into the arms of support professionals who may then also request a copy of the user dump. Dr Watson sets itself up the first time it is triggered by a program error. You can see how it is configured by entering DRWTSN32 into Start/Run/Open. Click on the Help button for more information. Interestingly, the user dump presents a potential security risk described at www.securiteam.com/windowsnt/focus/5TPOM203PS.html. As with the system memory dumps, there's little to be lost by disabling the user dump option, and you can always turn it on again if a problem presents itself and a support technician requests a copy of the dump.

Windows 2000 utility Dr Watson saves diagnostic information when programs run amok



SCREENSHOT 2

You can change the type of memory dump that is created when Windows crashes

also have an ntbootdd.sys file in the root of C: you have SCSI drives on your computer and the following advice may not apply to you.'

Michael correctly surmised that we had erred. What we meant to say, (and having said it here many times before, should have said), was 'Now create a Windows 2000 boot floppy by copying the NTLDR, ntddetect.com, and boot.ini files from C: to a freshly formatted blank floppy disk.' Apologies to all, grateful thanks to Michael, and now if you'll excuse us we're off to flagellate ourselves with a floppy.

Apropos reality biting, thousands of Windows users were caught by the Microsoft Blaster worm which rampaged across the Internet in the dog days of summer. Microsoft issued a patch for the vulnerability some weeks before the worm which exploited it arrived on the scene, but many computers were still exposed when the worm struck, not only because they failed to patch, but because they were not protected by a firewall. A correctly configured firewall would have protected even unpatched computers. Many Windows 2000 computers weren't infected by the worm but succumbed to its attempt to download its payload. All this could have been prevented by firewall protection. Microsoft offers basic guidance at www.microsoft.com/security/articles/firewall.asp and an in-depth technical article at www.microsoft.com/technet/security/prodtech/network/Firewall.asp. Both articles are linked from the Microsoft 'Protect your PC' page at www.microsoft.com/security/protect, which also links to advice on keeping Windows updated and using anti-virus software.

Advice on how to remove SP4 using the Recovery Console which we outlined in the November issue, saying it was not a supported option, has since become so by virtue of being published as a Knowledgebase article at <http://support.microsoft.com/default.aspx?id=825062>. Curiously, it was a Microsoft contributor posting to the public Microsoft newsgroups in July who said this method was unsupported by Microsoft, but the KB article dated 12 August describes it as new functionality.

CONTACTS

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Barry Shilliday

has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time prefers to travel the world – and snap it with his camera

Printing made easy

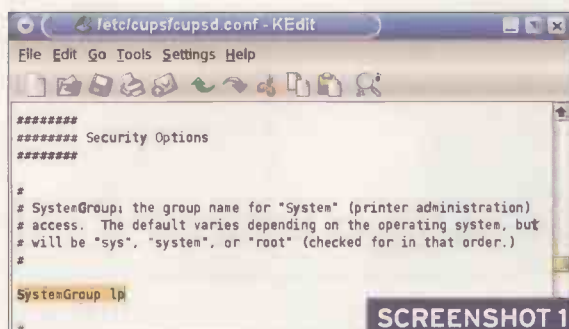
A common Unix printing system makes outputting documents and more simple

Over the past few months, we have looked at several aspects of Linux on the desktop, including transferring email from Microsoft Outlook to Mozilla, and setting up a few popular multimedia players for Gnome and KDE. An activity people take for granted on a desktop PC is printing their documents. Now, just a couple of years ago, printing under Linux and Unix wasn't terribly simple. If you didn't have a Postscript printer you were most likely stuck; Unix programs have traditionally output printed documents in the Postscript format, and drivers for other printers were few and far between. The Unix printing systems were designed back in the 1970s, when printing generally meant sending reams of text to line printers.

As you have probably gathered, the situation is much improved now. Support is available for just about every consumer printer, and is brought together through the 'Common Unix Printing System', or CUPS (www.cups.org). This is a system that aims to standardise printing across all the Unix flavours. Previously, there have been different spoolers and different commands, meaning anyone familiar with Linux wouldn't know how to print on HP-UX.

Cups provides the common System V and BSD command-line interfaces, so if you're used to using the 'lp' command in the shell, there will be no problem. While of course allowing access to printers connected to the PC directly (by USB or parallel port), it can also connect to network printers, whether they're using the old-style Unix servers, CUPS, Windows, or Jet Direct. By working together with other packages, such as GNU Ghostscript and Foomatic, you can print not only Postscript, but also any recognised file format, including pdfs, Microsoft Office documents (via Open Office) and pictures.

It took a while, but now all the major Linux vendors – Mandrake, Red Hat, Suse and others – have decided to adopt CUPS as the standard printing software. They also provide older spoolers, such as LPD and LPRng, though these aren't nearly as flexible. CUPS is released under the GNU GPL, and is thus completely free to use and



The CUPS configuration file. Set the group that's given full access to reconfigure CUPS

distribute, without any licence fees involved. If you use a recent Linux distribution, you probably already have it up and running. Check with the following command:

```
$ ps aux | grep cupsd
```

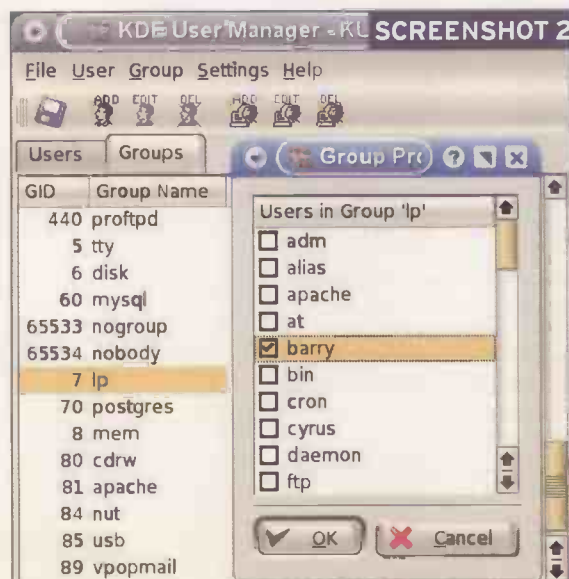
You should see '/usr/sbin/cupsd' in the output if the server is started. If not, you can manually start it up while logged in as root with the following command:

```
# /etc/init.d/cupsd start
```

In all likelihood, the CUPS server will already be set to run on boot-up, but if not, check your distribution's documentation for information on how to add services.

As it stands, CUPS isn't a lot of use if there are no print queues configured. Some distributions allow you to set up a printer during the initial installation, and others have tools to configure printers from the menus. We're going to look at configuring CUPS via KDE's own control program – it's easy to use and isn't specific to any distribution.

For the shell-shy, who prefer a graphical interface, Kuser will manage your users



Unix groups

In order to configure CUPS you need to be either logged in as root, or have privileges set as a normal user. We don't want to be typing in the root password all the time, and you may want a user to be able to configure printers without having root access, so the latter option looks best. However, if you do just want to use the root password, you can skip to the next section.

The easiest way to give the necessary privilege is to use normal Unix groups. In the CUPS configuration file, there is an option called 'SystemGroup'. Any member of the specified group is granted access to configure CUPS. The SystemGroup option isn't set to anything on a plain install, and defaults to 'sys'. It's a good idea to set the option to 'lp', a standard Unix group. The file you have to edit is located at /etc/cups/cupsd.conf (see screenshot 1). If the SystemGroup line is commented out with a hash, delete the hash and put the appropriate group afterwards. There's no requirement to use 'lp'; you can use any group.

The next step is to make sure the user in question belongs to the right group. A quick way to find out is to run the 'groups' command followed by the user's name, for example:

```
$ groups barry
users lp wheel cdrecording
```

Here we can see that the user barry is indeed a member of the lp group, as well as a few others. Adding a user to a group can be done in three simple ways: edit the /etc/group file directly, use the 'usermod' command, or use a GUI utility. All three require the root password. If you edit the group file, find the line that begins 'lp' and add the username after the colon. Many users can, of course, belong to a group, and these are separated by commas. The line might read:

```
lp::7:lp,barry,bob
```

Here the users lp, barry and bob all belong to the lp group. A user and group name can be identical, but they are not the same thing – the user lp doesn't necessarily belong to the group lp.

If you use the usermod command, run with the '-G' option and list all of the groups the user belongs to. If you miss out a group, the user is



removed from it. Assuming the user barry wasn't in the lp group, you could add it with the following:

```
# groups barry
barry: users wheel ✓
cdrecording
# usermod -G ✓
users,wheel,cdrecording,✓
lp barry
```

(Key: ✓ code string continues)

The final possibility is to use KDE's Kuser program; this is probably the most straightforward if you're uncomfortable with the command line. Load the utility from the system menu, and click on the Groups tab, double-click on the required group, and then tick any users that should belong to it (see screenshot 2). Kuser is a GUI to the user commands (such as usermod), and it lets you alter all sorts of user-related information.

Changes to a user's group membership don't take effect until login, so if you're already logged in as that user, you need to log out and back in.

Printer configuration

Now that our user is a member of Cups' SystemGroup, we can go in and configure Cups to our heart's content. The graphical utility KDE offers is part of the Control Centre, and is easy to use. Load it up and find the Printers option under the Peripherals menu. If you decided to use the root password as opposed to groups for administration, you can click the 'Administrator Mode' button in this window.

Make sure that the 'Print System currently used' is set to Cups. As long as the server is running, the connected status is displayed below. In this example we have no real printers set up yet, but KDE has automatically created a few 'pseudo' printers. These are real printers as far as any KDE program is concerned, but rather than sending the document off down the cable, they will instead create a pdf file, a fax, and so on. If you don't actually have a real printer, you can still use these pseudo models.

To add a printer, right-click on the top pane and select 'Add Printer/Class' from the menu. The 'Add Printer' wizard starts up (see screenshot 3). The first step is to select the back end. This is just how Cups finds the printer. We're going to add a local printer connected by USB, so select the first option. Now Cups finds an HP 950C printer connected to our PC by USB, so just highlight the printer and the wizard completes the URI section below (see screenshot 4).

Next we're presented with a list of all the models Cups knows about. The KDE utility isn't yet sensible enough to find the printer automatically based on its name, so look for the manufacturer and printer model in the list. There are several drivers available for most models, but in most cases, select the driver marked as recommended. In this case, the driver is provided by Hewlett-Packard, and produces the best results. If you want to change anything from the driver defaults, click on 'settings' on the next window – you might want to set the default paper size to A4 and the print mode to high quality, for example (see screenshot 5). You can also send a test page to the printer with the new settings.

The next few screens let you set printer banners, quotas, and access restrictions, and you can probably accept all the defaults. The final step is to give the printer a name and other identification information. The model name is already filled in for you, and you can use any unique name you like. Finish the wizard to complete the process.

Returning to the Control Centre, the new printer is listed among the pseudo printers. It appears in bold type to indicate that it's the system default printer; you can change the default by right-clicking on any printer name. If everything went well and you've remembered to put paper in the printer, go to any KDE application and just click the print icon to get going.

Command line

As we said previously, Cups supports the old BSD and System V Unix commands. Try the BSD 'lpq' command to display the queue status of the default printer:

```
$ lpq
HP950 is ready
no entries
```

And the System V equivalent to list the printer queues:

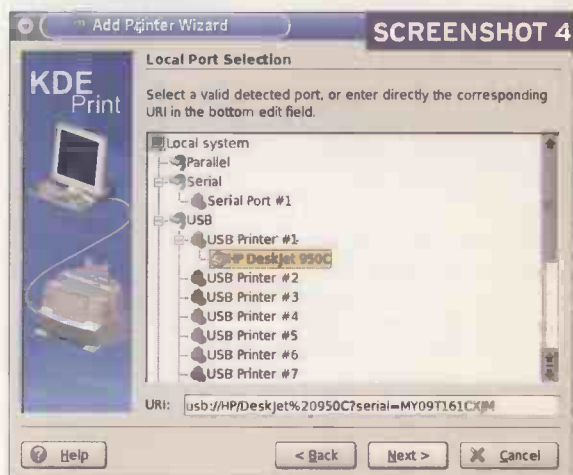
```
$ lpstat -a
HP950 accepting requests ✓
since Jan 01 00:00
```

Having these commands means you can print from old applications that don't support Cups directly, or from non-KDE applications. In Mozilla, for example, the print screen offers the choice 'Postscript/default' and, despite not having a Postscript printer, it works fine. A look at the properties indicates that Mozilla runs the lpr command, and sends the output to the default printer.

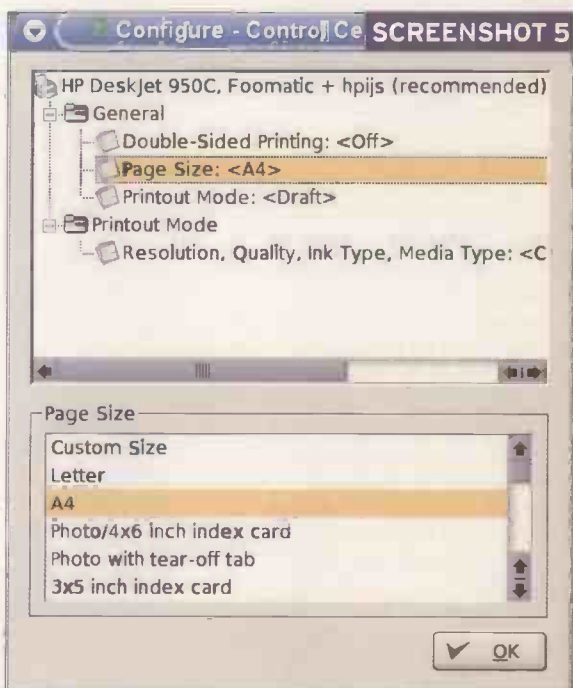
If you want to do a quick print from the command line, just run the



Configuring a printer with KDE's wizard is straightforward



Just click the printer in the list to select its connection



You can set defaults, including the paper size and print quality



SCREENSHOT 6

lpr (BSD) or lp (SYSV) command:

```
$ lp file.txt
request id is HP950-1 (1 ✓
file(s))
$ lpr pic.jpg
```

It's also possible to control the number of copies, the printer destination, and to pass driver-specific options using these commands. See the respective man pages and the extensive CUPS documentation for more details on the options available.

Printer instances

When printing something from a KDE program, in a similar way to Windows, you can click on the Properties button to change the output settings. These include the page size, whether the printout is portrait or landscape, the number of pages per sheet and the print quality. Most of us have settings we normally use, and these can be set up as defaults when you create the printer queue. However, what if you regularly want to print in a few different formats? For example, you might often print draft documents that have four pages per sheet. It is rather tedious to have to keep changing the settings every time you print.

Cups allows you to create instances of each printer. In fact, every printer has at least one default instance, which is created when the printer is first set up. Printing to the default instance doesn't need any extra effort, as we've seen in the last few examples.

Let's look at our HP 950C printer. From the Printer module in the Control Centre, select the 'Instances' tab after clicking on the printer. Next, click on 'Copy' and enter a new name, 'Draft' for example (see screenshot 6). Now select the new

Use the Control Centre to add new printer instances for different kinds of documents

Right: This pdf was generated through KDE's 'print to pdf file' option



SCREENSHOT 8

instance name, and then click the Settings button. Here you can control all sorts of printer settings, and for this new instance we want four pages per sheet, custom margins, draft quality printing and a starting banner. All of these are easy to find on the intuitive interface; once done just click Save and OK.

The instance is immediately ready for use. In the dropdown menu on the Print dialogue you will find the new instance listed beneath the printer name. Printing to the instance results in a print with all the previously chosen settings. You can create as many instances as you like, and each is listed under the main printer.

What's more, you can use printer instances with the command-line programs too. The queue names are in the format printer/instance, and act just like normal queues, so for our example:

```
$ lpstat -a
HP950 accepting requests ✓
since Jan 01 00:00
HP950/Draft accepting ✓
requests since Jan 01 ✓
00:00
$ lpr -P HP950/Draft ✓
file.txt
```

It's important to remember that printer instances aren't the same as real printers. Each instance is available only to the user who created it; instances are in essence

just a collection of private settings for any existing printer.

Non-KDE printing

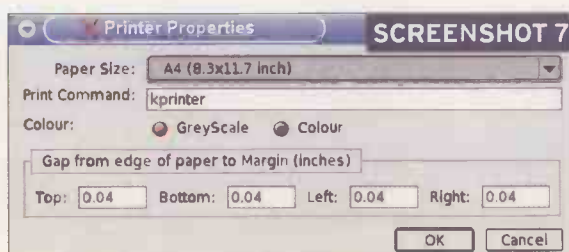
Although you can print from any application using the BSD or SYSV commands, they are a little antiquated and sparse; what if you would like to use KDE's native print system for non-KDE applications? Mozilla and Open Office immediately spring to mind. Both of these generate output requests using the lpr command and, as you'd expect, work as the previous examples show.

KDE provides a useful program called 'kprinter'. All this utility does is take the output from another program and run it through KDE's print system, giving the same print dialogue as usual. So instead of running prints through lpr, you can supply the kprinter program to do the job.

To make the change in Mozilla, take the print menu option (or type Ctrl & p) and click on the Properties button. Delete the lpr entry in the print command box and enter 'kprinter' as shown in screenshot 7. Now when you print any page from Mozilla, you get direct access to the full KDE print system, including the ability to print to email, fax and pdf. Screenshot 8 shows a pdf file Mozilla has generated via kprinter from a BBC News web page.

Cups has many more features – browse the documentation on the website (www.cups.org) to find out more about what it offers.

A surprisingly simple way to add KDE printing to the very non-KDE Mozilla



SCREENSHOT 7

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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A word about typefaces

Changing the fonts in your templates is easy, so try a different style

One frequently asked Word question is how do you change the default font? Both Windows and Office come with a variety of typefaces that are a distinct improvement on the standard Times New Roman, but the latter has been the default in every version of Word for Windows. So, if you'd like a change to something more distinctive, this is what you do.

Start Word with a new, blank document and go to Tools, Options, Save. Check the option 'Prompt to save Normal template', then OK out of the dialogue. Next go to Format, Font and choose the font and size that you want. Click the Default button at the bottom left of the dialogue, and OK the confirmation that 'This change will affect all new documents based on the Normal template'. Now close Word. You'll be prompted to save changes to the blank document – click 'No'. You'll next be asked if you want to save the changes to the global template, Normal.dot. Choose 'Yes'. When you restart Word – and as far as I can tell this works for all versions – the 'Normal' style, and any others based on it, will be in the font you specified.

This won't affect other existing templates. You can repeat the process of creating a new document based on each template, and changing the default font: in this case you'll get the message that the change will affect all new documents based on that template, and when you close you'll be asked if you want to save the changes to that template. If you want to change a lot of templates this can be tedious, and there's a more efficient way – using the Organizer.

You don't need to have any particular template loaded, and for argument's sake let's say you've just started Word with a new, blank, document. In Word 7 go to Format, Styles, and click the Organizer button, but in Word 97 and later you can go via Tools, Templates and Add-ins, Organizer. The Organizer window consists of four tabs, each containing two lists. We want the Styles tab. If you started a new blank document, the left list should show the Styles in Document1 and the right list those in Normal.dot. If yours show something else, don't worry because you can change this. Click the 'Close File'

Copying styles between templates is easy



SCREENSHOT 1

button under the left list, and the list will empty, and the label on the button will change to 'Open File'. Clicking this will summon a standard File Open dialogue at the folder where your templates are stored. Select the template you want to copy the new Normal style to and open it. If the right list isn't showing the styles in Normal.dot, repeat the process there to open Normal.dot.

It doesn't matter which way round you have the templates, as if you select a style in one list, the 'Copy' button changes direction to suit. In this example, we want to copy the Normal style in Normal.dot to the other template, so highlight the former and click the copy button, then answer 'Yes' to the confirmation (see screenshot 1).

You can copy any style from any template to any other template in the same session in this way: when you next hit the 'Close File' button for the target template, or close the Organizer dialogue, you'll be asked to confirm the changes to the target template. As the other Organizer tabs show, you can do the same thing with Toolbars, Autotext entries and macros.

Show formatting

The 'Show Formatting' button in Word has a question mark and arrow on it, and if you click on it (or press Shift & F1) the cursor changes to a similar shape. If you then click anywhere in a document a pop-up appears showing both the paragraph and font formatting at the selected point. In Word XP, however, this information will appear in the Task Pane, brusquely squeezing you

document sideways if it's not already open. The other, lesser-known function of this tool is not affected. If you click on a toolbar button or menu item you'll get a pop-up with a succinct description of that button or menu item's function, which can save a lot of time searching the help file or hapless experimentation. The Task Pane behaves like a toolbar – you can move it right out of the main Word window, which can be useful if you want to stretch it vertically so you don't have to scroll to see all the options (see screenshot 2).

Get your head sorted

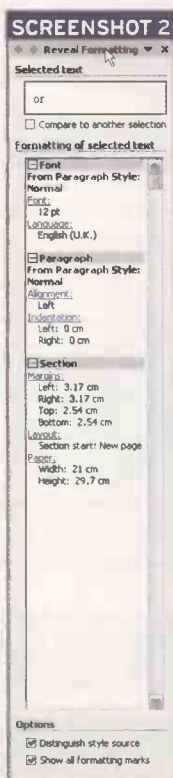
Further to last month's tip about sorting lists, one other trick when using Word's Sort command is that you can specify whether a list or table has a header row – if your list of names, for example, starts with 'Forename, Surname' you can select the Header Row option to keep this line at the top where it belongs.

Any other business?

Once again, this month's column is all about Microsoft Word. This isn't my choice, as both the Question time section and this column are driven by your queries, suggestions and tips. Any feedback or questions involving other word processors – Corel, Lotus, Openoffice.org and the rest – will be especially welcome.

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.



The XP Task Pane can float free



Making multiple choice easier

A lesson in using Excel's Data Validation feature to get results from multiple drop boxes

When we have talked about displaying data based on a choice made from an Excel drop box, readers inevitably ask: 'How do I produce a result based on the choices made in two drop boxes?' With one drop box you can have the spreadsheet user choose an item and then, in an adjacent cell, the price for that item might appear. But supposing the item comes with several options? You want the user to be able to first pick the item in one drop box, then the preferred version of it in another (see screenshot 1).

There are a number of ways of arranging this but here's a method using Excel's Data Validation feature.

Change a blank worksheet tab to read Data. In cell A1 to D1 enter the column headings, Item, Options, Prices and Check (see screenshot 2). Highlight cells A2 to A5. Enter Bed and press Ctrl & Enter. Similarly enter Wardrobe in cells A6 to A9; Chest in A10 to A13; and Rug in A14 to A17.

In B2 to B5 enter the options available for the bed: Single, Double, Queen, and King. In like manner in B6 to B17 enter the options for wardrobes, chests, and rugs.

In the range C2:C17 enter the applicable prices. In D2 to D4 enter Bed, Wardrobe, Chest and Rug.

Click in a blank cell and on the Insert menu choose Name, Define. Enter Item in the Name in workbook: box and in the Refers to: box enter `=OFFSET(Data!A2,0,0,COUNTA(Data!A1:A17),1)`

(Key: ✓ code string continues)

Click Add. Create the Name, Options and enter that it refers to `=OFFSET(INDIRECT(ADDRESS(MATCH(Pick1,Item,0)+1,2,,"Data")),0,0,COUNTIF(Item,Pick1),1)`

Be careful with all the brackets and commas. Make the Name, Check refer to `=Data!D2:D5`. Create a Name, Pick1 which refers to `=Form!B4` and a Name, Pick2 which refers to `=Form!D4`. OK out of this dialogue box.

You should now have five Names. Give another blank worksheet the tab name, Form. Make some headings like those in screenshot 1. Click on cell B4 and, on the Data menu, choose Validation, Settings. In the Allow: box choose List. In the Source: box enter, =Check. OK out. Similarly

in cell D4 choose List and in the Source: box enter =Options.

Finally, in cell F4 enter `=VLOOKUP(Pick2,Data!B2:£D17,2,FALSE)`. If all is well, click on B4 and a dropdown arrow will appear in C4 offering you the choice of Bed, Wardrobe, Chest or Rug. Click on D4 and an arrow in E4 will offer you the options for your item choice. The price for the item of your choice, in the option of your choice, should display in F4. Readers in trouble can write to me - no attachments, please.

More entries?

If you want to press on and add more drop boxes, to make an estimate or invoice, you can do it. Just make a Name, Pick3 which refers to `=Form!B6` and a Name, Pick4 referring to `=Form!D6`. Create an Options2 Name with the formula, `=OFFSET(INDIRECT(ADDRESS(MATCH(Pick3,Item,0)+1,2,,"Data")),0,0,COUNTIF(Item,Pick3),1)`

In other words just change both mentions of Pick1 in the original Options Name to Pick3.

Click on cell B4 on the Forms sheet and Copy and Paste to B6. Click on cell D4 and Copy and Paste to D6. Then, for D6 only, choose Data, Validation, Settings and in the Source: box change =Options to =Options2. In cell F6 enter `=VLOOKUP(Pick4,Data!B2:£D17,2,FALSE)`.

This is the same formula as in F4 except Pick2 is now Pick4. You'll then find the options available in D6 are appropriate to the items in B6 and the prices will be as you have specified on the Data sheet.

If you wish, you can total the prices in column F with the SUM() function to produce a total for the estimate or invoice as shown in screenshot 1. This may seem like a lot of work initially but you could create a form which is simplicity itself for others to use.

SCREENSHOT 1

Item	Options	Price
Wardrobe	2-door	£ 365.00
Rug	Medium	£ 155.90
	Small	
	Large	
	Extra-large	
		£ 520.90 Total

SCREENSHOT 2

Item	Options	Prices	Check
2	Bed	Single	£ 175.00
3	Bed	Double	£ 190.00
4	Bed	Queen	£ 290.00
5	Bed	King	£ 400.00
6	Wardrobe	1-door	£ 245.50
7	Wardrobe	2-door	£ 365.00
8	Wardrobe	3-door	£ 485.00
9	Wardrobe	4-door	£ 605.00
10	Chest	2-drawer	£ 195.00
11	Chest	3-drawer	£ 255.00
12	Chest	4-drawer	£ 315.00
13	Chest	5-drawer	£ 375.00
14	Rug	Small	£ 85.75
15	Rug	Medium	£ 155.90
16	Rug	Large	£ 225.25
17	Rug	Extra-large	£ 275.00

Top: Displaying a price based on making two choices

Bottom: The datasheet behind the top screenshot

Although this example is limited in the Item Name to 16 rows, you can change the length and enter as many items and options as you like, if you reflect the difference in the other formulas.

Weighted averages

After allowing for quantity discounts, a weighted average of the prices paid for an item often needs to be calculated. Screenshot 3 shows a simple example. The price when only one of the item is purchased is £89.95. In cell F4 is the formula `=D4*(F3-(F3*15%))`. As 12 is entered in cell D4 this means a 15 per cent discount is given when a dozen are purchased. In F5 is: `=D5*(F3-(F3*20%))` and in D5 is 144, as there is a 20 per cent discount for a gross.

The average price in the range C3:C5 is calculated in B7 with, `=AVERAGE(C3:C5)`. But the weighted average is displayed in the merged cells C7 and D7 with `=SUMPRODUCT(C3:C5,D3:D5)/SUM(D3:D5)`

How to calculate a weighted average

SCREENSHOT 3 `=SUMPRODUCT(C3:C5,D3:D5)/SUM(D3:D5)`

	Price per item	Number of items in order	Total per order
3	£89.95	1	= £89.95
4	£76.46	12	= £917.49
5	£71.96	144	= £10,362.24
6	Average	Weighted average	
7	£79.46	£72.42	

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

Better navigation for your movies

Add chapter points and highlight buttons to your DVDs, and check out our top plug-in

For those of you who've been waiting patiently since the last issue for the continuation of the DVD authoring tutorial, we'll get straight to work. In this issue I'm going to cover creating chapter points, thumbnail buttons and highlight menus.

As a brief introduction for anyone who has just joined us, this three-part tutorial covers the entire DVD production process, from planning to burning. Last month, having sketched a menu hierarchy, I showed you how to produce it in Adobe Encore and discussed some of the navigation and clip preparation issues.

As before, I'll be doing the bulk of the work in Encore, with occasional references to Pinnacle Impression DVD Pro 2.2 and Ulead DVD Movie Factory 2 where I've got specific knowledge of those programs.

If you've watched a movie on DVD, you'll know that chapter points allow you to make scene selections from a menu. Each chapter point is represented on the menu by a thumbnail image – usually, but not necessarily, the first frame of the scene. In a DVD movie, selecting play from a chapter point usually plays the entire movie to the end but, as we saw last month, Encore provides significant scope for more adventurous navigation.

A chapter point is really no more than a marker in the movie timeline. If you have a long video clip (a feature film, for example) and want to provide access to locations within it without splitting it into several smaller clips, then chapter points are the way to do it.

Adding chapters

Encore provides a button in the monitor window for adding chapter points and, if you use this in combination with the timeline window, you can quickly add chapter points to a lengthy clip. You simply scrub the timeline marker to the appropriate point in the clip and click the Add Chapter button in the monitor window.

The poster frame for the chapter point – the thumbnail image used to represent it on the menu – more often than not looks awful. It may be a good place to start the clip, but it often makes a poor still image. A fade-in shot, for example, will have a black

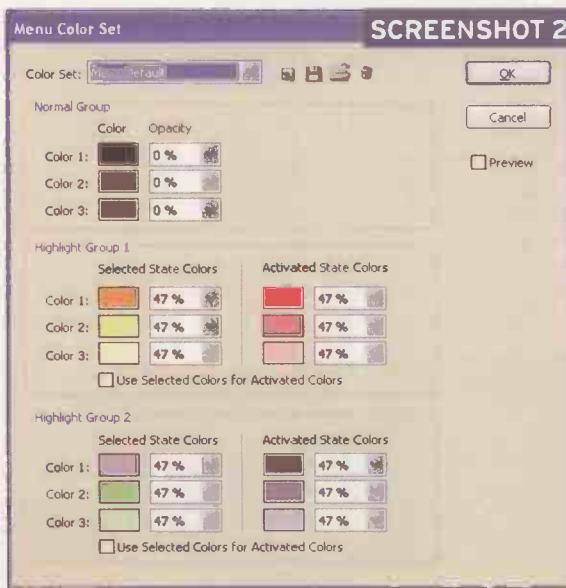


DVD movie factory can automatically add chapter marks at set intervals

poster frame. But this can be changed very easily by selecting the chapter point marker on the timeline, scrubbing to a better frame, right-clicking and selecting set poster frame from the contextual menu. Encore adds another marker to the timeline to indicate the position of the poster frame. In the properties window you can change the chapter name and add a short description.

To add the chapter point to a menu as a thumbnail button, take a look at the timelines tab of the project window, and select the timeline to which you added the chapter points; it will be listed in the lower panel. Drag and drop one onto the menu editor window and a thumbnail button is automatically created, complete

Colour sets are the key to DVD highlight menus in Encore



with a link to the chapter point and placeholder text.

If you want to archive the entire contents of a DV tape to a DVD with scene selections for each shot, chapter points are one way to do it. Ulead's DVD Movie Factory 2 can add chapter points to shots using automatic scene detection, or you can have chapter points inserted at specific time intervals.

If you've captured clips using another capture application, auto scene detection isn't an option, but you can add chapter points at, say, five-minute intervals and move them around, or simply put them in manually. Screenshot 1 shows a clip that has had chapter points added at five-minute intervals.

As in Encore, you can change the thumbnail image by right-clicking on it and selecting Change Thumbnail from the contextual menu. The existing thumbnail is replaced with the current frame from the preview window.

When you click the OK button, Movie Factory automatically adds the chapter points for the clip to a sub-menu. The clip button which points to the sub-menu goes on the title menu. For example, if you had four 20-minute clips each with chapter points automatically added at five-minute intervals, the title menu would show the four clip buttons and each clip sub-menu would display the four chapter points at 0, 5, 10 and 15 minutes.

The drawback of this system if you want to archive a DV tape is that, with only one clip and possibly lots of chapter points, you have a pretty redundant title menu with one clip on it. Also, there's no way of producing more complex navigational structures like the one we looked at last month. For that you'll need Encore or Pinnacle Impression DVD.

Talking of Impression, one of the things that got me down for a long while with Impression 2.2 was a bug that prevented you from changing the thumbnail image for chapter points. To be fair, it was possible to change the thumbnail, but you could never be sure what you'd end up replacing it with. In common with Encore, the Impression method of changing the thumbnail is to select the chapter point, scrub to a new frame on the timeline and use this as



the basis for the new thumbnail. Rather frustratingly, though, Impression replaces the thumbnail not with the selected frame, but with one chosen seemingly at random from elsewhere in the clip.

I've recently discovered the fix to this problem is to download the latest patch from the Pinnacle website, so if you too have been struggling with thumbnails in Impression DVD, be sure to download the Impression 2.2.2 patch from www.pinnaclesys.com.

Highlight menus

If you're fairly new to DVD authoring, the simplest way to get professional-looking results quickly is to adapt existing templates. But if you're feeling more adventurous or you're producing a corporate DVD, you might need something more bespoke.

Both Encore and Impression will allow you to create DVD menus in Photoshop and import them. It doesn't have to be Photoshop – any image editor which has layer support and can save .psd files will do the job.

Doing it this way gives you a much greater degree of control over menu appearance – you can design your own buttons, for example, and create much more dynamic-looking menus using highlight buttons, which are the DVD equivalent of web rollovers.

Both packages use a layer naming system with prefix characters to identify components of a DVD menu. In Encore the layer set containing the button components is prefixed with (+) and layers containing placeholders for video thumbnails start with (%).

Highlight buttons make use of 2bit, three-colour sub-pictures to define the colour and transparency of the dynamic parts of a menu. In Photoshop, each colour element resides on a separate layer and these layers are prefixed (=1), (=2) and (=3). If you're used to producing web rollovers where the content of individual layers is turned on or off depending on the button state, this works somewhat differently and takes a little bit of getting used to.

It helps to think of each of these layers as containers for menu elements that can react differently, but at the same time, to state changes. For example, the layers might be called (=1) text highlight, (=2) thumbnail highlight and (=3) arrow.

The behaviour of the elements on the sub-picture layers is determined by a colour index, or colour set. When you build the DVD, the three sub-picture layers are flattened to produce a 2bit image overlay. Each pixel references one of the three

Setting state changes in the Menu Colour Set dialogue

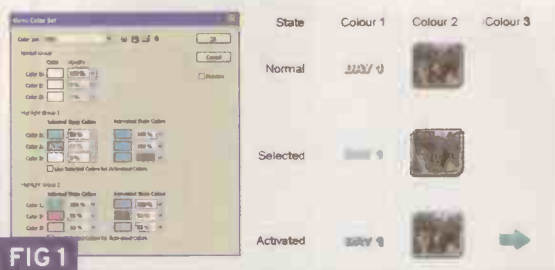


FIG 1

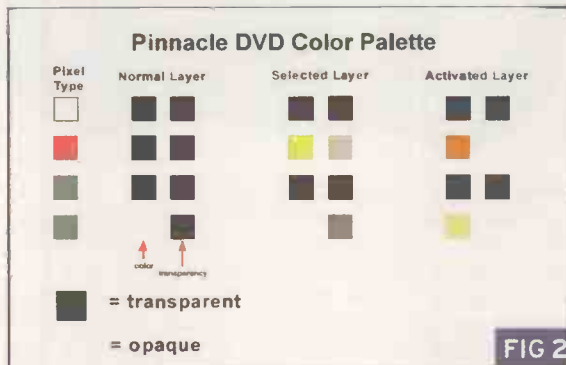


FIG 2

colours defined in the colour set or is transparent. Buttons can have one of three states – normal, selected and activated – and each state has its own definitions and opacity settings for each of the three colours.

Screenshot 2 shows Encore's Menu colour set dialogue box. When you import the .psd file into Encore a colour set is automatically generated based on the colour values in the sub-picture layers. Taking the first button (nearest the background layer), the (=1) layer sets the values for colour 1, and layers (=2) and (=3) set the values for colours 2 and 3 respectively. If another button uses different colour values in the sub-picture layers, these are used to define the highlight group 2 settings.

The colours are split into three groups – one group for the normal state and two highlight groups. Each highlight group contains up to six colours, three for the selected state and three for the activated state. The two highlight groups allow you to distinguish between two different types of buttons on the same menu – for example, you could use highlight group one for main menu navigation and highlight group two for previous/next buttons.

With the Menu Colour Set dialogue box open, it's a simple process to define how each element will react to button state changes. Figure 1 shows the settings and their effect for our three element button. The (=1) text highlight is white in the normal state, 53 per cent blue in the selected state and 100 per cent blue when

Top: You can define how each element will react to button state changes

Bottom: In the colour palette you can see what shade each layer will be

The latest update to Paint Shop Pro improves handling of Exif image data

activated. The (=2) video thumbnail highlight is transparent in the normal state, 53 per cent blue in the selected state and 100 per cent blue when activated. And the arrow is transparent other than in the selected state where it is 100 per cent blue.

In most cases you won't need to bother with the activated state – it won't be on screen long enough for anyone to notice it. The safest option is to set it the same as the selected state; checking the box at the bottom of highlight group one does this for you.

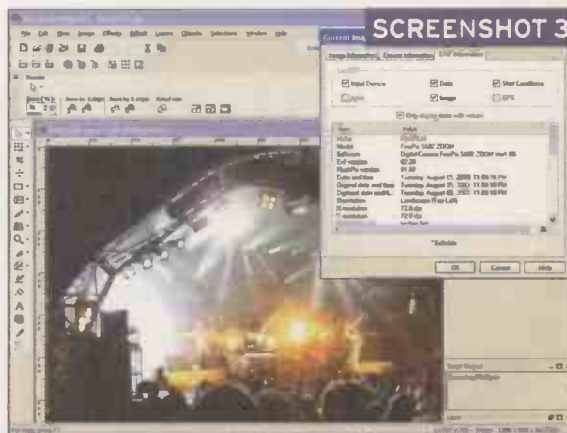
Once the menu has been created in Photoshop, it's quite a simple matter to alter the look of it by editing the colour set. Encore also allows you to save and load colour sets, making it possible to change entire menus at a stroke. Each menu can reference only one colour set, though you can use different colour sets for other menus within the same Encore project.

Hilites with Impression

Impression Pro hilite menus work on exactly the same principle, but are less adaptable due to the fact that the colour index, here called a palette, is actually included on a layer in the .psd file. Impression Pro hilite menus contain a background layer prefixed (B), a button background layer prefixed (#) the palette layer prefixed (P) and a layer containing all three sub-picture colours prefixed (^).

Figure 2 shows the colour palette layer. The pixel type column contains the three colours used to draw the dynamic elements in the sub-picture overlay. The normal, selected and activated layer colours and opacities are indicated by the swatches in those columns – black is transparent and white is opaque with grey levels defining degrees of transparency.

In figure 2, pixels coloured red in the (^) sub-picture layer will be transparent in normal mode, 20 per cent yellow when selected and 100 per cent orange when activated. To





edit the colour palette you just replace the swatches with different colour and opacity values.

Paint Shop Pro update

One of the better features of version 8 of Paint Shop Pro (PSP), at least as far as digital camera users are concerned, is that it supports Exif metadata. To view an image's Exif data, you must first open the file and then select image information from the image menu (or press Shift & I) (see screenshot 3).

It would be useful if this info was available in PSP 8's otherwise excellent browser, but I guess we'll have to wait for version 9 for that. In the meantime, PSP 8 users have been perplexed by the mystery of the disappearing Exif info. Jpeg images saved in PSP 8 are prone to having some, or all of the Exif data disappear.

If you'd like to keep hold of this information, I strongly recommend you download the version 8.01 update from www.jasc.com, which fixes this problem.

According to the Readme file, this patch also fixes a substantial number of other problems with version 8. The list is too long to reproduce here, but if you're troubled by crashes caused by any of the following – pasting during startup, clicking the Apply button while other processing is under way, scrolling in the styled lines dialogue box, using the jpeg optimiser, not setting a default printer, making changes too rapidly to the mesh warp parameters, or using the clone brush in certain circumstances – this update could provide the answer.

On the other hand, there are some things that still don't work properly, the most bizarre of these being that Animation Shop 3 doesn't support the Paint Shop Pro 8 file format, so if you want to open PSP files in Animation shop, you need to save them in PSP 7 format.

It's not all bad; the 8.01 patch actually improves some areas of the program that weren't wrong to begin with. For example, you can now round trip edit frames from Animation Shop 3.

Nikon fast image sensor

Nikon has unveiled a new digital SLR aimed at professional photographers. The 4.1megapixel D2H, like its predecessor the 2.7megapixel D1H, is aimed at sports photographers and photojournalists who need to shoot multiple frames at high speed.

Nikon's new digital SLR offers 4.1megapixels and five seconds of continuous shooting, ideal for



Nikon's 4.1megapixel D2H uses LBCast technology to enable users to shoot at 8fps for 40 consecutive frames

sports photographers.

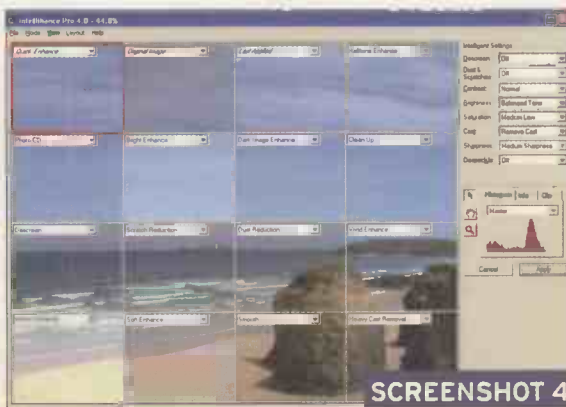
The D2H can shoot at 8fps (frames per second) for 40 consecutive frames or, to put it another way, for five seconds. This is made possible by the D2H's imaging sensor, which uses a brand new technology called LBCast (lateral buried charge accumulator and sensing transistor array). LBCast is said to be similar to, but faster than, Cmos (complementary metal-oxide semiconductor) sensors used in other high-end cameras, such as Canon's EOS 1D, which can also shoot at 8fps. Most consumer digital cameras use CCD (charge-coupled device) sensors.

In addition to high frame rates, the new sensor offers improved contrast and colour, higher resolution, lower power consumption and lower noise. Aside from the sensor, one very interesting feature of the new camera is an optional 802.11b wireless transmitter with firmware support for live FTP transfer of images as they are written to the CF card.

In the past, Nikon has used sensors manufactured by other companies in its cameras, but the LBCast sensor was developed and will be manufactured by Nikon itself, which suggests that this is not a technology the company is likely to want to share.

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Intelligence can make a wide range of changes to your digital photos with just a couple of clicks



SCREENSHOT 4

for the body only, there won't be too many readers of this column, myself included, queuing up to buy one. But, speaking as someone who recently paid less for a 3megapixel camera than a 1.2megapixel model from the same manufacturer bought in 1999, I can say with some confidence that I fully expect the benefits of this technology, or something similar, to be available in a more modestly priced camera some time soon(ish).

Plug-in of the month

This month's featured plug-in is Extensis Intelligence Pro 4.1. Depending on how you use it, Intelligence can provide either a one-shot quick-fix filter for improving digital images from cameras and scanners, or a more sophisticated tool for cleaning up and enhancing images suffering from a variety of problems.

Though there's nothing Intelligence can do that you can't do yourself in Photoshop or most other image editors, it makes the task easier by allowing you to apply several image adjustments and filters at once, and by showing you a preview of the results. It's also pretty good at analysing images and determining the best way to sort them out.

The Intelligence preview window (see screenshot 4) can be configured to show a variations-style grid in which each cell previews an enhancement preset. Alternatively, in power variations mode the effect of a particular filter can be assessed at various settings.

Presets are included for dealing with problems typical to images from a given source, such as digital cameras, drum and flatbed scanners and Photo CDs, as well as other common problems, such as dust and scratches, colour casts and incorrect exposure.

Batch processing features make it possible to fix bad pictures on an industrial scale. But, while its analytical powers produce a more finely tuned result than could be achieved with a Photoshop Action with preset parameters, for example, I'd nonetheless recommend individual tweaking to get the best results. Intelligence Pro 4.1 costs \$199.95. A free 30-day trial version can be downloaded from

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.

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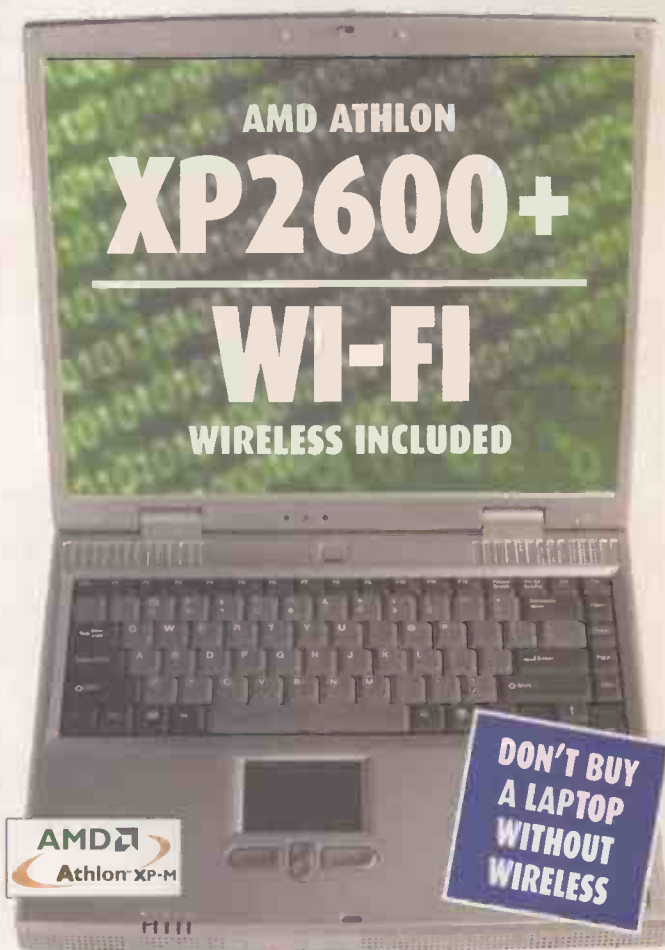
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Take the lead over Ethernet

With a little DIY, you can put your wireless access point where you want it

More on wireless in
our handbook >>



The problem is pretty easy to describe. You're building a wireless network for your home. You have a wireless Lan access point, which can hang quite easily on the end of a 100ft Ethernet cable. And you have a power supply for that access point, which has a cable that's probably about six feet long.

So you can put the access point exactly where you want – as long as you want to put it six feet away from a power socket.

However, the correct way to place a wireless access point (AP) is not six feet away from a power socket. Ideally, you want it on the ceiling so that its radiation spreads evenly through the rooms, rather than on a desk where computer screens can block it, computer cases can attenuate it, and other equipment can absorb the signal.

Most of us simply don't have mains power sockets up at the ceiling. And the problem gets even worse if you decide to put the AP in the loft or out in the garden.

There are good reasons for using both of these locations. If you want the signal to reach most of the house, then it must go through as few walls as possible. In a bungalow, an AP at the highest point of the ceiling loft will fill most of the building, if you can avoid chimneys. In a three-storey house, however, you may well find that you can shine an 802.11 signal through the windows into every room with an AP out in the front garden.

Think outside

Surprisingly few installers realise this, but the best way to provide a single hotel with Wifi is to install the AP on the front of the building opposite. On one famous occasion in Salt Lake City, Enterasys unwired the entire Hilton Hotel without the permission of the proprietors simply by putting the AP on the (cheaper) hotel over the road. The signal wasn't great – but it reached every room overlooking the street!

But when you try to get the power to a place like that, you'll find there are real problems with the supply that comes with the AP. In short, the cables are just not long enough.

In a year, of course, this will be academic. There is now a standard



There are two standards for colour coding for Ethernet cable, as shown

for power over Ethernet (PoE), and since June this year, the cables have all been correct.

There are eight wires in the twisted pair bundle that makes up the typical Ethernet cable, and only four of those are used for Ethernet signals. Theoretically, the other four are spare. In practice, if you're working in a big office, two more of them are normally used to carry phone signals. Best not to use those, because if you start putting power in, and someone plugs in a phone adaptor, you might have to buy a new phone or, even worse, replace the cable.

This year, however, most current access points don't take their power from the Ethernet cable. Manufacturers such as D-Link are already offering add-ons to provide power over the Ethernet cable itself for people who have such obsolete

devices. However, it only works on D-Link's own access points, providing the power requirements they expect; and other people expect different power levels.

Ethernet power

The typical home user doesn't need to do more than get a good pair of magnifying spectacles, some solder, a small soldering iron, and a pair of wire strippers, because you aren't too worried about universal standards for PoE. All you want is to extend the power cable of your access point by a few dozen feet – and what will do this for you is the Ethernet cable you're going to use to plug into the AP.

Here's the simple summary:

- 1) Cut the power output cable of your AP power brick.
- 2) Connect the wires to each end of the Ethernet cable, using the spare wires.
- 3) Plug the power adaptor into the mains, and plug the other end into the AP.

Before you get started, be warned – all sorts of things can go wrong, so you need to be prepared. And don't forget all the usual precautions when dealing with electricity.

First, you'll need to be very, very clear about which cables to use, and which cable is which.

In theory, Ethernet UTP cable is colour coded (see figure 1).

There are two accepted standards: their common factor is that, in theory, pin eight of the eight-wire plug is brown. The rest can vary. Normally, pin one is orange – but that's just the colour it happens to be on the cables you'll get from a UK-based store like PC World. In other cases, it may be green. It's not too hard to work out which standard cable you have; the RJ45 plugs are normally transparent.

My first Ethernet cable turned out to have twisted pairs that were all indistinguishable – the brown and white cable was brown and white, but so was the 'brown' cable, and the same for the other colours. If you find yourself with non-standard colours, go and buy another cable. Trying to remember which is which is simply asking for trouble (see figure 2).

You're ready to make the warranty-voiding step of cutting the wire.

What you do is select two of the unused wires and pull them out of the Ethernet plastic shielding,



If you've got non-standard coding, the safest bet is to throw the cable away and start again with a new one

FIG 2



FIG 3

cut them, and connect your power cables to them.

What you may want to do is select four of the unused wires, because the resistance of four wires will be a lot less than the resistance of two and you'll be able to send the power further. But remember this means that you can't use the other two for phone communications. I can't think why you might want to do this at home, but there it is.

For this exercise, we'll limit our ambitions. We'll assume that you don't want to put the AP much more than 20 feet away from the cable modem or ADSL box, and you don't care about the possibility of someone plugging a phone into the system.

If you want to go further, or save the extra cables on pins four and five, then feel free – but you may find that you have to go out and buy a new power brick. The voltage that the AP needs has some tolerance and, depending on which brand you use, it may have only a little. Drive 6v down a long wire, and you'll discover you've used quite a bit of the power up just heating the wire – and you've only got 5v at the other end. Will that be enough? Well, possibly. Or possibly not.

You can calculate what you need: someone has kindly created a PoE voltage drop calculator at www.gweep.net/%7Esfoskett/tech/poecalc.html from which you'll see (for example) that to get 6v at the far end of a 100ft wire, you might need to feed 7.2v in at this end.

The next caveat you'll have to observe is the killer: polarity. There are, obviously, two wires in a power cable; negative and positive, if they're carrying direct current. And they usually are. If you are lucky, you may have one of the old APs which rectifies its own alternating current, and a power brick that is really just a step-down transformer. But a swift examination of your power brick will quickly reveal what polarity you have.

It doesn't matter which polarity you put on which pin, as long as you're

Make sure you note which is positive and which negative at the other end!

the only person who's going to use the cable. What does matter is that you put the same polarity on the same wires at each end. There's no foolproof way of doing this unless you have a multimeter which will show you. Test first, write it down: plug the power brick into the wall, and see which pin on the output plug is positive. Then, when you've finished, make sure the same one is positive at the end of the day (see figure 3).

DIY

So the procedure is going to be simple. We're going to take the wires from pins seven and eight (usually, the brown, and the brown-and-white wires) and we're going to make pin seven negative and pin eight positive at each end.

The trick is to slit open the plastic sheath of the cable to expose the internal wires without cutting them or even the insulation on any of the wires (see figure 4). It's not really difficult, but if you're not

'You can move an AP that's in the wrong place without moving the new mains socket to another new point'

accustomed to this, I would strongly suggest getting a bit of waste cable and practising. Gentle pressure with a scalpel or a sharp Stanley blade will do it.

Then cut the brown pair, strip the ends and solder the power wires to them, and do the same at the other end.

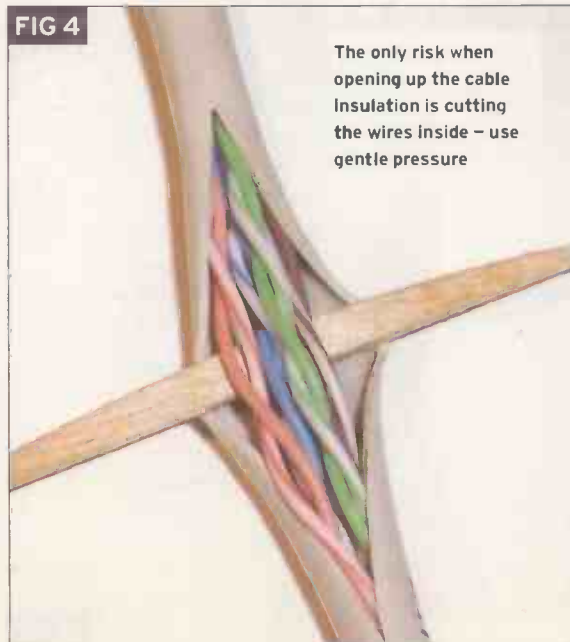


FIG 4

The only risk when opening up the cable insulation is cutting the wires inside – use gentle pressure

In both cases, please measure. It's really no use trying to lengthen wires that are too short to solder. And you don't want to have about two feet of slack Ethernet cable looped around in loose circles while the power cable takes the weight of the wires.

Finally, get some really good insulation tape, and fasten it firmly around the join to keep moisture out, and provide some extra strength for the weakened wires and insulation.

You can make this as ambitious as you like, of course. An excellent DIY article can be found at www.nycwireless.net/poe, which will enable you to electrify an entire 100Mbit Ethernet hub so that any device you plug into it will be powered. If you read the new 802.3af standards for PoE, you can even amuse yourself by making your home lashup conform to that standard.

But frankly, if you've got that sort of expertise, you shouldn't be reading this section for hints and tips!

A final caveat: when you're trying to get 100Mbps/sec down an Ethernet cable of more than 10 feet, you're asking for trouble. Any electrical noise along the way will be picked up and will degrade the signal.

And here's a tip that a veteran network installer passed on to me: 'When installing high-speed cable, there are two things to remember. First, lay the cable, don't pull it. And second, avoid sharp corners and kinks.'

As before with these exercises, if it goes wrong, it's your fault, not mine. This procedure will work if you get it right; it will go wrong if you get it wrong. If you decide to go ahead, don't tell me I made you do it! If you aren't sure of your ability to make solder joints and strip wire, then don't start.

But if you do go ahead, you will be able to put your access point exactly where you want it, without installing a new mains socket in the ceiling. And if it's not in the right place, you'll be able to move it without moving the new mains socket to another new point in the ceiling. That's got to be worth an evening's fun with a sharp knife and a hot soldering iron, right?

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Guy Kewney welcomes your comments on the Mobile computing column. Email him at: mobilecomputing@pcw.co.uk. Please do not send unsolicited file attachments.

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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

You're surrounded

Create your own surround-sound mix and play it on your home cinema

When you wander around Tesco and see people chucking £100 surround-sound home cinema kits into their shopping trolleys, it's pretty safe to say that multi-channel audio is finally mainstream. A few years ago people were saying it would never catch on because nobody wanted six speakers strewn around their living room, but those folk underestimated the nation's love of DVD movies. In fact the DVD player is now the fastest-selling piece of consumer electronics ever, and multi-channel audio has ridden on its coat tails to find its way into our living rooms.

In 1995 when the DVD Forum was creating the DVD movie standard, it decided to adopt Dolby Digital as the standard audio format for DVD flicks. Dolby Digital is still the standard audio format for DVD movies, but more recently the higher quality DTS format has gained ground and it can generally be found on most recent movie releases.

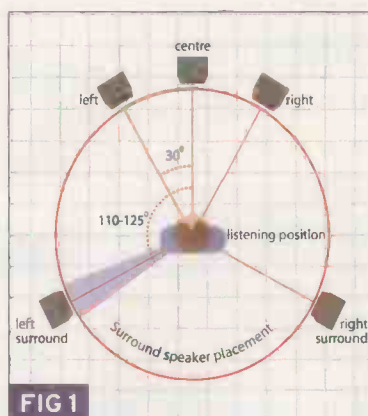
Computers haven't been immune to the surround-sound explosion either and, while early multi-channel sound cards merely added a pair of rear outputs, these were superseded by full 5.1 cards and more recently 7.1 offerings. However, the more usual 5.1 setup is likely to remain standard in mainstream home cinema for quite some time. Even DVD-Audio and Super Audio CD, the two new formats that are being groomed as the successor to CD, support 5.1 surround sound.

So there's a good chance 5.1 could replace stereo as the main way in which our music is reproduced in the home. This is no bad thing because surround sound is widely accepted as a more natural way to enjoy music. After all, we hear sounds all around us in real life and, even when a band is playing in front of us on stage, we still hear reflected and refracted sound from the side and rear walls.

History lessons

We had surround sound before we had two-channel stereo; stereo sound began as four-channel stereo, not the two-channel variety we are all familiar with today. This is because, like surround sound, stereo sound came into our homes via the cinema. From the outset, film stereo featured

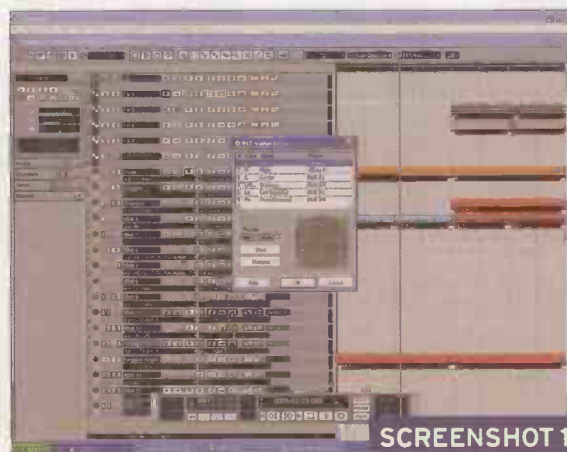
It's crucial to set up your speakers properly if you are going to use them to create a surround-sound mix



several channels across the front, plus at least one channel played over speakers towards the rear of the cinema. Eventually this was simplified for home use and became the two-channel stereo. However, film sound engineers never stopped innovating and in 1941 this led to the development of the first true surround-sound movie. Walt Disney's *Fantasia* was released with a classical music soundtrack recorded on four tracks that were fed to speakers in each corner of the cinema. By the use of some clever mixing techniques, instruments on the soundtrack appeared to swirl around the cinema.

Unfortunately, *Fantasia*, as it became known, was a complicated and expensive system, because the audio was held on a separate reel to the movie and the two had to be synced together. It was replaced by cheaper systems in the 1950s that used magnetic tracks around the edge of the film to produce the separate channels of surround sound. These developments eventually led to the

Before you can create a surround-sound mix, you need to switch Cubase into 5.1 mode



SCREENSHOT 1

use of three centre channels and two rear channels. Then, after experiments in the 1970s and 1980s, Dolby Laboratories added the subwoofer channel for low bass effects such as explosions. This is how we arrived at the full 5.1 setup we have today.

Surround sound is now so ubiquitous that the capability to produce 5.1 mixes is included in many high-end audio editors and sequencers. Cubase SX, for example, has facilities for 5.1 mixing built in as standard. But to be able to mix in surround sound you'll need both a sound card with six audio outputs and a six-channel speaker system to monitor the results.

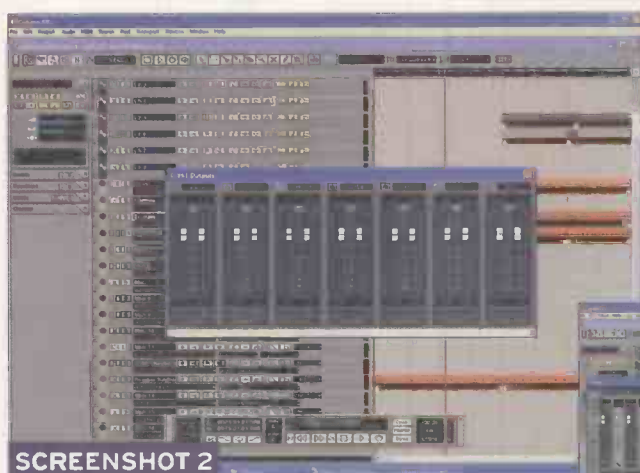
Mixing your surround

Before you start creating your own mixes you need to have your speakers correctly placed around your room. It's all right to have speakers positioned shabbily when you're just listening to someone else's 5.1 mix, but when you're creating your own mix you need your system configured as close as possible to the standard setup so that your mix will sound correct on other people's systems.

The right way to place speakers in a surround-sound setup is in a circular shape. The centre speaker should sit on the circumference of the circle directly ahead of you, with the left and right front speakers forming an equilateral triangle as they would in a stereo setup. Generally the surround speakers should be placed at an angle between 110 and 125 degrees from the centre of the circle. It doesn't matter too much where you place the sub, because humans don't really pick up directional information from low-frequency sounds, but the perceived wisdom is to place it outside the circle (see figure 1).

Once you've got your speakers placed properly you can fire up your sequencer and get started with a surround mix. We're going to use Cubase SX, but other sequencers and multi-trackers such as Logic, Vegas Video and Acid also come with surround-sound tools.

Once Cubase SX has started you need to configure it to work in surround-sound mode. You can do this by going to the Devices menu and selecting VST Master Set-up from the dropdown menu. When the



SCREENSHOT 2

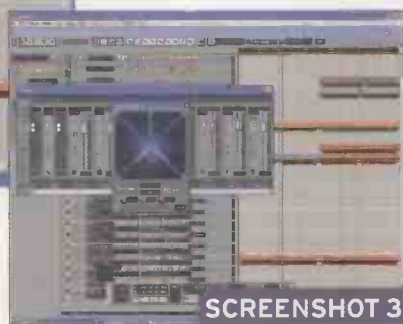
setup window appears, you'll see there is a list of different surround-sound formats shown in a dropdown box under Presets. There are different settings for 5.1. These are just different methods of naming the individual channels. Select 5.1 SMPTE/ITU from the list. The diagram displayed on the right of the window will show the speaker configuration for this selection. Just click OK to close the Master setup window (see screenshot 1).

When you set up Cubase for surround sound, all it really does is create separate audio buses for each of the surround outputs in its own mixer. We need to make sure that all these buses are turned on so they are allowing sound to pass through. Click on the Devices Menu again and this time select VST Outputs. You only need three buses to be active for surround sound: The Master Bus, Bus Two and, yes you've guessed it, Bus Three. The Master Bus should be set to control the front left and front right outputs. Bus Two should be set to control the centre and LFE (subwoofer) channels and Bus Three should be taking care of the rear left and right surround channels. If these aren't set up properly, change them to this configuration (see screenshot 2). When you're done, close the window.

We're ready to head to the mixer, so click on Devices again and select Track Mixer. Now the real fun can begin. Click in the box at the bottom of a channel strip that you want to use in your surround-sound mix. This will display a list showing the different buses in use, followed by each channel of the surround-sound setup and then a lone setting for Surroundpan. If you select one of the individual surround channels, such as left surround, then the audio on that channel will only be directed to that individual speaker in the surround-sound setup. This can be useful for

Left: You only need three buses to be active for surround sound

Below: The Surroundpan window in Cubase allows you to accurately place sounds around the listener



SCREENSHOT 3

accurately placing single sounds. For example, you could have an eerie whisper coming from the left rear speaker. However, if you want to be able to place the sound anywhere in the surround space then select the Surroundpan option. Once this has been selected you'll see a target type graphic shown in the top left of the mixer channel. This is the surround-sound pan control. You can click on the dot shown on the target and drag it around to pan the sound around all your speakers. If you want to edit the placement of the sound in the surround space more accurately, double-click on this box to open a larger panning window (see screenshot 3).

In this larger window you can hold down the Alt key and click on an individual speaker to turn it on or off. So if you wanted a sound to appear in the front left and right channels as well as both rear channels, but not in the centre channel, then you can just hold down Alt and click on the centre channel to turn it off.

You can repeat this process of assigning channel strips to surround-

When you export your mix it will be saved as six individual mono wav files

sound speakers or to the Surroundpan control until you've given all the different tracks in your mix in a place in the surround space.

Once you're satisfied with the overall mix, it's time to export the fruits of your labour. Click on File, select Export and choose Audio Mixdown. In the Save window that appears you'll notice a dropdown box marked Channels. Click on this and select Six Chan. Split. Then enter a name for your mix and click on the Save button (see screenshot 4). Cubase will now export individually numbered mono wav files for each of the six surround channels in your mix.

Encoding your mix

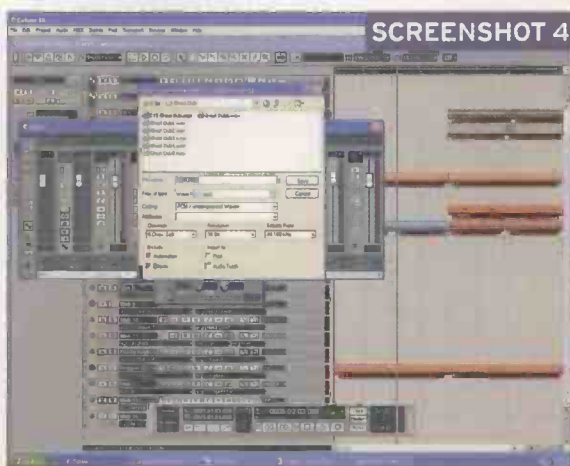
To get your surround-sound mix to play on a home cinema system, you need to encode it in either Dolby Digital or DTS. Software encoders are still pretty expensive, but Sonic Foundry has a relatively low-cost plug-in for Vegas Video and Acid which handles Dolby Digital 5.1 encoding, but it still costs \$279.97 (£177) from www.sonicfoundry.com. Minnetonka Software's Surcode CD Pro DTS allows you to take six individual channels and encode them into a single DTS wav file. It's not cheap either, costing £399.50 from Etcetera (www.etcetera.co.uk).

It was this software that we used to encode our surround-sound mix. We loaded each mono channel of the mix into the correct slot in Surcode. Then it was just a matter of giving the final DTS mix a name and hitting the Convert button. The conversion process doesn't happen in real time, even on a 2GHz P4, but it won't keep you hanging around for an age either. When it's done you'll be presented with a single wav file that is encoded in the DTS format.

To finish all you have to do is start your favourite CD burning program and use the DTS wav file to create a standard red book audio CD. When the disc is ready you just pop it in your home cinema DVD player and the CD will play back in surround sound. Be warned, however – DTS-encoded CDs aren't compatible with ordinary CD players. If you try playing a DTS CD in a standard CD player it will just sound like a load of horrible digital noise, and could even damage your speakers if you have the volume set too high.

CONTACTS

Niall Magennis welcomes your comments on the Sound column. Email him at: sound@pcw.co.uk. Please do not send unsolicited file attachments.



SCREENSHOT 4



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

Managing responses logically

Plan ahead to ensure you can track queries and messages easily on your website

In October's issue, we started to look at how you can use forms on your website to request responses, and suggested that, rather than publishing an email address that can be grabbed by spammers, you can feed customer queries directly into a database. This allows you to track whether or not someone has responded to each query.

Our basic example simply had two fields to control this – a yes/no field, and a text field to save the name of the person who sent a reply. It's straightforward enough to pull up all the sales queries awaiting a response with, say:

```
SELECT * FROM responses
WHERE category = 'sales'
AND responded = 'n'
ORDER BY submitted;
```

(Key: ✓ code string continues)

and then create an update form in, for example, Dreamweaver – we've explained how to do this before. It's the sort of simple web application that more or less writes itself and doesn't require you to do anything hard – or indeed anything at all, in some cases – using PHP.

That's all well and good and, while a simple system like this may suffice for a small company that's not too busy, if you want to deal with something more complicated, whipping up a quick database table and linking it to some web forms isn't really the best way to proceed.

Plan ahead

As we've mentioned before, a trawl around the web will probably turn up quite a few sites where it's all too obvious that, while graphic design and navigation have been thought about, the database driving the site is something of an afterthought. And if you want to create a successful web application – for that's really what these things are – then you need to plan ahead, just as if you were creating any other type of application.

One of the most important aspects of a web application is the design of the database that lies behind it, and if you're serious about creating reliable web applications, then the Hands on Databases column is recommended reading. Minimising the number of queries that you need to do, and the number of updates to the database, can be crucial in ensuring that things run smoothly.

Above: Now you see it...

...now you don't (ight). Use a regular expression match and the `gethostbyaddr` function to see which domain your page was requested from, and amend forms accordingly

So, going back to our response tracking, let's see how we have to think about the decisions we need in implementing a more detailed system. What we'd like to do is create a unique ID for each query submitted. That's easy enough with an auto incrementing field in the database. And then we want to track all the responses that are made, so that we have a complete chain of messages, enabling us to see at a glance how a particular query has been followed up and, hopefully, finally resolved.

The first inclination might be to add a field to each record that says what it's a follow-up to. But there's a problem here. If you have a single field, you can only refer to the previous entry in the chain. And, while there are some systems that are good at following such a 'linked list',

SQL databases aren't among them. If you took this option, you'd need two fields – one to look forwards, and one to look back, so that you can follow the chain of messages from either end. But the real penalty is in retrieving the whole sequence; you'll have to look at each record in turn and then do another SELECT to retrieve the next. It's pretty clear that you'll end up with a massive performance hit.

So, what's the solution? Well, as with many things, there are several ways you can do it, and I'd welcome suggestions from readers for improvements to the method outlined here.

We'll assume that each entry in the database has a unique reference ID, which is easy enough to arrange in the database. And we'll further assume that those IDs are allocated

in a sequential order – perhaps by an auto-increment field, which is the simplest way to do it.

All we really need to store, then, is a reference to the original, or root message, along with the reference of the current message. Whichever message you're looking at, you can get the whole thread by looking in one field and doing a simple query:

```
SELECT * FROM responses
WHERE rootid = '1234'
ORDER BY messageid;
```

To make that work, we'll need to ensure a root message is indicated by having its own root message pointing to itself. We've now got a simple way of pulling out all the messages in order, so you can easily see the whole thread. What if you just want to see everything from one point on? That's simple too – as long as you have something that can be compared easily as the message ID, such as a number. If the current message has an ID of \$current and the root is \$root, we might end up with PHP like this:

```
$result =
mysql_query("SELECT *
FROM responses WHERE
rootid = '$root' AND
messageid > '$current'
ORDER BY messageid");
```




If you chose to make up the message ID in some other way, perhaps with alphanumerics indicating the current user or something like that, then of course you might have problems with the comparison, which is why you need to think about this sort of thing first.

There are other issues too; how do we mark a problem as finally resolved? If we store the information with each message then, potentially, when a long chain of messages reaches its conclusion, we have to update each one of them, so that if a user jumps in at any point in the message chain, they can see that any problem is sorted. And while you can write a single SQL statement that would update a lot of records, it's going to impose a load on the database server that you probably don't want. We could simply store the final status in the root message, but this means that record has to be retrieved from the database when we look at any other, before we can say 'case closed'.

So what we'll do instead is have a second table with much less data; OK, so we still have to do an additional query to find the status of a chain of communication, but it can be a small compact table that doesn't have unwieldy things like large text fields. We can store root message IDs and a 'case closed' flag; and to make it more useful, we could also store a timestamp to show when the last change was made to the case, and the ID of the most recent message, so we can get there quickly.

Building site

All this might seem obvious to some readers, or not much to do with web development to others, but it is

crucial if you want to write sites that respond well, especially when they're busy. Simply put, decide how you're going to want to access and update data, and consider how many queries you need to make of the database, and what sort of queries those are. Follow a logical chain of thought, and don't begin coding until you've worked out exactly how the database driving your site has to be organised – you could end up having to redo a lot of PHP code, not to mention the web design, if you don't plan ahead.

Those decisions made, how are we going to construct the application? First, we can easily create a form that enters a first query into the database; the next step is probably to display to the user the ID number that's been assigned to their query, and to send them an email with the same information, so they can look at it again. Ideally, that email should give them a unique URL that they can use to access the query – that's easy enough to sort out, and we can create a page using Dreamweaver to display all the queries, using the repeated area to format everything.

There's a problem here for the unwary, though. How do you know the ID number that's been assigned to a query? When you make an entry in the database, you don't get a handy result back. One solution might be to do a query after inserting your new record, using MySQL's LAST_INSERT_ID function, which tells you the last value used in an auto-incrementing field. Sounds good – you can say:

```
SELECT * FROM responses
WHERE id =
LAST_INSERT_ID();
```

But wait a minute! What happens on

a busy site? You can put the query immediately after the insert, but that still doesn't avoid the race condition, where another visitor might make an entry between the two SQL commands in your script. When that happens, your script will return the wrong ID – so don't rely on functions like this if there's any chance of a race. Instead, you'll have to do something like:

```
SELECT MAX(id) FROM
responses WHERE name =
'thisuser';
```

Mine host

A list of unresolved problems is easy enough to produce, and to save extra coding we'll use the same script to display messages and prompt for a response, whether it's a user revisiting their query, or a member of staff responding. By looking at the domain that a request came from, we can determine if any new entry is a follow-up from your own staff, or from the original customer; you could provide a separate interface, but why code things twice when we can just turn on and off a few elements on a page? For example, figure 1 shows a section of the web page that displays a response form – if it's a customer following things up, we know who they are. If it's staff, we want them to type in their name or initials (see screenshots 1 and 2).

You'll notice a new function there – `gethostbyaddr`. When it's passed an IP address, the function returns the name of the host, so we can use it to check if someone is accessing the site from your own domain, combined with the `preg_match` function – provided, of course, you have your DNS set up properly. Similarly, `gethostbyname` will return the IP address, given the hostname.

This is one case where we're not taking the easy way out and asking Dreamweaver to code the database update for us. It's simple enough to do for ourselves, and we want to do other things too, such as email to the user any responses submitted by our own staff, and update the status table. It's frankly a lot more straightforward to do something like that yourself, rather than work your own code into that generated by a program.

Next month, a miscellany of your web development queries.

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.

FIG 1

Code to determine the domain of a web request

```
<FORM METHOD="POST" ACTION="updatequery.php">
```

```
<H3>Enter your response in the box below:</H3>
```

```
<TEXTAREA NAME="message" COLS="50" ROWS="20">
</TEXTAREA>
```

```
<?php
```

```
if ( preg_match('/mydomain.com/',gethostbyaddr($_SERVER['REMOTE_
ADDR'])) ) {
```

```
    // this request is from an internal host
    // ask for the user's name
```

```
?>
```

```
<H4>Enter your name or initials</H4>
```

```
<INPUT TYPE="text" NAME="user">
```

```
<?php
```

```
}
```

```
?>
```

(Key: ✓ code string continues)



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

Build strong and effective defences

Secure your network with a firewall and stop spammers using your server for mail relays

In this month's Network column, I promised to carry on looking at email server deployment, in particular the security implications of a publicly addressable mail server. Before I get into that, however, I want to talk a little about network security in general.

If nothing else, recent well-publicised Internet attacks by worms such as MS Blaster and Sobig-F will have brought home to many people the need for increased network security. So much so that, whether you've a small home network or a large corporate Lan, two types of protection are now absolutely essential. The first, of course, is anti-virus software and the second is a firewall – without both you're just asking for trouble, no matter how you connect to the Internet.

Unfortunately a lot of people assume that a firewall is only really necessary with an always-on broadband connection, but that's not the case. Even if you use analogue or ISDN dial-up to connect to the Internet, your network could still be attacked. Admittedly, the risk is lessened because the connection isn't permanent, and you'll probably be using Nat (Network Address Translation) to hide internal server and workstation addresses, but that doesn't make you immune to trouble. Worms and trojans, for instance, can still be received via email or hidden in innocent sounding downloads and, once on your Lan, can deliver their payloads as easily over dial-up as over a broadband connection.

What kind of firewall

Software-based personal firewalls are an obvious and seemingly easy way of providing protection from such threats, especially on a small home network. But they're not the best approach, no matter how small your setup, as you'll need one for every system on the network and they can be time consuming to set up and manage. A much better option is a hardware firewall, which may cost more but, deployed at the Internet gateway, can provide protection to all the users on the network.

Even if you don't have an always-on broadband connection to the Internet, it's worth investing in a firewall, such as the Sonicwall, to protect the resources on your Lan



That may sound a little daunting, the very term firewall conjuring up images of exotic and expensive hardware requiring a degree in astrophysics to configure, but that's not the case. Most modern Internet routers now incorporate at least a basic firewall, with dedicated firewall appliances for those who don't and for networks with more demanding requirements. It's true that the technology involved can vary, but virtually all provide protection against common threats such as Denial of Service (DoS) attacks as soon as you've plugged them in. In addition, they will all block Internet access to everything other than port 80, immediately cutting off the most common routes used by hackers at a stroke.

Some firewalls can even be configured to check for viruses. In addition, they commonly provide one other very useful facility – the ability to map an internal Nat-protected device to a public IP address. Which brings me back to the subject of mail server deployment and how best to configure a mail server to receive incoming messages over the Internet.

Getting the mail

I covered one option in last month's column, where I described how it's possible to pull down incoming mail

via an intermediate ISP host using the POP3 retrieval protocol. The server then doesn't need to have a public IP address, making it very secure, but this approach does have its drawbacks. For example, you'll need to continually check for incoming mail, plus you'll be reliant on your ISP's servers, which might not be as quick as you'd like. Many users prefer to have mail delivered direct to their own servers using SMTP, cutting the ISP middleman out of the loop altogether.

SMTP delivery is very easy to set up, but to fully understand what's required you have to appreciate how the protocol works. In particular, that it's a push rather than a pull technology, like POP3; a receiving server using SMTP simply waits for messages to be sent to it.

Senders, therefore, have to know the exact address of each recipient mail server. That's something they find out by looking for MX (Mail Exchange) records, held on public DNS servers, that map email domains to server IP addresses.

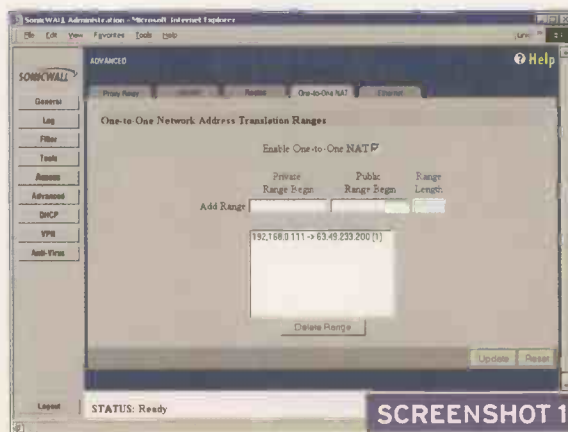
That works fine if you've signed up for a block of public IP addresses. If, though, you've only been given a single IP address by your ISP, which is what most of us get, and are using Nat to share this on your Lan, your email server will be invisible. It can still send mail and pull down messages from the ISP's servers using POP3, but other SMTP servers won't be able to find it.

Address mapping

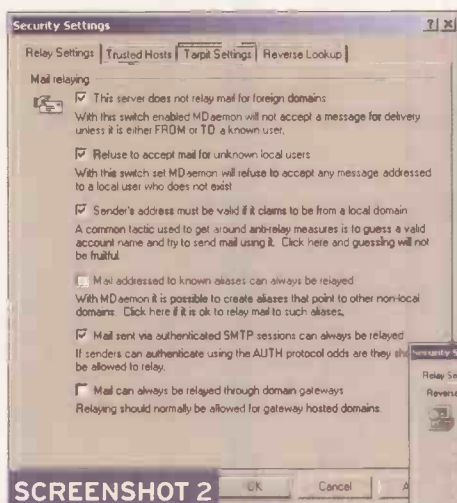
It's here that one-to-one mapping of public to private addresses by a firewall or a router comes into play, as in screenshot 1, which shows the setup of a Sonicwall firewall used to protect a real small company Lan.

In this example, devices on the private network are each given addresses on a 192.168.0 subnet. The email server has a fixed address of 192.168.0.111 (to make sure it can always be found) and is configured to service a mail domain called somecompany.com (note that the domain names and actual addresses used have been changed to protect the network concerned). The public address assigned by the ISP for Internet access is

This Sonicwall SOHO3 firewall allows external SMTP servers to send messages to a Nat-protected server on the local network using the public Wan address assigned to the Internet gateway



SCREENSHOT 1



SCREENSHOT 2

63.49.233.200 (again this isn't an actual address) and the ISP has included MX records on its public DNS servers to return this address to other mail servers looking for the somecompany.com domain.

The one-to-one mapping option in the Sonicwall setup shown then enables the somecompany.com mail server (at 192.168.0.111) to respond to incoming mail sent to 63.49.233.200. Or at least it does when a rule allowing port 25 to be accessed from the Internet is also set up for this server.

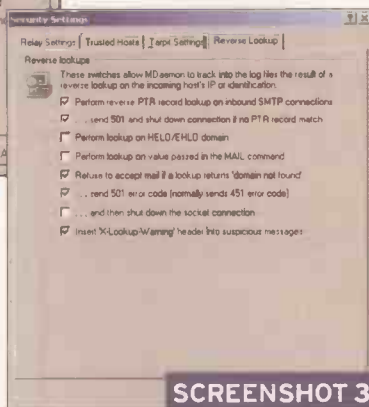
Of course other Nat routers and firewalls may implement this facility differently. For example, they might have a specific option to map SMTP traffic alone to the specified private internal address. The end result, though, is the same, and this kind of mapping option is well worth seeking out and using to protect any network mail server.

Relay protection

Firewall and Nat protection aside, another essential precaution is to make sure you stop unauthorised relaying of messages via your server. When a message arrives that is neither from nor to a local address, the server is being used as a relay, usually by a spammer, to send out mass mailings. Huge volumes can be involved and, if you're paying for the Internet connection, that will cost money, plus it can grind your server to a halt as it attempts to forward what is possibly thousands of messages an hour. Your server will also receive all the bounce-back messages generated by undeliverable mail. Added to which there's a strong possibility of your mail domain being blacklisted as a source of spam.

Open mail relays are a really bad thing to have. Fortunately, most developers recognise this and will,

Relay protection is provided by default by most SMTP server applications. MDAemon Pro, for example, will not relay messages from foreign domains or those sent by users it doesn't recognise



SCREENSHOT 3

by default, arrange for their software to stop messages being forwarded if the sending domain isn't recognised, if the recipient isn't a local user, or both. Screenshot 2 shows how this is set up in MDAemon Pro, the software used in last month's column to illustrate basic mail server setup.

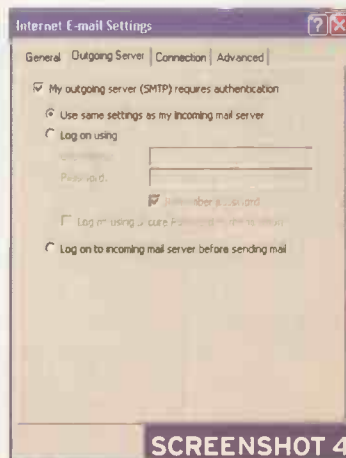
What you see in this screenshot are the default security settings for MDAemon, which automatically block messages sent from any domain other than that served locally. Similarly the software will refuse to accept messages for local users who don't exist, which is useful when it comes to spammers mailing every name they can think of.

In addition, the MDAemon server can check on the validity of a sender by performing a DNS lookup of the sending domain and/or a reverse lookup using the IP address of the sending server, as in screenshot 3.

If the sending domain isn't found or the IP address doesn't map to the domain claimed (as will be the case with a lot of spam), the incoming messages can, again, be refused. However, this technique won't stop everything as

A fair amount of spam can be blocked simply by getting your mail server to perform a reverse DNS lookup, using the IP address of the sending mail server to see if it has a valid domain name

Some mail servers allow mail users to authenticate themselves using their POP3 credentials, to enable them to forward messages as normal, even though connecting from a non-local network



SCREENSHOT 4

it's commonplace for spammers to forge sending domains and server addresses to provide credentials that will pass such tests.

Relaying and the ISP

Finally, while on the subject of mail relays, I just want to finish with a word or two about relay protection and ISP-hosted mail services – a topic which, judging by some of the emails I've been sent recently, can cause a fair number of headaches.

At the root of these is usually the fact that, quite understandably, ISPs routinely stop their mail servers from being used as relays, using techniques such as those already mentioned. Which is fine if you always send mail via a server hosted by the ISP that provides you with Internet access. In that situation you will be identified as a member of a local domain and all will be well. Connect using a different service provider, however, and the SMTP server will identify you as a foreign user and block all attempts to send mail.

This situation can arise for a variety of reasons, such as when visiting another location and using their network to connect to the Internet. Similarly, it can happen when travelling abroad and connecting via a local service provider, or simply when you want to change access provider but keep your existing email address.

Fortunately there are several ways of resolving this issue, one of which is for valid users to identify themselves using their POP3 credentials. Most mail servers provide this facility as does most client software, including Microsoft Outlook (see screenshot 4), although POP3 authentication isn't universally implemented as a service by every provider.

Another way around the problem is to use a web-based mail service rather than a dedicated mail client to send and receive messages. Here you're authenticated from the start, enabling the server to weed out potential spammers from legitimate users, regardless of where or how they connect to the Internet. Web-based mail offers other advantages and is available as both a hosted service and as an option on in-house mail servers. I'll be looking at this option in more detail in next month's issue.

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

Elegant concatenation

Dirty data can be a problem, but there are solutions to blank lines and inconsistencies

In the September column I wrote about the difference between concatenating strings with + and &. The behaviour can be summarised as:

String + Null = Null
and

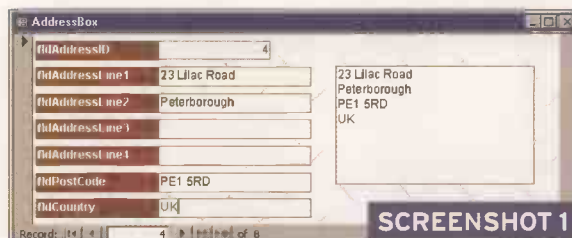
String & Null = String

Reader Brian Jones has used this behaviour to help with the old problem of how to elegantly display an address that contains blank lines. His solution uses both + and & to give much the same effect that using an If statement would. Brian's code is shown in figure 1, but the crux of the matter is the line that starts:

```
MakeAddressBox = (rst(0) +  
vbCrLf) & (rst(1) +  
vbCrLf)
```

(Key: ✓ code string continues)

rst(0) and rst(1) are lines from the address, and vbCrLf is a carriage



On the left is the data as stored in separate fields in the underlying table. On the right it's neatly concatenated with no blank lines

return and line feed. This bit:

```
(rst(0) + vbCrLf)
```

takes the first line of the address and adds to it a carriage return and line feed but this only works if the first line of the address has content. In other words, if the field contains a null, the expression inside the brackets returns a null. Each line of the address is treated in this way. The results from each piece of bracketed code are concatenated using &, building up to an address with no blank lines in it. Very elegant.

I've implemented this in a slightly modified way on a form called AddressBox and the module Foo in dbcdec03.mdb, which you can find at www.penguinsoft.co.uk. It's rapidly written sample code with no error checking, so treat it with a stiff dose of caution. In screenshot 1 the address is shown on the left and the concatenated version on the right.

It's all in the parse...

Bob Veitch has an interesting string handling challenge. He has inherited a database containing 30,000 names stored like this:

J, Bloggs
Samuel, Jones
A, Smith
P, Longbottom

Some first names are present in full and some are just initials, but invariably both are separated from the last name by a comma. The data has been sucked into Access and Bob now wants to render this into two separate fields, one for initials and one for last names.

The dbcdec03.mdb file contains a table of such data called Robert and a query called ParseNames. The query generates a table with more columns than Bob requires because I've processed the string in small stages. You could combine expressions but splitting it up makes it easier to see

what each expression achieves. It's also easier to alter the expression to produce different results.

You might think that another string parsing challenge is unlikely to come your way, but I'm constantly surprised at how often I can re-use elements from earlier projects, and using a modular approach greatly simplifies adaptation for other tasks. The first four columns in the query look like screenshot 2.

The first just picks up the Name (the first line in the sample table reads 'M,Whitehorn' and I'll use this to illustrate what the query is doing). The second column is where we start dismantling the string with: **Initial: Mid([Name],1,1)** which picks out the initial letter of each first name. Initial is the name of a new field in the answer table. Mid is an Access function that starts at a specified position in a string and returns a certain number of characters. You give it the string [Name], the starting position (1, ie the first character in Name) and the number of characters to return (1). This gives us 'M'.

In the third column, **PositionOfComma: InStr([Name],",")** identifies the location of the comma. InStr is another function which inspects a string and looks for a given character. By default, it counts from left to right and returns a number which tells you how many characters in from the start the comma lies. The comma is in position 2 in the 'M,Whitehorn' string.

The fourth column expression is: **NameWithSpaces: Mid([Name],[PositionOfComma]+1)**

This uses the Mid function again, giving it the [Name] string and the number generated by the comma-finding expression. It takes the position of the comma (2 in the example) and adds 1 to it, and the resulting number, 3, is used as the point from which Mid is to start returning characters. If you don't tell Mid how many characters you want, it returns everything from where it starts to the end of the record. This picks out 'Whitehorn' in the example, but some of the entries have spaces between the comma and the first letter of the last name, and some have trailing spaces. This

FIG 1

Address formatting code

Function MakeAddressBox(lngID As Long) As String

On Error GoTo Err_MakeAddressBox

Dim rst As Recordset
Dim strSQL As String

```
strSQL = "SELECT  
tblAddress.fldAddressLine1, tblAddress.fldAddressLine2,  
tblAddress.fldAddressLine3,"  
strSQL = strSQL & "tblAddress.fldAddressLine4, tblAddress.fldPostCode,  
tblAddress.fldCountry"  
strSQL = strSQL & " FROM tblAddress  
WHERE tblAddress.fldAddressID = " & lngID
```

```
Set rst = CurrentDb.OpenRecordset(  
strSQL, dbOpenForwardOnly)
```

```
MakeAddressBox = (rst(0) + vbCrLf) &  
(rst(1) + vbCrLf) & (rst(2) + vbCrLf) &  
(rst(3) + vbCrLf) & (rst(4) + vbCrLf) &  
(rst(5) + vbCrLf)
```

```
Exit_MakeAddressBox:  
rst.Close: Set rst = Nothing  
Exit Function
```

```
Err_MakeAddressBox:  
If Err.Number = 94 Then 'null  
MakeAddressBox = ""  
ElseIf Err.Number = 3021 Then  
'no current record  
MakeAddressBox = ""  
Else  
MsgBox Err.Description & Err.Number  
End If  
Resume Exit_MakeAddressBox
```

End Function

(Key: ✓ code string continues)



SCREENSHOT 2

ParseNames: Select Query

Field: Name, Initial, Mdx([Name],1,1), PositionOfComma: InStr([Name],","), NameWithSpaces: Mdx([Name],[PositionOfComma]+1)

Table: Robert

Sort:

Show:

Criteria:

or:

Name	Initial	PositionOfComma	NameWithSpaces	LastName	UpCaseInitial
M.Whitehorn	M	2	Whitehorn	Whitehorn	M
R. Veitch	R	2	Veitch	Veitch	R
Penguin, Penguisson	P	8	Penguisson	Penguisson	P
Albert, Einstein	A	7	Einstein	Einstein	A
Eric the Red	E	9	Red	Red	E
Longbottom	P	2	Longbottom	Longbottom	P

Record: 14 | 1 | 5 of 6

Left: This is part of the query that parses the database entries into separate entries for initial and last name

expression picks up the last name and any leading or trailing spaces.

In column five is:

LastName: ✓
Trim([NameWithSpaces])

Trim is a handy function which strips the leading and trailing spaces from a string. This time we give it not the original string from [Name] but the [NameWithSpaces] string we've just generated. It returns 'Whitehorn'. (It didn't have to work hard this time, but given 'Einstein' it would have returned 'Einstein'.)

The last column contains:

UpCaseInitial: ✓
UCase([Initial])

which simply takes the string in the Initial field generated by the expression in the second column and turns it into an upper-case character. The complete answer table looks like screenshot 3. You can go on adding refinements to this query: if you wanted to ensure that the first letter of each last name was upper case, you'd investigate using the StrConv function and so on.

When you're happy that the query does what you need, you can run it as a 'make table' query and it will create a table with the names in the format you require. Alternatively you can turn this into an update query, add the Initial and LastName fields to the original table and running the query will then modify that original table. Whichever route you choose, always run this sort of query on a copy of your data, and always make backups of the entire database first.

Given clean data, and Bob is reasonably sure that in each record the first and last name elements are separated by a comma, a query like this is hugely cost-effective in time and effort terms. Even with dirtier data, you might be able to process 99 per cent of them in a single pass. It often turns out that batches of records are dirty in the same way (some may have two commas, for instance) so with a quick tweak of the query it can be run again to clean another batch, and so on, until you reach the few obdurate records that must be fixed individually by hand.

The list box that sorts

Philip Marks uses Access and wants a control on a form to list the companies in his database – that's straightforward enough. Once a company has been selected in that control, he wants a second control that will list just those contacts for the company just selected. And that's the sticking point.

Screenshot 4 shows four tables and their interrelationships: Company and Contact are self-explanatory, WhoWhere links companies to the contacts who work there, and Conversations contains records of communications with contacts.

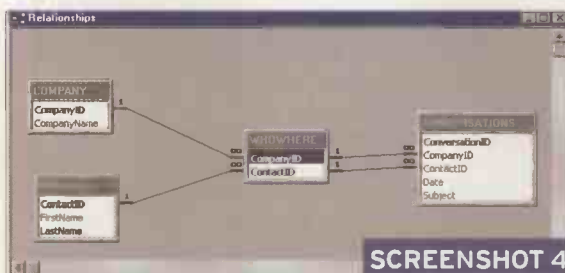
Create a new form (ConvRec) and the first control you need to build is a combo box: use the wizard to take records from both fields in the Company table (CompanyID and CompanyName), to hide the key column (CompanyID) and to store the value in the CompanyID field in the Conversations table. Save the form.

The second control is also a combo box, but its workings are more subtle.

This is the answer table, showing the various steps used to reach the final versions of initial and last name visible in the last two columns

SCREENSHOT 3

The tables and relationships in the database for which we're building a clever combo box



ParseNames: Select Query

Field: CompanyID, Name: [FirstName]*[LastName], ContactID

Table: COMPANY

Sort:

Show:

Criteria:

or:

[Forms]([ConvRec])([CompanyID])

The query that finds the contacts at a company we specified in the first combo box

It will be based upon a query which tells us who works for the company selected in the first combo box, called Company, so we'll write that query (ContactSubset) now.

We want the first column of the query to give us a CompanyID, so the data originally comes from the CompanyID field in the Company table. However, we want to restrict the query to finding the CompanyID we've just entered using the Company combo box, so the criteria must direct attention to that combo box.

Forms!ConvRec!CompanyID points it to a form called ConvRec and then to the field we want.

The second column concatenates the FirstName and LastName fields into a single Name field, and the third provides the contacts that match the CompanyID. Save the query.

Now we return to building the second combo box, Contact. In the Data tab of Properties, its Row Source is all three fields from the ContactSubset query: the SQL looks like this:

```
SELECT [CompanyID],  
[Name],[ContactID]  
FROM ContactSubset;
```

The third column containing ContactID is the one we want to be the bound column. In the Format tab, the Column Count is set to 3 because we've selected on three columns. We want the combo box to display data from just the middle column, the one containing the concatenated name, so set the Column Widths to: 0cm;2.54cm;0cm, which hides the first and third ones.

Now when you pop down the second combo box, you see only the contacts at the selected company.

The form's behaviour appears a little erratic: Access buffers information automatically so it doesn't always re-query the source for a control. To force a re-query for the whole form and specifically for the second combo box, we need a fragment of code, or even a macro.

Inspect the form's properties, click the Event tab and the On Current property, type in a name (RebuildList), click the Build button and choose the Macro Builder. Select the Requery action and set the Control Name to Contact. Use the same macro as the On Got Focus property in the Event tab for the Contact combo box.

Now your combination of combo boxes should work perfectly.

CONTACTS

Mark Whitehorn welcomes your comments on the Databases column. Email him at: database@pcw.co.uk. Please do not send unsolicited file attachments.



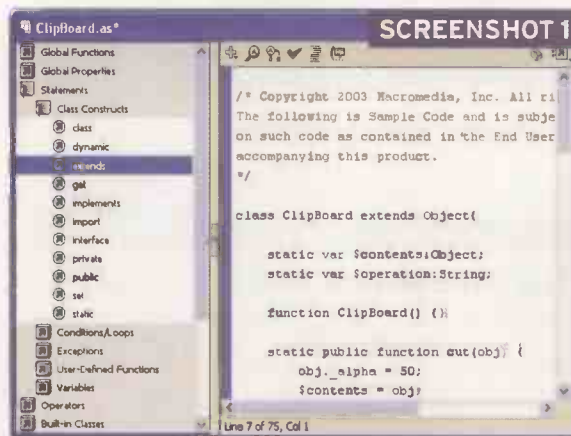
Tim Anderson
is both an IT journalist and software developer, and began writing for PCW in 1993. Since his first Commodore Pet, he has acquired expertise in Rad programming, Windows and the Internet

New developments in Flash MX

We reveal the changes and challenges to be found in the 2004 version of Flash

When it comes to embedding applications into web pages, you have a choice. Leaving aside ActiveX, which is Windows-only, there is Java and there is Flash. Although Java is more powerful, Flash has many attractions. The runtime is small and widely deployed, and presents developers with a well-defined small platform for applications. Flash was designed as a multimedia runtime, and this remains its primary area of use, but Macromedia is promoting the idea of Flash as a universal rich client with a role in business applications as well as special effects. Flash MX Professional 2004 takes this further with several new features aimed at application developers. According to Macromedia, the new forms-based development environment makes Flash more approachable for Visual Basic or Delphi developers. This is an important point, because the Timeline at the heart of Flash makes perfect sense if you are creating an animation, but none at all if you are building a database application.

Here's a quick look at what Flash 2004 offers developers. Note that Flash MX 2004 comes in two versions. The standard version is fine for multimedia authoring, but



The ActionsScript editor offers coding help as a hierarchical reference – double-clicking an item inserts it into your code

for application development, most of the new features are reserved for the Professional edition.

ActionsScript 2.0

The first change is the language, which has been updated to ActionsScript 2.0. ActionsScript is Macromedia's version of Javascript, officially known as ECMAScript or by the even less user-friendly name of ECMA-262, which is the name of the standards document that defines it. For more details, see the box below. In its original Netscape-originated guise, Javascript was frequently confused with Java. That confusion may

persist, because ECMA-262 Edition 4, which is in preparation, makes the language more Java-like than before. It's relevant to Flash, because ActionsScript 2.0 is based on the Edition 4 specification. The new features include:

● Full case-sensitivity

ECMA-262 has always been case sensitive, but ActionsScript was previously case sensitive for keywords, not variables. Now variables that differ only by case are considered different variables. Be warned that this can break code.

● Explicit data typing

ActionsScript now lets you declare the type of a variable, enabling code hints in the editor and compile-time errors for incorrect assignments. Type casting is also supported, and data typing is optional.

● Exception handling with try .. catch .. finally.

● **Greatly improved object orientation** with new keywords such as class, extends, implements, interface, get and set. These will be familiar to programmers in other object-oriented languages, and echo the equivalent Java keywords. Many of these keywords can only be used in external script files.

Compatibility with Flash Player 6, the original MX player, is fairly good, because most of the new features are really compiler changes. That means the new language features don't necessarily require the new Flash 7 player.

Javascript, ECMAScript and ActionsScript

The origins of Javascript lie in the early years of the browser wars. Netscape Communications had a script language then called Livescript. Java was cool and Netscape had an alliance with Sun, so it was renamed Javascript. There was some sense to it, because you can use Javascript to script Java applets, but the name was unfortunate in that the general public tended to confuse Java and Javascript and regard them as the same.

Despite the efforts of Microsoft with VBScript, Javascript became a de facto standard for scripting web pages, so other browser vendors needed to implement compatible versions. The term Javascript could not be used for trademark reasons. For example, Microsoft calls its version Jscript. In 1997 the European Computer Manufacturers Association (ECMA) produced a specification called ECMA-262, known as ECMAScript, in order to promote a common standard. Javascript, Jscript and ActionsScript are all implementations of ECMAScript. In 1998 and 1999 ECMA produced updated specifications; the 1998 version is also an ISO standard. Edition 4 is in preparation, and includes major changes. Although it is not yet finalised, Microsoft states that its Jscript.net implementation is based on Edition 4, as does Macromedia with ActionsScript 2.0. Netscape's Javascript 2.0 is also intended to be a superset of Edition 4.

With all these languages adopting the ECMAScript standard, you might think there would be a high level of compatibility. In reality this is not the case. One of the key difficulties is that even where the language fundamentals are the same, the environments in which the language is hosted vary hugely. Typically, the code makes frequent reference to the objects in its host environment, so porting code is often a matter of working out what the equivalent objects are, and how to reference them. This issue with the object model is the main source of problems converting scripts between browsers, despite the efforts of the W3C (World Wide Web Consortium) to promote a standard Document Object Model (DOM). The same factors would make it difficult to port code between ActionsScript 2.0 and Jscript.net, even though both are based on ECMA-262 4.

Flash Professional IDE

The next big change is in the Flash Professional IDE. When you create a new Flash movie, you can choose between three application types: Document, which is the old Timeline-based movie; Slide Presentation; or Form Application. The latter two types are based on Screens, which are containers for Flash content. Screens are either Slides, which have sequential behaviour suitable for a slide presentation, or Forms, which are designed for applications. The Timeline is still there in these new movie types, although hidden by default, and seasoned Flash developers will find little that couldn't be done before. The main aim is to offer a more comfortable environment for programmers skilled in other environments.



Database connectivity

Macromedia released an add-on for Flash MX called the Data Connection Kit (also known as Firefly). This functionality has now been incorporated into Flash MX Professional. Specific data-aware components are no longer required, since any visual component can be bound to data. Unfortunately, existing Firefly applications will need rewriting for Actionscript 2.0. Flash MX 2004 has several database components. The Dataset is a source-agnostic component that stores data in tabular form. Connector components, such as XMLconnector and Webservice Connector, enable reading and writing data from and to external sources. Resolver components, such as RDBMSresolver and XUpdateresolver, send updates back to the source. Databinding lets you bind one or more properties of a component to data, specifying the direction In for displaying data, or Out for accepting input.

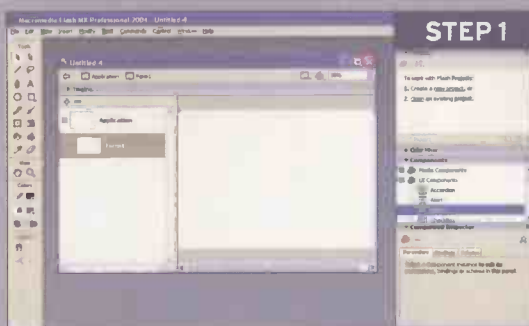
Using Flash MX 2004

Macromedia has been only partly successful in making Flash more approachable for application developers. Working with a late beta, there are some obvious stumbling blocks. For example, Flash screens overlay each other, unlike forms in most other environments. In other words, they are more like layers than forms, reflecting the fact that Flash is designed for multimedia. In order to treat them as forms, there is a Hide Screen option that prevents the content from showing when other forms are selected. However, this is only for design-time. At runtime, you can set the visible property to show and hide individual forms.

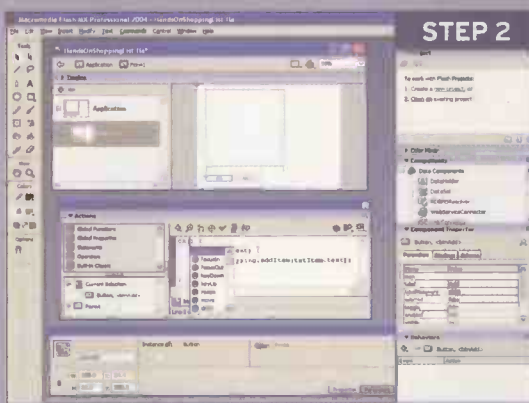
Another feature a VB developer may find odd is the way visual components are edited. In other environments, dropping a component on a form creates an instance with a default name, such as Button1. You can then edit its properties using a property grid. In Flash MX, dropping a component on a form does not automatically give it an instance name – you have to type this when required.

Even more confusing is the way components have two property windows. The instance name is only shown in the Properties window, while other properties (called Parameters) can be set both in the Properties window and the separate Component Inspector. For databinding, only the Component Inspector can be used. Not all objects are Components, since Components are higher-level objects

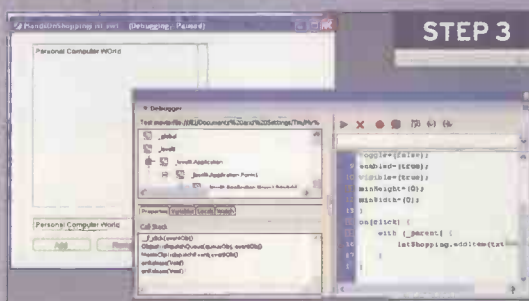
Building a simple Flash MX application



This step demonstrates starting a Flash MX 2004 forms-based application. The Timeline is still there, but rolled up by default. Along with standard drawing tools on the left, note the Components panel and the Components Inspector on the right. Both can be used for building the form's content.



This screenshot shows the Properties window at the foot where the Instance Name is set for each component, and the Actions window where you can type code.



The Flash MX debugger lets you run the movie, set breakpoints and step through the code.

that are composed from base objects and Actionscript.

Another part of the learning curve is how to reference objects and components in code. For example, imagine a shopping list application which has a list, a text input field and a couple of buttons for Add and Delete. Clicking the Add button adds the contents of the text field to the list. In VB, you could add the

components to a form, double-click a button to open its Onclick event handler, and write something like:

```
lstShopping.Items.Add(txtItem.Text)
```

(Key: ✓ code string continues)

In Flash MX, you can't just double-click the button. You need to select the button and open the Actions panel. Type the word 'on' followed by an opening parenthesis, and code hints will prompt for the event you want to handle, in this case 'click'. If you now write the handler as follows:

```
on (click) {
    lstShopping.addItem(txtItem.Text);
}
```

you will find that the application compiles and runs, but the button does not work. This is because Flash can't find the objects you are referencing. You need to use fully qualified names, or add a with block:

```
on (click) {
    with (_parent) {
        lstShopping.addItem(textItem.Text);
    }
}
```

Incidentally, the fully qualified name in this case would be:

```
_root.Application.frmFlash.lstShopping.addItem(...);
```

This is probably not what you would have guessed, without some existing Flash expertise.

The above is not meant to put you off developing with Flash. On the contrary, Flash is well worth exploring. In the beta, the Flash MX 7.0 player is a 640KB download, a fraction of the size of Java or Microsoft's .Net runtime. Its multimedia capabilities are proven, and if you add features such as the new database components, easy access to web services and built-in XML parsing, it becomes a capable operator for more general use. There's nothing wrong with the product, and serious developers will put in the time required to learn how to get the best from it. However, if Macromedia is serious about attracting VB developers, it could do more to make the Flash IDE and development experience easier.

For information about Flash MX 2004, see www.macromedia.com.

Try www.ecma-international.org for more on ECMA. Also see www.mozilla.org/js/language/es4/index.html.

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.

Marc thinks he's smarter than you...



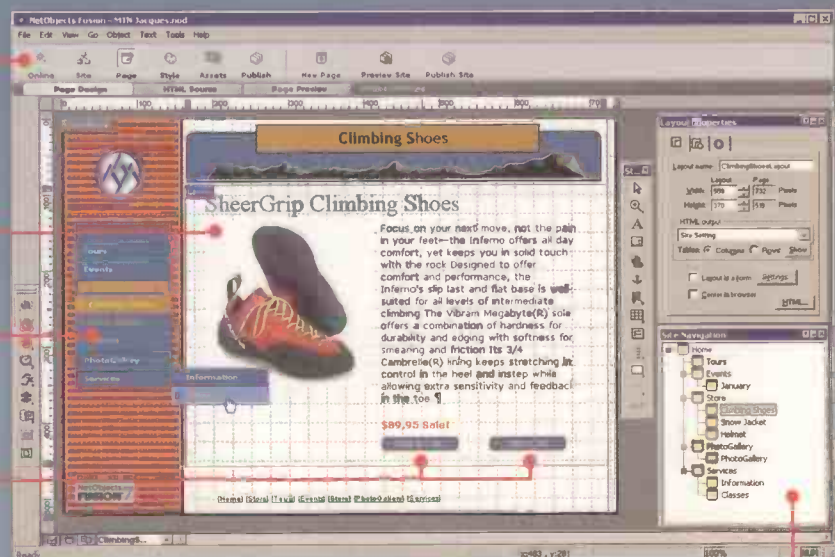
...just because he was able to create and publish a 15-page Web site in an afternoon without any Web experience. Is Marc some kind of genius? Sorry Marc, but No. Marc just used the fastest, easiest, and most powerful Web authoring tool on the market. Now you can build like the pros in a matter of minutes, not days. So go ahead, impress your friends with your new Web building talents. Your secret is safe with us.

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Leisure

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The Fate of role playing lies within

An unremarkable role-playing game with a bit of eastern promise



a simple enough system, creating different spell effects in the five fields of fire, ice, lightning, earth and holy magic is a matter of guesswork because no details are given as to the effect of combinations.

Graphically, the game is passable if dated. It looks pixelly, limited by the possible resolutions and on-screen text is hard to read. Apart from long loading times, however, The Fate ticks along well on a minimum spec machine.

The Fate is easy enough to play, the characters are likeable and the monsters intriguing. A focus on single objectives with lots of sword-wielding and spell-casting limits its variety as a single-player game.

Ian Marsh

LOADING



A Lara, Lara laughs

She may have bombed at the box office, but Lara Croft is now ringing in the changes with Vodafone Live. Eidos has secured a deal to bring one of the most popular gaming characters to mobile phones across 22 countries, and Live users will be able to download three different platform games to play on their handsets.

Each game is a new episode in Lara's adventures, with 15 levels plus one training section to teach the user how to play the game. The first episode, Tomb Raider: The Osiris Codex, should be available by the time you read this.

Sadly, one thing that won't be available any time soon is the eagerly awaited Half Life 2. The game we all want to get our paws on is now scheduled for a holiday release. Oh well, something else to stick on Santa's gift list.

Medieval backgrounds are the distressing norm in role-playing games, so it's a relief when one comes along that's a little different. Hints of eastern promise abound in The Fate, from atmospheric music that conjures up the imagery of powerful fantasy movies such as *A Chinese Ghost Story* to an array of weapons and monsters with a distinctly oriental slant. Developer Tronwell Software is Korean, so the influence is perhaps not surprising.

Lony, the treasure-hunting hero of the story, has escaped an adventure in which his twin brother went missing. He arrives on La-Tranada island, where he is mistaken for a mysterious cloaked man who has brought nothing but trouble. He sets off on the man's trail and, on his travels, is joined by the sorceress Lenya and warrior Blunt – a giant of a man who could kick sand in Arnold Schwarzenegger's face with impunity.

Movement, melee and magic are quickly picked up as the interface is largely intuitive. It's also geared to the healing and recovery process, with slots for

jars of healing and magic potions accessible through hotkeys.

Play involves controlling one active character and using the AI buttons for the others to decide whether they stand still like dummies or follow the lead character and fight at will. Lenya, with her useful ability to spot monsters, makes a good lead character, leaving Lony and Blunt free to fight without lots of mouse-clicking. Pathfinding around objects is sometimes sticky, though, and characters occasionally vanish off-screen.

Lenya has to create her own magic by combining runes, scrolls and effects. Although it's

DETAILS

PRICE £29.99 inc VAT

CONTACT 4am Entertainment
01332 242 700

www.4amgames.com

SYSTEM REQUIREMENTS

Windows 98/ME/2000/XP •
Pentium III 500MHz • 128MB Ram •
DirectX8.1a • 500MB hard disk space

VERDICT

Oriental aspects give some colour and diversity to an otherwise acceptably average role-playing game

OVERALL

★★★★★



Sword fight with the skill and precision of a medieval warrior

BF1942 Secret Weapons

Expansion pack with experiences galore



When it was launched in 2002, EA's Battlefield 1942 brought online multiplayer gaming to new heights. With up to 64 players in a game, each fighting for either Allied or Axis forces, it not only included man-to-man combat but also tanks, planes and ships. In short, it was the best game of soldiers ever.

Secret Weapons of WWII isn't the first expansion pack for BF1942 – Road to Rome was released earlier this year, adding Italian campaigns to the mix. Secret Weapons, however, is a little different. While BF1942 and Road to Rome strived for historical accuracy, this expansion pack has a 'what if?' premise and imagines what WWII would have been like if certain pieces of futuristic fighting technology actually made it off the drawing board before the war ended.

The expansion pack adds eight new battles to the 16 in the original game and six added by Road to Rome. Each of the new maps is well put together and encompasses a variety of environments. Highlights include Mimoyecques in France, where Allied troops must destroy Hitler's V3 cannon; The Eagle's Nest, involving an attack on his fortress; and Kbelly Airfield, where German scientists are developing a flying saucer.

Which brings us neatly on to the most exciting part of this expansion pack – the secret weapons. There's a handful of

new tanks, including the devastating Sturmtyger, amphibious vehicles, plus armed motorcycle sidecars. Better still, there's also the opportunity to fly one of several jet and rocket-propelled aircraft, take control of a guided rocket, strap on a personal jet pack and parachute from a cargo aircraft that acts as a mobile spawn point. Throw in half a dozen new weapons and the result is an expansion pack that makes BF1942 feel like a whole new game.

Unfortunately, EA hasn't taken this opportunity to beef up the AI in the game. The sight of Allied and Axis troops standing side by side, blissfully unaware of each other, is a common one and computer-controlled troops really should give up a vehicle when you want to take control of it, particularly since they're so bad at driving.

Julian Prokaza

DETAILS

PRICE £19.99 inc VAT

CONTACT EA Games

www.battlefield1942.ea.com

SYSTEM REQUIREMENTS

Original copy of Battlefield 1942

• 800MHz PIII/Athlon • 256MB Ram •

16x CD-Rom drive • 64MB Direct 3D

card • Internet access for online play

VERDICT

You'll need the original game to play, but at £14.99 Secret Weapons of WWII is an expansion pack that'll make you feel as if you're playing a completely new title. Highly recommended

OVERALL

★★★★★

Madden NFL 2004

The latest fix for gridiron addicts



If the terms 'second down', 'touch down' and 'end zone' do nothing more than confuse and frighten you, there's a good chance you're not familiar with the game of American Football, nor the massively popular Madden NFL series from EA Sports. Some 14 years after the original release, Madden 2004 has added a collection of new elements to the already feature-rich sports simulation.

Probably first to catch the eye of any Madden addict is the new owner mode. Now you can put your skills to the test, both on and off the field, as the game allows you to take complete control over the running of your team. This includes hiring and firing staff, controlling ticket prices and making sure the all-important prawn sandwich eaters have their very own luxury corporate box.

If you feel your current fan base is a little too reluctant to splash out on official merchandise, it's even possible to move the entire team to another location in the hope that you'll find some more appreciative supporters.

If American Football isn't your thing, it's more than likely you won't even consider giving Madden NFL 2004 a chance – the huge range of 'offense' and 'defense' tactics, and the endless advice from Madden himself, isn't everyone's idea of fun.

Newcomers to the Madden series will certainly need a fair

amount of patience when it comes to learning exactly how to make all the players run where they're supposed to, and if you have no previous knowledge of gridiron action, your task is made infinitely harder.

The use of a gamepad is also highly recommended since the bewildering array of keyboard controls can be particularly difficult to master.

Anyone who has already bought and enjoyed previous versions of Madden probably won't need any encouragement to upgrade to this latest version. The added extras bring more excitement to the game and the owner mode provides a totally new angle.

In short, Madden NFL 2004 makes a number of improvements to what is already an in-depth simulator, but the nature of the game means that American Football novices will struggle to get to grips with how to play it.

Will Stapley

DETAILS

PRICE £29.99 inc VAT

CONTACT EA Sports

www.uk.ea.com

SYSTEM REQUIREMENTS

Windows 98 or later • Pentium III 700MHz • 128MB of Ram • 500MB of hard disk space

VERDICT

Another successful entry in the Madden series

OVERALL

★★★★★

Welcome to the land of opportunity

From the publisher of 'American Conquest' and 'Cossacks' comes a new PC Strategy game set against the dramatic backdrop of American History, from the Spanish Conquistadors to the War of Independence. Place your forts and strongholds wisely, manage your natural resources, build the first trans-continental railroad and send your troops into battle. But beware of the bounty hunter your opponents may send against you. The conquest of America is full of strategic challenges.



www.cdv.de



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PC Gaming World

"Strategy fans should keep a close eye on No Man's Land"

Gamespot

"What we've seen of No Man's Land so far indicates that the game should offer something new and different to fans of real-time strategy games who are weary of the fantasy, modern, and science fiction themes so prevalent in the genre."



www.nomans-land.com





10 Pure Digital Videologic ZXR-750 7.1 speaker systems

It's true to say 5.1 speaker systems are everywhere now and we've all nodded sagely and agreed 'it's just like being in the cinema' when we've experienced them. Except, of course, that the local multiplex has one-upped us by adding even more speakers – first 6.1 then 7.1 – how can you compete with that?

Easy! Just be one of 10 lucky winners of our competition this month.

Pure Digital has introduced the first £100 7.1 speaker system for your PC, the

Videologic ZXR-750. In our review of them a few months back (*PCW* August 2003), we reckoned they were 'good value, with plenty of features and just loud enough to annoy the neighbours. A great buy.'

Sound good, don't they – a must have for any home entertainment enthusiast. But what's that you say? You've no 7.1 DVDs to do them justice? Pure's Surfe technology takes care of that. As we pointed out in our review 'the real bonus in this system is that you can upmix 5.1 to 7.1. The built-in

processor uses the side front and rear signals to create two extra channels'. Sorted.

For a chance to win one of these speaker systems, just answer the question below and follow the How to enter instructions.

Q: How many speakers does the Videologic ZXR-750 7.1 system have?

- a) Seven
- b) Eight
- c) Five

PCW DECEMBER 2003 PURE DIGITAL

COMPETITION ENTRY FORM

How many speakers does the Videologic ZXR-750 7.1 system have?

.....

Name:

Address:

Email address:

Daytime telephone number:

Mobile telephone number:

We may use the contact details supplied to communicate with you regarding *PCW*.

If you are also happy for us to contact you about other products or services available from *PCW* and the VNU Business Publications Ltd Group, please indicate here. Contact by: Email ☐ Telephone ☐ Mobile ☐

If you are happy for us to pass your details on to other carefully selected companies to contact you about their products or services, please indicate here. Contact by: Email ☐ Telephone ☐ Mobile ☐

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PERSONAL
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Rules of entry

This competition is open to readers of *PCW*, except for employees (and their families) of VNU Business Publications, Pure Digital and Jal. *PCW* is the sole judge of the competition and the Editor's choice is final. Winners will be selected at random from all correct entries received. No cash alternative is available in lieu of prizes. VNU will use all reasonable endeavours to notify the winner(s) within 14 days of the close of the competition. Prizes will be dispatched direct by the competition sponsor(s) and the winner(s) name(s) and address(es) will be provided to the competition sponsor(s) for this purpose. No purchase of the magazine is necessary to enter the competition. VNU will use all reasonable efforts to ensure that the prizes are as described on this page. However, VNU cannot accept any liability in respect of any prize, and any queries regarding a prize should be taken up directly with the sponsor of that prize.

October winners

The winner of the Advent Centrino notebook was S Williams from Blrmingham. The four winners of the Brother multifunction devices were Ian Brown of Tyne and Wear, Brian Venn of Horsham, West Sussex, M Smith of Bromsgrove and Paul Major.



2 Jal Scorpio 2500 Powerpro PCs with TFT monitor

Two lucky PCW readers have the chance to win a Jal Scorpio 2500 Powerpro PC with TFT monitor, worth £499 ex VAT. The Scorpio 2500, from this long-established independent PC company, received a Highly Commended award in PCW's November PC group test.

The Jal system is powered by an Athlon XP2500+ processor. It achieved first place in PCW's Sysmark performance tests in the group test, with a score of 209. The integrated Nforce2 graphics are impressive,

so gamers won't be disappointed. Inside the case is a microATX motherboard, 256MB of Ram, an 80GB hard drive plus a CD-RW and DVD-Rom. The PC also comes with a Microsoft optical mouse and keyboard.

Not only do you get a PC, but you also win a 15in TFT monitor*, Power DVD software and a two-year on-site warranty followed by lifetime labour return to base.

For a chance to win one of these PCs with TFT monitor, just answer the question below and follow the How to enter instructions.

For more information about Jal, go to www.jal.co.uk.

Which processor powers the Jal PC?

- a) Athlon XP2400+
- b) Athlon XP2500+
- c) Athlon XP2600+

* Due to a current market shortage of TFT monitors, those supplied with these prizes may differ from the ones reviewed in PCW.

How to enter

Fill in the coupon and send to the following address by 24 November 2003:

Pure Digital or Jal Competition, PCW, VNU Business Publications, 32-34 Broadwick Street, London W1A 2HG
Or enter online at www.pcw.co.uk/competition.
Or text your answer to 85100, ensuring you put the keyword **PCW3** for the Pure Digital competition, and **PCW4** for the Jal competition at the beginning of your text, followed by a space, then your answer, then a space, then your name (eg PCW1 B John Smith). **Please send separate messages for each competition.**

All text entries cost 50p, plus the cost of sending a normal standard text message (contact your network provider for details). Some Pay As You Go customers may experience difficulties using this service, and it is also not currently available to Virgin Mobile customers. We may use the contact details supplied to communicate with you regarding PCW. If you do NOT wish to receive any future free promotional messages by text message, please email sms@vnu.co.uk. Competition open to UK residents only.

PCW DECEMBER 2003 JAL COMPETITION ENTRY FORM

Which processor powers the Jal PC?

.....

Name:

Address:

Email address:

Daytime telephone number:

Mobile telephone number:

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**PERSONAL
COMPUTER
WORLD**



DECEMBER 1983

December 1983 seemed to be a fairly exciting time for the computer industry. A multitude of new systems were being released, continually pushing the envelope of speed and efficiency. Even the French got involved in the microcomputer revolution with the Goupil-3, which looked more like a prop from some sci-fi show than a modular computer.

Logo, the language most associated with school maths lessons, was also at the centre of attention. We produced a guide to explain how Logo was actually misunderstood and could not only be used as a 'pretty pattern' program



The Goupil-3 micro: back in 1983 we slapped an elegant little beret on this computer to signify its French origins

most children pondered over during their school lunches, but also as a competent programming language.

Micros were also delving into the world of music. Three pages of the issue were dedicated to explaining the terms and meanings of exotic things like synthesisers and frequency modulation. The article showed how different noises could be made by simply changing the amplitude and frequency of a soundwave. Complicated stuff, but interesting nevertheless.

DECEMBER 1988

December 1988 saw us gazing into the skies above, staring at the small gleaming stars many light years away, all from our computers. We explained how anything from supercomputers to a micro with a 6in reflector could help the observer gaze into the unknown and see something noteworthy. It was a sign of things to come, with computers now dominating the science of astrology.

IBM had also been busy on a new type of graphics card. The new video standard, dubbed VGA (you may recognise it), was the product of the company's research and we tested out some of the very first cards to use this format. The reason behind this new standard? It was all in the interest of compatibility and usability as, until then, outputs from computers had all been in CGA's horrible

colours. As expected, the results of the tests signalled VGA was the future, as indeed it was!

We also had a bit of gaming fun with Rocket Ranger as Chris Cain (this month's acting reviews editor, but in 1988 a mere editorial assistant) became a Nazi-killing hero from a B movie. This wasn't any ordinary game; it belonged to the Cinemaware series and was more of an experience than anything else at the time. Game designers were aiming for immersive scenarios back then, just as they are today.

DECEMBER 1993

Office applications looked to be all the rage in this edition, with 24 pages dedicated to testing and evaluating word processors. The usual suspects were all lined up and put through their paces – Wordstar, Wordperfect, Multimate, Lotus Write (there was a lot more choice in the market!) – but, not surprisingly, Microsoft Word for Windows came out trumps.

There was a caveat, however, as MS Word shared top prize with Ami Pro 3.0 from Lotus. It had 'a sense of imagination and fun that made working with it a pleasure,' we cooed. Could you say the same about any word processor today?

Supercomputing was also getting a supersized name for itself 10 years ago. The race was on to produce a computer that could process a teraflop (trillion floating point operations) per second, and the main race was then between superpower US and super-economy Japan. The EC was also in on the game, trying to pull together a £3.5b funding package to get a European angle on this 'technology race'. With a little hindsight it all looks seriously overhyped and rather overtaken by events – the economic doldrums that ensnared the key players, and a move towards distributed computing platforms (particularly the Internet).

Also emerging in 1993 was the Apple Newton Messagepad, one of the first in a long line of PDAs. The batteries didn't last long and required changing every day (costing our reviewer £3 for a set). At least we predicted correctly that batteries would get cheaper and more efficient in coming years. Phew!

DECEMBER 1998

December 1998 introduced us to the original cyberman – Kevin Warwick. Our Kev had a chip implanted into his arm, all in the name of science (and possibly to see what it felt like). What did the chip do? Well, all it really did was act as a form of security identification and let him in and out of his workplace.

As he passed through a doorway, his security honchos identified him and granted him access. This was a big step, we predicted, in merging technology with humans and would open the doors, so to speak, for other manufacturers to develop similar ideas.

This edition also saw the results of our sneaking around undercover, investigating PC companies on their sales and technical support, as well as the hardware they supplied. PCW's highly trained consumer spies set themselves up as a small business, with £1,000 to spend on a new computer, and were let loose among the manufacturers to find out who really offered the best 'buying experience'.

Stealth tactics were always the best way to truly test someone and, in this case, it worked perfectly. Top marks for sales service and tech support went to Gateway, Dell and Hi-Grade.

It also seemed like this was the month of 56K as we rounded up a bunch of these 'high-powered' modems and put them under the spotlight. Back then, 56K was the fastest thing around; today there are speedier options, with broadband connections available at up to 20-times faster for home users. It's a fast-moving technology world!

Dominik James

Nascom-1

Nasco's home computer kit inspired a generation of enthusiasts, and the launch of PCW

Back in 1977, the hobbyist computer market was exploding.

Inspired by this brave new world, electronics enthusiasts brandished their soldering irons, built kit-computers and compared notes with likeminded folk at new-found clubs. Giant electronics manufacturers would even attend college departments and bigger clubs, demonstrating their latest components and ensuring everyone was kept bang up to date with the industry. Yep, it sure was an exciting time, so long as – ahem – you lived in North America.

Sadly, it was quite a different story in the UK. While a handful of computer clubs existed in 1977, they were on a much smaller scale than America and had virtually no support from the industry. We needed a proper home computer project, but the man who'd first satisfy the desires of UK enthusiasts wasn't Clive Sinclair. It was John Marshall.

Marshall had witnessed the high standard of West Coast computer clubs while visiting the Californian headquarters of the North American Semiconductor Company (NAS). NAS had a subsidiary supplying components to enthusiasts in the US called Lynx Electronics, and Marshall operated a similar component distribution in the UK, under the name Nasco.

Nasco already distributed most of the components necessary for a home computer kit but, as legend has it, the idea of producing one came to Marshall while chatting on a transatlantic flight – he sketched the concept on an airline napkin. It was the summer of 1977.

Shelton Instruments in London was commissioned to design the Nasco Microcomputer, or, as it became known, the Nascom-1. Nasco's goal was to produce a kit-based microcomputer which offered the greatest possible software

control and straightforward expansion for the target price of around £200.

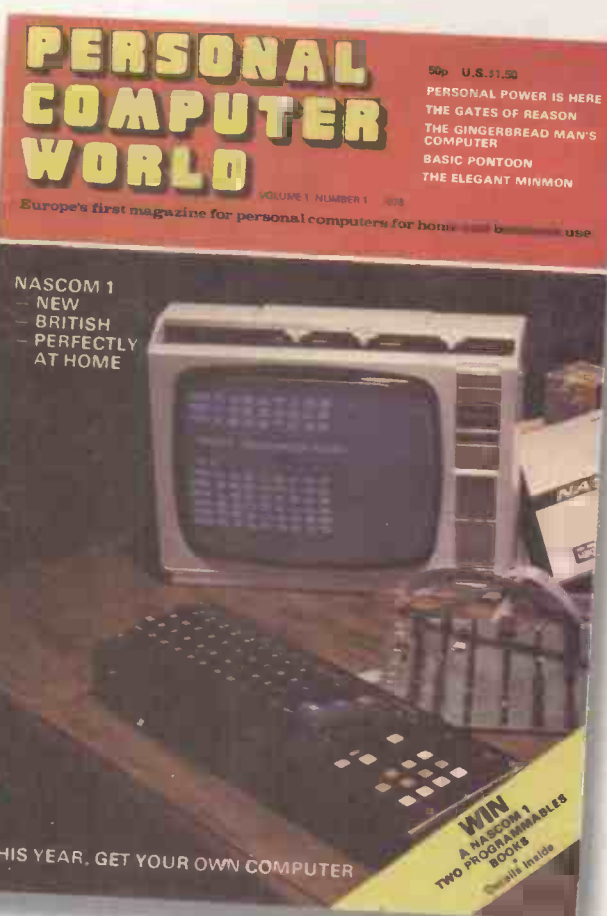
Shelton Instruments opted for Mostek's Z80 processor for the Nascom-1. The Z80 was relatively new but already established with numerous home applications; Mostek also proved to be helpful during the design process.

Since the Nascom-1 was targeted at home hobbyists, it was also designed to make use of equipment that already existed in the home. An RF output allowed domestic TVs to be used as displays, while conventional audio cassette recorders provided data storage.

A hexadecimal keyboard was rejected in favour of a full Qwerty keyboard, which was one of the most expensive components in the kit. Finally the Nascom-1 was equipped with 2KB of Ram, half of which was dedicated as video memory for the display. The basic kit cost £197.50 inc VAT, or £226.90 inc VAT including an appropriate power supply.

Shortly before launching the kit, Nasco technical director Tony Rundle apparently asked Marshall how many they needed to sell to be profitable. Marshall replied 200 units would be good, but 400 would be great. As it happened, 400 Nascom-1 kits were sold within two weeks of launch. The only problem was this virtually exhausted the supply of cheap keyboards from the original supplier. At the time, most keyboards cost more than the entire Nascom-1 kit, putting the project in some jeopardy until Marshall found a replacement supplier at the right price.

While the Nascom-1 began life as a simple components kit from Nasco, its success justified the forming of a separate company in November 1977 with full-time staff, and later with Marshall as MD. Indeed its popularity, along



with a quick visit to a New York computer show, inspired Angelo Zgorelec to launch *Personal Computer World* magazine, which featured the Nascom-1 on its first cover in May 1978. This issue also featured an interview with Kerr Borland, Nascom's sales director, explaining the background to Britain's first Microcomputer. Mirroring the Nascom-1's own success, *PCW* sold out of its initial 30,000-copy print-run and went monthly from the second issue.

Unlike many systems that followed, the Nascom wasn't a one-hit wonder. After 18 months' development, the Nascom-2 was launched. The machine was impressive, but funded entirely by Nascom itself and, when sales didn't generate revenue as

quickly as expected, the company found itself without funding or backing. The receivers were called in May 1980.

The Nascom story doesn't end there. Marshall, with several ex-Nascom employees and dealers, set up Gemini, which launched the 801 in 1981 and other machines into the mid-1980s. The Nascom name didn't die either, with Lucas Logic buying it in mid-1981 and launching the Nascom-3 that December.

Today, Sinclair may be credited with kickstarting the British home computer industry, but even his kit-based MK14 was preceded by the Nascom-1 – the machine that can truly lay claim to being the first British Microcomputer.

Gordon Laing

Mindbenders

These puzzles will keep you amused for hours, and if you solve them you could win a Concise Oxford English Dictionary or a CD version of a dictionary and thesaurus

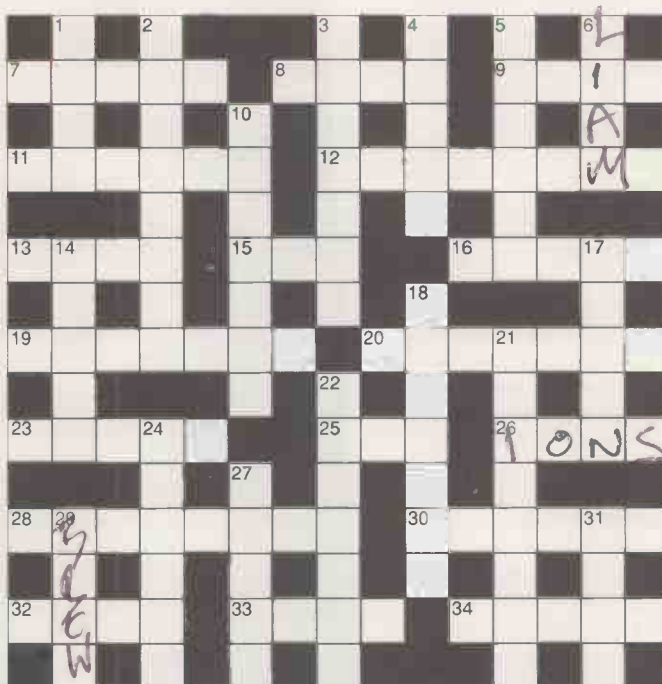
Prize crossword

ACROSS

- 7 Make a disk accessible to a Mac's file system (5)
- 8 Clever with Corel Draw? (4)
- 9 Reference line on a chart (4)
- 11 Slanted type style (6)
- 12 Cognomen required for logging-on (8)
- 13 High execution speed (acr) (4)
- 15 ___ line, private communications carrier (3)
- 16 Make files accessible over a network (5)
- 19 In another location (3,4)
- 20 Organizing data (7)
- 23 Post an emotion-stirring newsgroup message (5)
- 25 ___ address, WWW site (3)
- 26 Electrically charged particles (4)
- 28 Terminating abruptly (8)
- 30 ___ mode, modem setting (6)
- 32 Denoting communication over distance (4)
- 33 Retrievals of home pages eg (4)
- 34 Screen image duplicates (5)

DOWN

- 1 Mail (4)
- 2 Loosens (a brooch) (8)
- 3 Filled between tiles (7)



- 4 ___ Grove, children's TV series (5)
- 5 ___ and her Sisters, 1986 film (6)
- 6 ___ Gallagher, Oasis singer (4)
- 10 Transparent film (7)
- 14 Surmise (5)
- 17 Arrest (3,2)
- 18 Depict (7)
- 21 Tests (5,3)
- 22 Back-row chessmen (7)
- 24 Food store (6)
- 27 Good-looking (sl) (5)
- 29 Make beer (4)
- 31 Trade fair (4)



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 *The Concise Oxford Dictionary* and *The Oxford Thesaurus*.

Send your completed crossword to: 'PCW December - Prize Crossword', VNU, 32-34 Broadwick Street, London, W1A 2HG, to arrive no later than **11 November 2003**.

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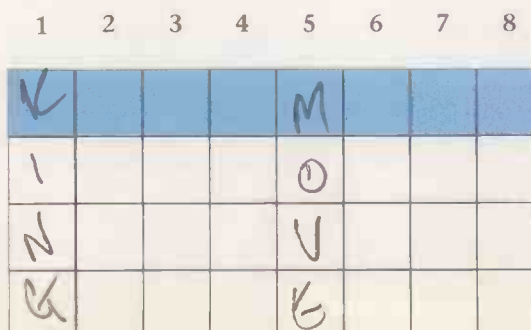
October winners

The winner of October's crossword was George Moy of Chichester, and Glenn Lyons of Cambridge won the brainteaser puzzle.

Coming across

What is the eight-letter word going across the coloured squares at the top of this grid? Solve the numbered Down clues, the answers to which consist only of the letters in the Across solution. For information on how to enter see above right.

- 1 Emperor
- 2 Sign
- 3 Turn sharply
- 4 Always
- 5 Shift
- 6 Rib, eg
- 7 Flat
- 8 Dress



SOLUTIONS

November crossword

ACROSS: 7 Hertz 8 AOC
9 Ones 11 Stores 12 Navigate
13 Dell 15 IRC 16 Seats
19 Deleting a file 20 Pin grid
23 Shell 25 Ent 26 Mode
28 Dingbats 30 Robust 32 Meta
33 Icon 34 Train
DOWN: 1 Sect 2 Startles
3 Connect 4 Heavy 5 Tongue
6 Cent 10 Assigns 14 Earth
17 Third 18 History 21 Game-bird
22 Pension 24 Log-jam
27 Basil 29 Ikea 31 Swim

October brainteaser

Q 9 A 5 J 3 J K 2 8 J K 10 K 6 4 7

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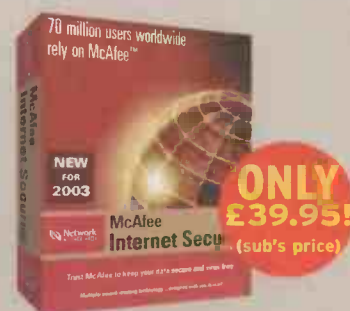
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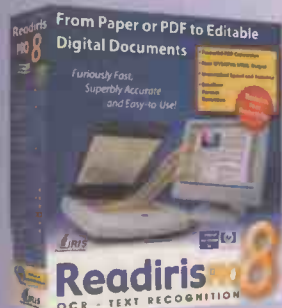
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December 2003 edition

issue 102

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quicklink > 2S8JPW Go

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This is issue 102 of Direct Focus, your guide to the hottest technology at great value dabs.com prices.

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Product News & Price Guide

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- Resolution: 1024 x 768
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Iiyama

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quicklinx 2FX1PW

www.dabs.com/iiyama

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E285.00



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- Maximum resolution 1280 x 1024
- Full colour (16 million)
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SONY

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LG

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SONY

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NEW

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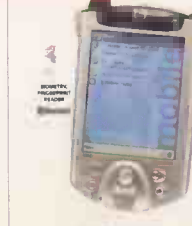
The PEG-TG50 CLIE handheld features the latest Palm OS® 5 software, high-resolution color screen, built-in voice recorder and MP3 audio player, providing everything you need to stay organized and entertained. Integrated keyboard can be used to type in new appointments or take notes on the go.

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2CLXPW	C4-1200 Combo (M8840B/A)	1643.82	1399.00
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Pentium® 4® 3.06GHz

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The TV, Stereo, DVD/CD Burning, All-In-One Entertainment PC!

Introducing the ultimate PC that does more than just computing. Now you can record & watch your favourite TV shows with the Giga Pocket Personal Video Recorder. The unique folding keyboard hides all of the unnecessary controls, so it looks like an actual TV when in the TV mode. The built-in 17.5" wide screen LCD makes it a perfect size for the den or bedroom.

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VAIO

SONY

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- Enhanced Microsoft Outlook synchronisation2
- Create, edit, email3 and share Word and Excel files in their native formats
- Device security

£304.32 inc

£259.00 ex

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1. 52 MB actual storage capacity
2. Windows compatibility only
3. Requires installation of included email software, a separately purchased compatible mobile phone and Internet service (for email only). Additional charges from your mobile and/or Internet service provider may apply

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www.dabs.com/palm

quicklinx 2S7VPW

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1. Windows compatibility only
2. 28.3 MB actual storage capacity
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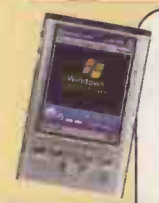
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quicklink 2R8VPW

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- 1.5GB hard disk and USB 2.0 connectivity
- For MP3, WMA or data, this system delivers on capacity, playtime and ease of use

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Creative MuVo Nx

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CREATIVE
www.europe.creative.com

The Creative® MuVo™ NX with 128MB memory stores around 60 songs in WMA* or 30 songs in MP3*. It incorporates a backlit LCD display, scroller wheel for fast access to all features, and microphone. It comes with MediaSource software, stereo headphones, and an armband that's great for jogging or working-out in the gym

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- The all-round solution for active people

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MP3 CD-R/RW Playback
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Remote Control



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SONY

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- Wide XGA Panel
- Digital noise reduction

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Sony Network Walkman® NW-MS70

quicklink 2GODPW

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SONY

Sony's NW-MS70 Network Walkman® Digital Music Player is the latest solution from Sony for listening to digital music on the go.

Small enough to carry in your pocket or purse, this titanium device comes equipped with 256MB of embedded memory. The internal battery provides up to 33 hours of continuous playback (ATRAC3 Playback), and the Magic Gate Memory Stick® Duo™ expansion slot allows you to take along even more music!

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RDR-GX3 Recordable DVD Player

Dual RW Recording Format
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ARCHOS

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Widescreen Flat Tube
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quicklink: 2HTOPW

SV-SD85

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This incredibly small, light and wearable audio players enables easy listening of music recorded from a PC using SD Memory Cards.

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£127.65

Creative I-Trigue L3450

quicklink 2Q98PW

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CREATIVE
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The Creative I-Trigue L3450 2.1 speaker system is built to the highest standards of style and technology. Dual amplifiers power the 9 Watts RMS satellites, with their titanium micro-drivers and side-mounted Lateral Firing Transducers. A 30 Watts RMS subwoofer, Creative's Audio Control Pod, and M-PORT™ connectivity for direct audio playback with compatible MP3 players complete the package.

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Super Slim DVD
Home Cinema System
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quicklink: 2HRAPW

JVC GR-DX95EK

quicklink 2DD9PW

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JVC

- 1/6-Inch 800,000-Pixel CCD
- 16x Optical Zoom
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- USB PC Link

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Canon MVX10i

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The MVX10i offers superb functionality combined with superior technology. It shoots movies and stills and can also be used as a webcam.

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Canon

Half the size of many mobile phones and weighing in at just 100g, this all-metal bodied 4.0 Megapixel dynamo packs 180 second video clips.

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Sony DSC-U50 Cyber-shot U

quicklinx 2QL1PW

www.dabs.com/sony



MEMORY STICK PRO
SONY

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FUJIFILM

With a 3.2 million pixel effective resolution and 3x zoom, the FinePix A210 Zoom Is an impressive, yet affordable, choice for anyone moving on from a compact film camera to take their first steps into digital photography. This silver-finish, easy to use digital package has big buttons and clear markings, making it ideal for use by all the family.

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Nikon

A unique statement of style, grace and performance

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- 3x Optical Zoom
- Swivel lens
- Slim design

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hp

Get picture perfect photos using the new HP Photosmart 935 digital camera with HP Instant Share. With its 5.3 megapixel total resolution and up to 21x total zoom you can be sure of superior image quality.

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5.3
Megapixels

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quicklinx 2Q81PW

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OLYMPUS

Strikingly attractive, this weatherproof camera with full-metal body is the centre of attention in any situation

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- 3 x optical zoom
- 4 x digital zoom
- 5 scene modes

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inc
£263.83
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Kodak Easyshare CX6230

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Kodak

Simple to shoot. Simple to share.

The CX6230 features 2.0MP for great-looking prints up to 8"x10", and 3X optical zoom for getting close. It has multiple programmed scene modes, so you'll always be prepared to shoot. Then print, e-mail or organize your photos with our exclusive, one-touch-simple Share button. If you're ready for digital, the CX6230 is ready for you.

NEW

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MINOLTA

An affordable camera offering high-quality images.

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- 38-114mm (in 135mm format)
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- Movie clips up to 60 seconds

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£119.36
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Sony DCR-PC105 Digital Handycam Mini DV

quicklinx 2M31PW

www.dabs.com/sony



SONY

This compact camcorder combines a one-megapixel imager optics to produce video with crisp detail and color clarity. It also incorporates an intelligent pop-up flash to ensure that the still images (1152 X 864) are captured in bright and vivid resolution even in tough lighting situations. The camcorder offers an easy-to-use touch panel 2.5" SwivelScreen™ hybrid LCD display with access to its entire menu.

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- Megapixel (Gross) Advanced HAD™ CCD Imager
- Digital Still Memory Mode with Memory Stick® Media

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£689.36
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Panasonic NV-DS10

quicklinx 2FFJPW

www.dabs.com/panasonic



Panasonic

- 800K Pixel CCD
- 10x Optical/500x Digital Zoom
- Super Image Stabiliser
- 2.5 inch LCD Monitor
- Colour Night View with an LCD Light Panel
- DV Output

£454.99
inc
£387.23
exc

Digital Cameras

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1Y1MPW	PowerShot A30	195.87	165.00
2FC7PW	S50	428.87	365.00
25KHPW	PowerShot G3	504.99	429.78
244FPW	Finepix A202	128.00	108.94
244HPW	Finepix A203	170.37	145.00
14CHPW	Finepix 2800 Zoom	199.99	170.21
221TPW	Finepix 401	280.02	239.00
177KPW	Finepix F601 Zoom	398.32	339.00
21JNPW	Finepix S602	508.77	433.00
2PTHWP	Photosmart 435	116.32	99.00
2N5DPW	Photosmart 635	135.12	115.00
2G8BPW	Photosmart 735 Camera 3.2 MP	168.02	143.00
2R77PW	Photosmart 735 And Docking Kit	217.37	185.00
2G99PW	Photosmart 935	299.00	254.47
2PTJPW	Photosmart 945	339.57	289.00
2G8CPW	Photosmart 935 Camera & Dock	349.98	297.86
2R85PW	Photosmart 945 with Dock	381.87	325.00
2FG2PW	Easyshare DX6340	214.98	182.97
2FJWPW	Coolpix 2500	276.12	235.00
27TNPW	Coolpix 3500	351.32	299.00
2FG4PW	DSC-P32 Cyber-shot	174.99	148.93
2CWNPW	DSC-P52 Cyber-shot	199.99	170.21
2D39PW	DSC-P72 Cyber-shot	242.99	206.80
2FC9PW	DSC-P8 Cyber-shot	305.00	259.58
2FC8PW	DSC-P92 Cyber-shot	347.00	295.32
2FC9PW	DSC-P10 Cyber-shot	389.00	331.07
2FC9PW	MVC-CD500 Mavica	480.57	409.00
2FGDPW	DSC-V1 Cyber-shot	446.99	396.59

Digital Camcorders

quicklinx	CANON	inc VAT	ex VAT
2DGYPW	MV 600	379.99	323.40
2DH0PW	MV50i	579.99	493.61
21K9PW	MV5i	727.32	619.00
2FNHPW	MVX150i	749.99	638.29
Q21PW	MV30i D	938.82	799.00
2CP4PW	DCR-TRV145 Handycam D8	308.00	262.13
2CD3PW	DCR-TRV245 Handycam D8	327.82	279.00
2CD4PW	DCR-TRV355 Handycam D8	469.00	399.15
2CP8PW	DCR-TRV22 Handycam MiniDV	565.01	480.86
2G1DPW	DCR-TRV60 Handycam	879.00	748.09
11BVPW	IP7 MicroMV Pocket Camcorder	999.00	850.22
28KXPW	DCR-IP220 Network Handycam IP	1314.82	1119.00
2M22PW	DCR-PC103 Handycam MiniDV	649.99	553.19
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2.5" LCD, 800K CCD
500 x Digital Zoom
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www.dabs.com/sharp quicklinx: 2H77PW

Memory

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2DGKPW	Compact Flash 512MB 12X USB	90.00	76.60
2P4TPW	Compact Flash 1GB 32X	186.00	158.30
2P4ZPW	Compact Flash 2GB 40X	418.00	355.75
28FQPW	Memory Stick 128MB	32.00	27.66
2P51PW	Memory Stick 256MB Pro	61.50	52.34
2P53PW	Memory Stick 512MB Pro	162.00	137.88
2P54PW	Memory Stick 1GB Pro	325.00	276.60
28FXPW	Smart Media 128MB	22.50	19.15
28GQPW	XD Picture Card 128MB	34.00	28.94
2F24PW	XD Picture Card 256MB	82.00	69.79
28G3PW	MultiMedia Card 128MB	31.50	26.81
28G5PW	Secure Digital 128MB	32.00	27.24
28G8PW	Secure Digital 256MB	53.50	45.54
28G9PW	Secure Digital 512MB	181.00	154.05
J7KPW	64MB Memory Stick	29.99	25.53
YZVPW	128MB Memory Stick	44.99	38.29
2DMKPW	128MBx2 Memory Stick	69.99	59.57
2DMLPW	64MB Memory Stick Duo	40.99	34.89
2HDPPW	256MB Memory Stick Pro	85.99	73.18

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quicklink	CANON	inc VAT	ex VAT
29T4PW	I850	150.40	128.00
29T3PW	I950	263.20	224.00
205MPW	I70	210.32	179.00
EPSON			
21J3PW	C42UX	51.70	44.00
2310PW	C62	61.10	52.00
25V7PW	C82	81.07	69.00
25V6PW	Photo 915	112.80	96.00
25VJPW	Photo 925	130.42	111.00
1YR0PW	Photo 950	260.85	222.00
2113PW	Photo 2100	521.70	444.00
HP			
24YNPW	Photosmart P7550	229.00	194.90
22YKPW	Photosmart P7150	115.00	97.87
256NPW	Photosmart P230	135.12	115.00
24YJPW	Deskjet 6122	134.00	114.04
LEXMARK			
29S0PW	265P	139.82	119.00

Laser Printers

quicklink	BROTHER	inc VAT	ex VAT
2FF1PW	HL5040	175.07	149.00
EPSON			
21J4PW	EPL-6100	210.32	179.00
2892PW	EPL-6100L	158.62	135.00
KYOCERA			
20NNPW	FS-1010	222.07	189.00
2DF0PW	FS-1900D	499.37	425.00
OKI			
2CTHPW	B4200	210.32	179.00
2CTJPW	B4300	233.82	199.00
OMS			
22T0PW	Pagepro 1200W	158.62	135.00
22T1PW	Pagepro 1250e	198.57	169.00
SAMSUNG			
2F9FPW	ML1510	139.82	119.00
2F9CPW	ML1710	163.32	139.00

Scanners

quicklink	CANON	inc VAT	ex VAT
2483PW	Lide 20	45.82	39.00
24N2PW	Lide 30	52.87	45.00
2889PW	Lide 50	66.97	57.00
2CXHPW	3000F	69.32	59.00
24N3PW	5000F	170.37	145.00
24N4PW	8000F	186.82	159.00
2CXJPW	9900F	278.47	237.00
EPSON			
24LXPW	Perfection 1260	52.87	45.00
2445PW	Perfection 1660 Photo	88.12	75.00
2444PW	Perfection 2400 Photo	131.60	112.00
HP			
24YVPW	ScanJet 4570C	144.99	123.40
24YXPW	ScanJet 5500C	229.12	195.00
MICROTEK			
201WPW	ScanMaker 4800 Photo	92.82	79.00
17T4PW	FilmScan 3600	433.57	369.00
UMAX			
11HXPW	Astra 4450	118.67	101.00
28M0PW	Astra 6700	137.47	117.00

Multifunction Devices

quicklink	CANON	inc VAT	ex VAT
28BKPW	Smartbase MPC 200 Photo	116.32	99.00
1Y27PW	Smartbase MPC 600F	257.32	219.00
HP			
28D3PW	OfficeJet 5110	158.62	135.00
2C6MPW	OfficeJet 6110	269.00	228.94
2CCHPW	PSC 1205	92.82	79.00
1XZPW	PSC 2110	139.99	119.14
2HY2PW	PSC 2175	195.00	165.96
24YRPW	PSC 2210	219.00	186.39
LEXMARK			
24LJPW	X125	128.07	109.00



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2700dpi x 2700dpi
Slides, film
Manual load
USB

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quicklink: 21P1PW



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Compact, reliable and easy-to-use personal printer, ideal for creating high quality documents. HP's Instant-on fuser lets you print your first page in less than 10 secs!

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LaserJet 1300
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LaserJet 2300L
The printer that grows with your business needs, delivers superior laser performance and provides an advanced printing solution.

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EPSON

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Stylus C84 Photo Edition
The Stylus C84 Photo Edition is EPSON's high-end, four colour ink jet printer. As an advanced multipurpose printer, it is ideal for all types of applications from home projects and photo printing to business documents and presentations.

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Stylus C64
The Stylus C64 replaces the EPSON's Stylus C62 ink jet printer. It is ideal for all types of applications from school projects and web printing to occasional photos. Benefiting from New DURABrite pigment inks, the Stylus C64 can print on a variety of media with fantastic results.

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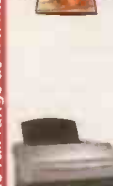
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Designed for creative home users
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New 802.11g technology provides
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five times faster than the current
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802.11g is the easiest wireless
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interoperable with existing 802.11b
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£79.00 exc

Linksys Wireless-G 54Mbps PCI Card

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Wireless-G connectivity at 54Mbps
lets you network at high-speed from
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Also interoperates with Wireless-B
(802.11b) networks at 11Mbps.

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- Adapter for PCI Bus
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- 32-bit PCI bus master operation
- Full duplex support
- Single shielded RJ-45 connector

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Wireless Access point

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www.dabs.com/netgear



- 802.11b 11 Meg standards-based networking
- Up to 32 wireless devices per Access Point
- Up to 3 Access Points per network

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£65.00 exc

Netgear ADSL Modem Router

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Netgear's DG814 DSL Modem Internet Gateway (4x10/100 ports) paves the way to shared DSL access with a modem and a switch. High-speed web access file sharing, video streaming, head-to-head Internet game playing and MP3 downloading.

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The complete digital photo and video solution, includes Adobe Photoshop Elements 2 and Pinnacle Studio 8LE, the best products in their respective markets and ideal for use with the tablet. Also includes pen palette filters and ACDSee Imaging software. Positioned as a SOLUTION/SOFTWARE orientated product the G3 studio will sell itself as a complete digital creative package, with huge savings on the included software of approximately £180 - and it is commercially proven software!

WACOM

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- 6 colour borderless printing
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- Prints 4"x6" photos in 60 seconds
- PrecisionSense™ Technology

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Brother HL-5030 with Free Toner

quicklinx 1Y0LHD

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**FREE
Toner**
WHILE STOCKS LAST

Quick and easy to install, the HL-5030 printer has state-of-the-art interactive animations to help you get the most from this machine. And that 'most' includes an impressive 4MB of memory, up to 16ppm print speed, 250 sheet paper capacity and software that automatically prints out your emails.

brother

£151.98 inc
£129.00 exc

GeForce Ti 5200 cards from £36.50 (£31.07)

AGP Video Cards

quicklink	CONNECT 3D	inc VAT	ex VAT
2DBXPW	Radeon 9000 DVI VO 64MB	46.50	39.58
2C9YPW	Radeon 9200 DVI VO 128MB	59.00	50.22
2LJMPW	Radeon 9600 DVI VO 128MB	94.50	80.43
2LJNPW	Radeon 9600 Pro DVI VO 128MB	134.00	114.05
2MY9PW	Radeon 9800 Pro DVI VO 256MB	370.00	314.90
CREATIVE			
27SRPW	GeForce MX 420 VO 64MB	68.00	57.88
2HXYPW	3D Blaster 5 FX5200 64MB AGP VO	54.00	45.96
2LRTPW	3D Blaster 5 FX5200 Ultra DVI VO	110.00	93.62
2N2VPW	3D Blaster 5 FX5600 128MB	110.00	93.62
2S2YPW	3D Blaster 5 FX5600 256MB	144.00	122.56
GAINWARD			
2MBSPW	ULTRA/760 TV-DVI 128MB	134.00	114.05
2MB6PW	ULTRA/760 TV-DVI 256MB	149.00	126.81
2MBGPW	ULTRA/760 XP "GS" 128MB	213.00	181.28
2MBJPW	ULTRA/780 XP "Pro" 256MB	223.00	189.79
2MFXPW	ULTRA/1200 XP "GS" 128MB	366.00	311.49
2MYFPW	ULTRA/1600 XP "GS" 256MB	465.00	395.75
2MCDPW	COOL FX ULTRA/1600 XP "GS" 256MB	599.00	509.79
LEADTEK			
2MBSPW	ULTRA/760 TV-DVI 128MB	134.00	114.05
2MB6PW	ULTRA/760 TV-DVI 256MB	149.00	126.81
2MBGPW	ULTRA/760 XP "GS" 128MB	213.00	181.28
2MBJPW	ULTRA/780 XP "Pro" 256MB	223.00	189.79
2MFXPW	ULTRA/1200 XP "GS" 128MB	366.00	311.49
2MYFPW	ULTRA/1600 XP "GS" 256MB	465.00	395.75
2MCDPW	COOL FX ULTRA/1600 XP "GS" 256MB	599.00	509.79
MSI			
2M5JPW	GeForce FX5200 VO 128MB	56.00	47.66
2M5KPW	GeForce FX5200 DVI VO 128MB	65.50	55.75
2M5NPW	GeForce FX5600 DVI VO 128MB	121.00	102.98
2M5PPW	GeForce FX5600 DVI VO 256MB	136.00	115.75
2M5QPW	GeForce FX5600 DVI VIVO 128MB	129.00	109.79
2MTDPW	GeForce FX5900 DVI VO 128MB	294.00	250.22

Sound Cards

quicklink	CREATIVE	inc VAT	ex VAT
13QVPW	SoundBlaster 5.1 Digital	25.50	21.70
18C2PW	SB Extigy	123.01	104.69
2LJTPW	SB MP3+ USB	33.50	28.51
HERCULES			
2217PW	Gamesurround Muse LT	12.50	10.64
2218PW	Gamesurround Muse 5.1 DVD	29.00	24.69
25DHWP	Gamesurround Fortissimo III 7.1	44.00	37.45
2FMLPW	DIGIFIRE 7.1	66.00	56.17
24LSPW	Game Theater XP 6.1	105.00	89.37
PHILIPS			
2FR2PW	Dynamic Edge 4.1 Channel Retail	26.50	22.56
2FR1PW	Sonic Edge 5.1 Channel Retail	35.50	30.22
12LQPW	Acoustic Edge 5.1 Channel Retail	59.50	50.64
PURE DIGITAL			
282YPW	SonicKiosion RP	40.50	34.47
283QPW	SonicKiosion DVD RP	61.00	51.92
TERRATEC			
24RTPW	128i PCI	15.00	12.77
28B9PW	Aureon 5.1 Fun	26.00	22.13
28BCPW	Aureon 5.1 Sky	80.00	68.09
28BDPW	Aureon 7.1 Space	107.00	91.07
24R2PW	DMX 6Fire 24/96	159.00	135.32

DVD Drives

quicklink	AOPEN	inc VAT	ex VAT
XX9PW	DVD-1648 Bonus IDE 16xDVD 48xCD	23.00	19.58
IOmega			
2MSSPW	32700 IDE DVD+R/RW	175.00	148.94
LITE-ON			
2533PW	LTD-165 OEM IDE 16xDVD 48xCD	24.15	20.56
24C7PW	LTD-165 Retail IDE 16xDVD 48xCD	25.00	21.28
2PFBPW	LDW-401S Retail IDE DVD+R/RW 4x	127.00	108.09
2H34PW	DM2000TE OEM IDE 16xDVD 50xCD	30.50	25.96
2FTQPW	DW7081TE IDE DVD+R/RW 4x	163.00	138.73
PANASONIC			
2FMKPW	LFD-521E IDE DVD-RAM/R/RW	175.00	148.94
PHILIPS			
2MPWPW	DVDRW416K/00 IDE DVD+R/RW 4x	171.00	145.54
PLEXTOR			
2FOYPW	PX-504A IDE DVD+R/RW	180.00	153.20
PIONEER			
2DH6PW	DVD-120 IDE 16xDVD 40xCD	28.00	23.83
2G9FPW	DVD-120S IDE 16xDVD 40xCD	30.50	25.96
2N65PW	DVR-106 IDE DVD+R/RW 4x	147.00	125.11
2N66PW	DVR-A06 IDE DVD+R/RW 4x	187.00	159.15
TDK			
2NPJPW	DVW-A040212N IDE DVD+R/RW	194.00	165.11
TOSHIBA			
2C5KPW	SD-M1612 Black IDE 16xDVD 48xCD	32.50	27.66
288CPW	SD-M1712B IDE 16xDVD 48xCD	32.00	27.24
2DH7PW	SD-M1712KIT IDE 16xDVD 48xCD	39.50	33.62
291HPW	SD-R5002B IDE DVD-R/RW	145.00	123.41
291JPW	SD-R5002K IDE DVD-R/RW	169.00	143.83

GeForce FX 5900 Ultra 256MB VIVO

quicklink 2N36PW
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- CineFX Engine
- 500MHz Core Clock
- 500MHz Memory Clock
- DDR II Memory Interface
- 8 pixels per clock rendering engine
- 200 million triangles/sec
- DX9 with Vertex Shader 2.0+ & Pixel Shader 2.0+
- FX Flow heat pipe technology



quicklink	PNY TECHNOLOGIES GeForce/4	inc VAT	ex VAT
2CNTPW	MX440-8x VO ACP 64MB	41.00	34.90
2HNSPW	FX5200 2XVGA VO PCI 128MB	80.50	68.51
	FX5200 2XVGA VO ACP 128MB	63.50	54.05
2LH7PW	FX5200 Ultra DVI VO ACP 128MB	105.00	89.37
2LH8PW	FX5600 DVI VO ACP 256MB	146.00	124.26

Hauppauge Media MVP

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Hauppauge!

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3D Blaster FX5200 64Mb

quicklink 2HXPWP

www.dabs.com/creative

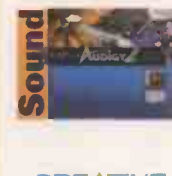


- 250MHz core
- AGP 8x
- Direct x9 support
- 64MB DDR

SB Audigy 2 ZS

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- 24-Bit
- 100db
- SNR audio quality
- SB1394 connectivity

DVD+R/RW Int IDE 4x

quicklink 2NB6PW

www.dabs.com



- Internal DVR A06 DVD/RW IDE
- Read 32x (CD) 12x (DVD)
- Write 32x (CD) 4x (DVD)
- ReWrite 16x (CD) 2x (DVD-RW) 2.4x (DVD+RW)

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£312.34 exc

Pinnacle Linx USB Plus

quicklink 2CTBPW

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PINNACLE SYSTEMS

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£39.00 exc

Dabsvalue Radeon 9600 DVI VO

quicklink 2HMXPW

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dabsvalue

• 128MB DDR AGP

quicklink	DABSVUE GeForce	inc VAT	ex VAT
2HZFPW	FX5200 DVI VO 64MB AGP	45.00	38.30
2GM9PW	FX5200 DVI VO 128MB AGP	50.00	42.56
2HZCPW	FX5200 Ultra DVI VO 128MB AGP	105.00	89.36
2HZXPW	FX5600 DVI VO 128MB AGP	100.00	85.11
2HZLPW	FX5600 DVI VO 256MB AGP	115.00	97.67
2HZLPW	FX5600 Ultra DVI VO 128MB AGP	139.00	118.29
DABSVUE Radeon			
2HMPVW	9200 DVI VO 128MB DDR AGP	58.00	49.37
2HMPVW	9600 Pro DVI VO 128MB DDR AGP	129.00	109.78
2HNPVW	9800 Pro DVI VO 128MB DDR AGP	289.00	245.96
2HNSPW	9800 Pro DVI VO 256MB DDR AGP	379.00	322.56

3D Blaster 5 FX 5900 256Mb

quicklink 2MTHPW

www.dabs.com/creative



- 256-bit graphics architecture
- AGP 8x support
- Memory configuration 256MB of DDR

SB Audigy 2 ZS Platinum

quicklink 2S2SPW

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DVD+R/RW 4x Int IDE

quicklink 2MSSPW

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2FV6PW	CDRW 52x52x24x USB 2.0	110.00	93.62
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2MSSPW	DVD+R/RW Int IDE Retail	175.00	148.93

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2BVS5PW	D2 52x52x24x USB 2.0 + Firewire	98.70	84.00
29WN9PW	PocketDrive 24x24x10x Firewire	110.45	94.00
2DN9PW	PocketDrive 24x24x10x USB 2.0	139.82	119.00

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2MRK5PW	500002 MiniCD 24x PCMCIA TwentyFour	85.00	72.34
2MR1PW	500003 MiniCD 24x USB TwentyFour	72.00	61.28
	ASUSTEK		
12QSPW	CD-5520 IDE Fifty Two	16.00	13.62
	LITEON		
2179PW	LTN-5265-02VVC IDE Fifty Two	14.00	11.92
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17NXPW	FX-5410 OEM IDE Fifty Four	15.00	12.77
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2M3PPW	CS2 IDE Fifty Two	13.50	11.49
2M3QPW	CS2-Black IDE Fifty Two	14.00	11.92
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2B8BPW	BHW-5224U Bonus USB 2.0 52r 52w 24rw	74.00	62.98
2J3B5PW	COM4012 IDE 16x DVD 40r 40w 12rw	52.50	44.69
	ARCHOS		
2MRCPW	500250/315 MiniCDRW USB 24r 16w 10rw	85.00	72.34
2MRCPW	500367 CESAR USB2 24r 24w 10rw	136.00	115.75
	ASUS		
2B8JPW	CRW-5224A IDE 52r 52w 24rw	31.00	26.39
2J6NPW	CRW-5224U/External USB2 52r 52w 24rw	70.50	60.00
	BENQ		
2CPPPW	4816ARET IDE 48r 48w 16rw	34.50	29.37
2CPNPW	5224PRET IDE 52r 52w 24rw	38.50	32.77
	LITEON		
2T79PW	LTR-522465 Retail IDE 52r 52w 24rw	31.00	26.39
2FTLPW	LXR-40243A 06VC USB 2.0 40r 40w 24rw	74.00	62.98
	LG		
2FV8PW	GCE-8520BB OEM IDE 52r 52w 24rw	37.00	31.49
2CZQPW	GCE-8520B Retail IDE 52r 52w 24rw	40.50	34.47
2FYCPW	GCC-4480BB OEM IDE 16x DVD 48r 48w 24rw	52.00	44.26
2CZRPW	GCC-4480BB Retail IDE 16x DVD 48r 48w 24rw	56.50	48.09
	MSI		
2M3K5PW	CR52-A2 IDE 52r 52w 24rw	30.00	25.54
2M3LPW	CR52-A2-Black IDE 52r 52w 24rw	33.00	28.09
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2CCTPW	JR52RMDVX USB 2 12x DVD 40r 32w 10rw	158.00	134.47
	SAMSUNG		
2DLQPW	SW-248EA Black OEM IDE 48r 48w 16rw	34.50	29.37
2J1K5PW	SW-252BEA Black OEM IDE 52r 52w 24rw	35.50	30.22
2FHOPW	SW-252BEA OEM IDE 52r 52w 24rw	35.00	29.79
2CZCPW	SW-252BEA RP IDE 52r 52w 24rw	37.50	31.92
2HTMPW	SW-352 Retail IDE 16x DVD 52r 52w 24rw	58.00	49.37
2M92PW	SM-352 OEM IDE 16x DVD 52r 52w 24rw	56.50	48.09
2M28PW	SM-352 OEM Black IDE 16x DVD 52r 52w 24rw	56.50	48.09
	TEAC		
2DHDPW	CD-W552E-002 OEM IDE 52r 52w 24rw	43.00	36.60
2DHCPW	CD-W552EK Retail IDE 52r 52w 24rw	44.00	37.45
2DHPW	CD-W552PUK USB2 52r 52w 24rw	103.00	87.66
2DHJPW	CD-W224PUK USB2 24r 24w 10rw	113.00	96.17
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2C24PW	SD-R1312K Retail IDE 16x DVD 40r 32w 12rw	63.00	53.62
	PLEXTOR Plexerwriter		
252W5PW	PX-W4824TA/BP-X IDE 48r 48w 24rw	56.50	48.09
252X5PW	PX-W4824TA IDE 48r 48w 24rw	61.50	52.34
2CHSPW	PX-W4012TS SCSI 40r 40w 12rw	193.00	164.26
2LSP5PW	Premium/T3B IDE 52r 52w 32rw	88.00	74.90
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1Y1ZPW	PX-320A IDE 12x DVD 40r 20w 10rw	92.00	78.30
13R8PW	PX-588TU Retail USB 2.0 24r 8w 8rw	96.00	81.71
28M2PW	PX-W4824TU Retail USB 2.0 48r 48w 24rw	118.00	100.43
	SONY		
2FC2PW	CD-RW 52x24x52 OEM Int	34.07	29.00
2N2QPW	CD-RW 52x24x52 Int	38.77	33.00
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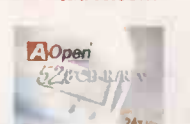
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2CBNPW	Celeron 2.2GHz 5478 400MHz	66.00	56.17
2FHWPW	Celeron 2.3GHz 5478 400MHz	66.50	56.60
2HNHPW	Celeron 2.4GHz 5478 400MHz	74.50	63.41
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2PHDPW	7K250 120 UDMA100 2Mb 7200	91.50	77.88
2PHFPW	7K250 120 UDMA100 8Mb 7200	99.50	84.69
2PHMPW	7K250 160 UDMA100 8Mb 7200	127.00	108.09
2PHNPW	7K250 160 UDMA100 8Mb 7200	133.00	113.20
2PHQPW	7K250 250 UDMA100 8Mb 7200	261.00	222.43
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10M1PW	Caviar 20 UDMA100 2Mb 7200	43.50	37.03
10M3PW	Caviar 40 UDMA100 2Mb 7200	54.50	46.39
2352PW	Caviar 40 UDMA100 8Mb 7200	56.00	47.66
10M4PW	Caviar 60 UDMA100 2Mb 7200	59.50	50.64
25T0PW	Caviar 60 UDMA100 8Mb 7200	66.50	56.60
10M5PW	Caviar 80 UDMA100 2Mb 7200	64.00	54.47
21K1PW	Caviar 80 UDMA100 8Mb 7200	76.00	64.69
12N1PW	Caviar 120 UDMA100 2Mb 7200	85.00	72.34
18HFPW	Caviar 120 UDMA100 8Mb 7200	90.50	77.03
2N5BPW	Caviar 120 SATA150 8Mb 7200	108.00	91.92
12NMPW	Caviar 160 UDMA100 2Mb 7200	115.00	97.88
21J2PW	Caviar 160 UDMA100 8Mb 7200	129.00	109.79
25T1PW	Caviar 180 UDMA100 2Mb 7200	139.00	118.30
25T2PW	Caviar 180 UDMA100 8Mb 7200	133.00	113.20
25T3PW	Caviar 200 UDMA100 2Mb 7200	157.00	133.62
25T5PW	Caviar 200 UDMA100 8Mb 7200	170.00	144.69
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21FNPW	120 USB 2	175.00	148.94
21FPPW	120 FireWire	175.00	148.94
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29WKPW	D2 USB2 40GB	98.70	84.00
25SKPW	D2 USB2 80GB	128.07	109.00
25SLPW	D2 USB2 120GB	151.57	129.00
2G6LPW	D2 USB2 200GB	222.07	189.00
25SQPW	D2 FireWire 120GB	163.32	139.00
2G6PPW	D2 FireWire 160GB	180.95	154.00
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2OC0PW	128Mb Smartmedia	19.50	16.60
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2PL5PW	256Mb XD Picture Card	80.00	68.09
2BHPWP	64Mb Memory Stick	21.00	17.88
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2PL6PW	256Mb Memory Stick Pro	60.00	51.07
2PL7PW	512Mb Memory Stick Pro	160.00	136.17
2PL3PW	1Gb Memory Stick Pro	320.00	272.34
153SPW	64Mb SD	18.00	15.32
153TPW	128Mb SD	30.00	25.54
28HNPW	256Mb SD	50.00	42.56
2PL9PW	512Mb SD	220.00	187.24
2P8XPW	6 in 1 Card Reader	11.50	9.79
2NC0PW	32Mb Mini USB Drive	10.50	8.94
2NC0PW	64Mb Mini USB Drive	14.00	11.92
2NCLPW	128Mb Mini USB Drive	22.00	18.73
2NCPWP	256Mb USB Drive	40.00	34.05
2NCPWP	512Mb USB Drive	79.00	67.24
2NCPWP	1GB USB Drive	159.00	135.32
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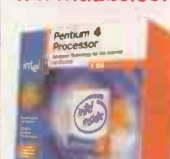
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21X3PW	2200+ 1.8GHz 256Kb 266MHz	51.00	43.41
24T9PW	2400+ 2GHz 256Kb 266MHz	59.50	50.64
2BP9PW	2600+ 2.08GHz 256Kb 333MHz	73.00	62.13
28Z6PW	2700+ 2.17GHz 256Kb 333MHz	98.50	83.83
2CY6PW	2500+ 1.83GHz 512Kb 333MHz	67.50	57.45
2CYKPW	2800+ 2.08GHz 512Kb 333MHz	120.00	102.13
2CYLPW	3000+ 2.17GHz 512Kb 333MHz	186.00	158.30
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24SWPW	Pentium 4 2.80 533MHz	225.00	191.49
28LXPW	Pentium 4 3.06 533MHz	330.00	280.86
2HNKPW	Pentium 4 2.4 800MHz	153.00	130.22
2HNLPW	Pentium 4 2.6 800MHz	166.00	158.30
2HNMPW	Pentium 4 2.8 800MHz	230.00	195.75
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SHHPW	128MB 168Pin	DIMM PC133	SDRAM Non-Parity	CL2
17BLPW	512MB 184Pin	DIMM PC2100	DDR RAM Non-Parity	CL2.5
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259ZPW	Plus9 120.0 UDMA133 8Mb	73.62	86.50
2580PW	Plus9 120.0 SATA150 8Mb	83.83	98.50
2582PW	Plus9 160.0 UDMA133 8Mb	97.88	115.00
2583PW	Plus9 160.0 SATA150 8Mb	106.39	125.00
29XPWP	Plus9 200.0 UDMA133 8Mb	140.43	165.00
296WPW	MaxLine Plus II 250.0 UDMA133 8Mb	191.49	225.00
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2FZNPW	7200 40 UDMA100 2Mb 7200	42.56	50.00
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2FZ0PW	7200 80 UDMA100 2Mb 7200	52.34	61.50
2FZRPW	7200 80 SATA150 8Mb 7200	76.17	89.50
2FZSPW	7200 120 UDMA100 2Mb 7200	67.66	79.50
2FZVPW	7200 120 UDMA100 8Mb 7200	71.49	84.00
2FZWPW	7200 120 SATA150 8Mb 7200	85.11	100.00
2FZYPW	7200 160 UDMA100 2Mb 7200	93.62	110.00
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21X1PW	FHD-1 18016 USB 2 120GB	171.00	145.54
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2PLFPW	FHD-1 18018 USB 2/FireWire 80GB	152.00	129.37
2PLGPW	FHD-1 20160 USB 2/FireWire 120GB	183.00	155.75
2LK5PW	FHD-2 20155 USB2 20GB	110.00	93.62
2LK9PW	FHD-2 20156 USB2 40GB	158.00	134.47
2LK7PW	FHD-2 20690 USB2 60GB	220.00	187.24
2N01PW	FHD-2 20686 USB2/FireWire 20GB	130.00	110.64
2N02PW	FHD-2 20688 USB2/FireWire 40GB	171.00	145.54
2N03PW	FHD-2 20403 USB2/FireWire 60GB	233.00	198.30



Lacie PocketDrive 20GB USB 2 & FireWire

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2163PW	PocketDrive 20GB, USB2 cable	104.57	89.00
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2H5VPW	875P Neo-FSR2 Intel 875P ATX	143.00	121.71
2H3VPW	865PE Neo2-FIS2R Intel 865PE ATX	118.00	100.43
2H40PW	865PE Neo2-LS Intel 865PE ATX	84.50	71.92
2H41PW	865PE Neo-L Intel 865PE ATX	76.50	65.11
2H42PW	865G Neo2-LS Intel 865G ATX	89.50	76.17
2BDCPW	845PE MAX-L Intel 845PE ATX	58.00	49.37
221XPW	845E Max Intel 845E ATX	51.00	43.41
2BDDPW	845CE Max-L Intel 845CE ATX	73.00	62.13
2NTLPW	648 Neo-L S5 648 ATX	58.00	49.37
2861PW	648 Max S5 648 ATX	53.50	45.54
2BTDPW	645 Combo-L S5 645 ATX	42.50	36.17
2H46PW	651M Combo-L S5 651 MATX	48.50	41.28
2NTMPW	K7 Delta-FIS2R VIA KT600 ATX	99.00	84.26
2NTPPW	K7 Delta-L VIA KT600 ATX	73.00	62.13

quicklinx	MSI	inc VAT	ex VAT
2222PW	MS-6378 VIA KLE133 MATX	37.00	31.49
2223PW	MS-6378-L VIA KLE133 MATX	40.50	34.47
2H2RPPW	KM2M Combo-L VIA KM266 MATX	45.50	38.73
2BDCPW	K4 Ultra-FISR VIA KT400 ATX	88.00	74.90
2B69PW	K4 Ultra-SR VIA KT400 ATX	72.50	61.71
2BTHPW	K4V-L VIA KT400 ATX	52.50	44.69
2MYKPPW	K3V-L VIA KT333 ATX	47.50	40.43
2BTKPW	K2 Combo-L VIA KT266A ATX	39.00	33.2
2BDJPW	K7N2G-ILSR nForce 2 ATX	101.00	85.96
2BDKPPW	K7N2G-L nForce 2 ATX	81.00	68.94
2H2VPPW	K7N2 Delta-ILSR nForce 2 ATX	88.00	74.9
2M3GPW	K7N2 Delta-L nForce 2 ATX	65.50	55.75
2FHPPW	746F Ultra-L S5 746 ATX	53.50	45.54

£66.50 inc
£56.59 exc

- CPU: AMD Athlon XP/Athlon/Duron CPU, 333MHz
- Chipset: nVidia nForce2 IGP (Crush 18G), nVidia MCP-T
- Main Memory: DDR DIMM x3
- Graphics: 8X AGP slot
- Form Factor: AT

Motherboards

quicklinx	ABIT	inc VAT	ex VAT
2G91PW	IC7-G Intel 875P Socket 478 ATX	158.00	134.47
2L08PW	IC7 Intel 875P Socket 478 ATX	105.00	89.37
2HV2PW	IS7-G Intel 865PE Socket 478 ATX	126.00	107.24
2HV3PW	IS7 Intel 865PE Socket 478 ATX	95.50	81.28
2HV4PW	IS7-E Intel 865P Socket 478 ATX	80.50	68.51
24NTPW	KD7-RAID VIA KT400 Socket A ATX	59.00	50.22
2BRNPW	KD7-S VIA KT400 Socket A ATX	65.50	55.75
2BRQPW	KD7-C VIA KT400 Socket A ATX	70.00	59.58
24NVWP	AT7 MAX2 VIA KT400 Socket A ATX	79.50	67.66
2B9JWP	NF7 nForce 2 180 Socket A ATX	70.00	59.58
293RWP	NF7-S nForce 2 180 Socket A ATX	92.00	78.3
2G92PW	NF7-SL nForce 2 180 Socket A ATX	93.50	79.58
2BRSPW	NF7-M nForce 2 180 Socket A ATX	80.02	69.79

quicklinx	ASRock	inc VAT	ex VAT
2J31PW	AX45C-N Intel 865G Socket 478 ATX	84.50	71.92
2J32PW	AX45C Max Intel 865G Socket 478 ATX	131.00	111.49
2J33PW	MX45C-N Intel 865G Socket 478 MATX	79.00	67.66
2HRTPW	MK77M-II VIA KM266 Socket A MATX	50.50	42.98
280YWP	AK77-BXN VIA KT400 Socket A ATX	62.00	52.77
2810PW	AK77-BX MAX VIA KT400 Socket A ATX	68.50	58.3
2J37PW	AK77-BX VIA KT400 Socket A ATX	57.00	48.51
2J36PW	AK77-400 MAX VIA KT400A Socket A ATX	87.50	74.47
2J38PW	AK79D-400VN nForce 2 Socket A ATX	74.00	62.98
2FSLPW	AK79C MAX nForce 2 Socket A ATX	100.00	85.11
2FSLPW	AK79D MAX nForce 2 Socket A ATX	94.50	80.43
2CR0PW	AK79C-1334 nForce 2 Socket A ATX	73.00	62.13
2CR3PW	MK79C-1334 nForce 2 Socket A MATX	81.00	68.94
2CR4PW	MK79C-N nForce 2 Socket A MATX	74.50	63.41

quicklinx	ASRock	inc VAT	ex VAT
2D10PW	K7V12 VIA KT266 Socket A ATX	29.00	24.69
2D15PW	K7VM2 VIA KM266 Socket A MATX	41.00	34.9

quicklinx	ASUS	inc VAT	ex VAT
2M8KPPW	P4C800 Intel 875P Socket 478 ATX	125.00	106.39
2J4VPW	P4C800/Deluxe Intel 875P Socket 478 ATX	146.00	124.26
2P28PW	P4P800 Intel 865P Socket 478 ATX	75.00	63.85
2M8LPW	P4P800 Intel 865PE Socket 478 ATX	95.50	81.28
2M8MPPW	P4P800/Deluxe Intel 865PE Socket 478 ATX	108.00	91.92
2M8NPPW	P4P800-VM Intel 865G Socket 478 MATX	79.50	67.66
2B8LPW	A7N8X/Deluxe/CD nForce 2 Socket A ATX	89.00	75.05
2B8VPW	A7N8X/LAN nForce 2 Socket A ATX	87.00	73.07
2P31PW	A7N8X-X nForce 2 Socket A ATX	62.00	52.77
2P33PW	A7N8X-VM nForce 2 Socket A ATX	76.00	64.69
2J5FPW	A7V8X-X/LAN VIA KT400 Socket A ATX	49.00	41.71
2P34PW	A7V800 VIA KT600 Socket A ATX	68.00	57.98
2P38PW	A7V8X-MX VIA KM400 Socket A ATX	51.00	43.41

quicklinx	GIGABYTE	inc VAT	ex VAT
2LLWPPW	GA-8KNXP ULTRA Intel 875P S478 ATX	267.00	227.24
2LLXPW	GA-8KNXP Intel 875P S478 ATX	159.00	135.32
2LLVPW	GA-BK1100 Intel 875P S478 ATX	106.00	90.22
2LLZPW	GA-8PENXP Intel 865PE S478 ATX	141.00	120
2LMOPW	GA-8IPE1000 PRO Intel 865PE S478 ATX	88.00	74.9
2LM1PW	GA-8IPE1000 Intel 865PE S478 ATX	74.00	62.98
2M2KPPW	GA-8IPE1000L Intel 865PE S478 ATX	75.50	64.26
2LM5PW	GA-8IPE1000MK Intel 865PE S478 MATX	74.00	62.98
2LM6PW	GA-8I1000 PRO Intel 865G S478 ATX	93.00	79.15
2LM9PW	GA-8I1000 Intel 865G S478 ATX	75.50	64.26
2LMPPW	GA-8I1000MK Intel 865G S478 MATX	77.00	65.54
2LMQPW	GA-8I900 Intel 865P S478 ATX	73.00	62.13
2LMRPW	GA-8I900MK Intel 865P S478 MATX	73.00	62.13

quicklinx	FUJITSU-SIEMENS	inc VAT	ex VAT
2PFJWP	D1625 Intel 865PE S478 ATX	89.00	75.75
2PFKWP	D1627 Intel 865PE S478 ATX	100.00	85.11
2HR5PW	BOXD875PBZLK Intel 875P S478 ATX	134.00	114.05
2MBTWP	BOXD865PERL Intel 865PE S478 ATX	91.50	77.88
2L66PW	LEADTEK K7NCR1BD		
2PF6PW	Pro II Deluxe nVidia nForce2Socket A ATX	106.00	90.22

Networking

quicklinx	DABSVUE	inc VAT	ex VAT
14XHPW	5 Port 10/100Mbps	17.63	15.00
14XJPW	8 Port 10/100Mbps	20.56	17.50
1Y30PW	16 Port 10/100Mbps	58.75	50.00
1Y31PW	10/100 R45 PCI	5.58	4.75
28V1PW	10/100 CardBus	15.28	13.00
28V3PW	10/100 USB	14.63	15.00
29XPWP	802.11b+ 22Mbps Cardbus	24.68	21.00
178VPW	802.11b 11Mbps Cardbus	22.33	19.00
178ZPW	802.11b 11Mbps USB	29.38	25.00
1790PW	802.11b 11Mbps PCI	52.88	45.00

Modems/ADSL

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14XBPW	56k PCI Hardware Voice Intel	10.58	9.00
25BWPW	56k External USB	9.50	8.09
14XFPW	56k External Serial	17.50	14.90
86LPW	56k PCMCIA	23.50	20.00
28NJPW	ADSL USB + Filter + PSU	29.38	25.00
17P7PW	ADSL Coaxial Router 1Port	29.38	25.00
17P8PW	ADSL Coaxial Router 4Port	59.35	50.51
2LP2PW	Wireless ADSL Router + Filter	117.49	99.99

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quicklinx 13LYPW

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quicklinx	IOMEGA	inc VAT	ex VAT
1008PW	Peerless USB 20GB Bundle	245.57	209.00
10PCPW	Ultimate Slim Zip 100MB H/Powered	57.58	49.00

Gigabyte nForce 2 7N400EL

quicklinx 2QP6PW

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quicklinx	ABIT	inc VAT	ex VAT
2B5SPW	GA-7DXE AMD 761/VIA SoA	43.00	36.60
2LNKPW	GA-7NNXP nForce2 SoA	154.00	131.07
2LNKPW	GA-7V400V Pro nForce2 SoA	105.00	89.37
2M2QPW	GA-7N400V nForce2 SoA	80.00	68.09
2LNLPW	GA-7NNXP nForce2 SoA	137.00	116.60
2LNPWP	GA-7N400 Pro nForce2 SoA	87.00	74.05
2LNPWP	GA-7VAXP-A Ultra VIA KT400A SoA	94.00	80.00
2LNPWP	GA-7VAXP-A VIA KT400A SoA	83.50	71.07
2LNQWP	GA-7VAX-A VIA KT400A SoA	64.00	54.47
2B5TPW	GA-7VAXP-Ultra VIA KT400 SoA	88.50	75.32
250SPW	GA-7VAXP VIA KT400 SoA	82.00	69.79

SoA VIA KT400A ATX A L

quicklinx 2J36PW

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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

S478 Intel 875P ATX A L R

quicklinx 2HV6PW

www.dabs.com/aopen

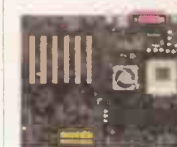


- Chipsets: Intel 875P
- Max Bus Speed: 800MHz
- Supports DDR SDRAM
- Storage Controller: IDE (DMA/ATA-133 (Ultra)) -Fast Intergrated

S478 Intel 865PE ATX A L

quicklinx 2J34PW

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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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20CLPW	Intuit QuickBooks 2003 Pro	235.82	199.00
20WVW	Intuit QuickBooks XG	57.57	49.00
20WVW	Intuit QuickBooks XG Startup	19.97	17.00
2N22PW	Microsoft Money 2004 Standard	29.37	25.00
2N23PW	Microsoft Money 2004 Premium	52.87	45.00
2R43PW	Sage Instant Accounts 10.0	116.32	99.00
2R43PW	Sage Instant Payroll 10.0	81.07	69.00
quicklink	ANTIVIRUS/SECURITY	inc VAT	ex VAT
2H9BPW	McAfee TVD Suite 5-user Pack	211.28	179.82
2H9BPW	McAfee TVD Suite 10-user Pack	422.60	359.66
250JWP	McAfee VirusScan 7.0 Home	29.37	25.00
250KWP	McAfee VirusScan Professional 7.0	41.12	35.00
24V1PW	Symantec Norton Antivirus SB 5-user	175.07	149.00
247TPW	Symantec Norton Internet Security 2003	45.82	39.00
quicklink	BACKUP	inc VAT	ex VAT
13P6PW	Dantz Retrospect Express 5.6	41.12	35.00
28C7PW	Elby Clone CD+CDR's	19.97	17.00
2N2JWP	Symantec GoBack	29.37	25.00
248BPW	Symantec Norton Ghost 2003	38.77	33.00
2M2MPW	PowerQuest Drive Image 7.0	41.12	35.00
quicklink	CAD	inc VAT	ex VAT
2002PW	AutoCAD LT2004	804.87	685.00
12QTPW	Autodesk Volo View	151.57	129.00
15B6PW	Autodesk AutoSketch 8.0	146.87	125.00
2G1QPW	IMS TurboCAD 9.0 Standard	64.62	55.00
quicklink	COMMUNICATIONS	inc VAT	ex VAT
14LFPW	Laplink Gold 11.0	111.62	95.00
15W6PW	Laplink PC Sync	52.87	45.00
2LWDPW	Symantec PC Anywhere H+R v11	135.12	115.00
UG9PW	Symantec WinFax Pro 10.0	52.87	45.00
quicklink	CONTACT MANAGEMENT	inc VAT	ex VAT
2R23PW	Microsoft Outlook 2003	92.82	79.00
244TPW	Act! 6.0	118.67	101.00
244VPW	Act! 6.0 S User	574.57	489.00
quicklink	DATABASES	inc VAT	ex VAT
225TPW	Filemaker Pro 6.0	245.57	209.00
2RYFPW	Microsoft Access 2003	186.82	159.00
2H01PW	MS Visual FoxPro Pro 8.0	515.82	439.00
quicklink	DIAGRAMMING	inc VAT	ex VAT
WMPPW	Visio Standard 2002	163.32	139.00
WMRPW	Visio Professional 2002	370.12	315.00
quicklink	DTP	inc VAT	ex VAT
212HPW	Adobe FrameMaker 7.0	746.12	635.00
13N1PW	Adobe InDesign 2.0	705.82	599.00
X2QPW	Adobe Pagemaker 7.0	475.87	405.00
2LS2PW	Adobe Publishing Collection 13.0	985.82	839.00
2L14PW	Adobe Design Collection 7.0	1086.87	925.00
Q2R2PW	Microsoft Publisher 2003	135.12	115.00
2N13PW	Quark Xpress 6.0	1126.83	959.00
quicklink	GRAPHICS	inc VAT	ex VAT
2GBJPW	Adobe Acrobat 6.0 Standard	252.62	215.00
2GBKWP	Adobe Acrobat 6.0 Professional	386.57	329.00
113NWP	Adobe Illustrator 10.0	381.87	325.00
17V8PW	Adobe Photoshop 7.0	586.32	499.00
236BPW	Adobe Photoshop Elements 2.0	81.07	69.00
2PG7PW	Adobe Premiere Pro 7.0	546.37	465.00
01JPW	Adobe Type Manager Deluxe 4.1	64.62	55.00
12N2PW	Corel Draw 11.0 Graphics Suite	363.07	309.00
2F3QPW	JASC Paint Pro v8	88.12	75.00
2B2KWP	Macromedia Freehand MX	339.57	289.00
WVFPW	Microsoft Powerpoint 2002	186.82	159.00
24PCPW	Ulead Photo Impact 8.0	64.62	55.00
quicklink	INTEGRATED PACKAGES/OFFICE	inc VAT	ex VAT
2N12PW	Ability Office	41.12	35.00
2G9LPW	Corel WordPerfect office 11.0	210.32	179.00
20PFPW	Corel WordPerfect Family Edition	69.32	59.00
2RYTPW	Office 2003 Standard	339.57	289.00
2RYVPW	Office 2003 Standard Upgrade	193.87	165.00
2596PW	Office 2003 Small Business	351.32	299.00
2595PW	Office 2003 Professional	405.37	345.00
22V5PW	Microsoft Works 7.0	57.57	49.00
20CQPW	Microsoft Works Suite 2004 inc. Word	92.82	79.00
quicklink	OCR	inc VAT	ex VAT
Q852PW	Abby Fine Reader Pro 7.0	76.37	65.00
23V8PW	ScanSoft OmniPage Pro 12.0	327.82	279.00
21V1PW	ScanSoft TextBridge Pro 11.0	45.82	39.00
quicklink	OPERATING SYSTEMS	inc VAT	ex VAT
2FT0PW	MS Windows 2003 server Std 5 Clients	797.83	679.00
1JLQPW	MS Windows 2000 server	856.57	729.00
1JLRPW	MS Windows 2000 Professional	269.07	229.00
2GB8PW	Red Hat Linux 9.0 Personal	26.23	22.33
2GB9PW	Red Hat Linux 9.0 Professional	97.48	82.97
2FCQPW	SuSE Linux 8.2 Personal	29.37	25.00
1FCHPW	SuSE Linux 8.2 Professional	45.82	39.00
quicklink	PROGRAMMING	inc VAT	ex VAT
2PJPW	MSDN Universal Subscription	2214.87	1885.00
2PGCPW	MSDN Professional Subscription	945.87	805.00
2FT4PW	MS Visual Basic .NET 2003 Standard	88.12	75.00
2FT6PW	MS Visual C++ .NET 2003 Standard	88.12	75.00
2FT6PW	MS Visual C# .NET 2003 Standard	88.12	75.00
2NPTPW	MS Visual Studio .NET Pro 2003	1863.62	1585.00

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ZL6PW	Windows XP Professional	252.62	215.00
ZL7PW	Windows XP Professional Upgrade	170.37	145.00

Microsoft

Norton Internet Security™ 2004

quicklink 2PSYPW

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quicklink	SYMANTEC	inc VAT	ex VAT
2PS2PW	Norton Internet Security 2004 Upgrade	29.37	25.00

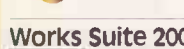
AntiVirus 2004

quicklink 2PQRPW

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Microsoft

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2GBKWP	Acrobat 6.0 Professional	386.57	329.00

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IBM

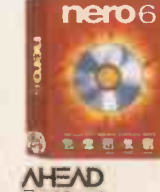
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2PWGPW	Fireworks MX 2004	292.57	249.00
2PWCWP	Flash MX 2004	492.33	419.00
2PWDPW	Flash MX 2004 Professional	680.33	579.00
2PWFPPW	Studio MX 2004	821.33	699.00
2PW9PW	Studio MX 2004+Flash MX Professional	938.83	799.00

quicklink 2P8WDM

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£69.00 exc

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quicklink	REFERENCE	inc VAT	ex VAT
2NX9PW	MS Encarta 2004 Standard NEW	29.37	25.00
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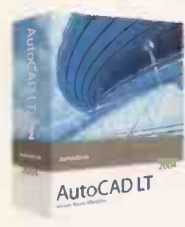
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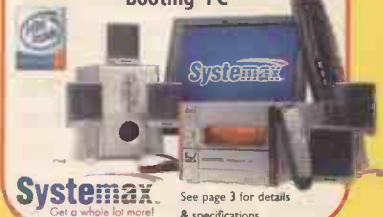
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- AMD Athlon™ XP 2600+ Processor with Quantispeed™
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- 52x24x52 CDRW & 16x DVD Combo Drive
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- On-Board 6 Channel Digital Sound
- On-Board 10/100 Fast Ethernet
- Systemax Internet Keyboard & Optical Wheel Mouse
- Plus All Additional Features.



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- 15" CTX LCD Monitor
- On-Board NVIDIA® GeForce 4 MX440 + 8x AGP Slot VGA
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- 52x24x52 CD-RW Drive
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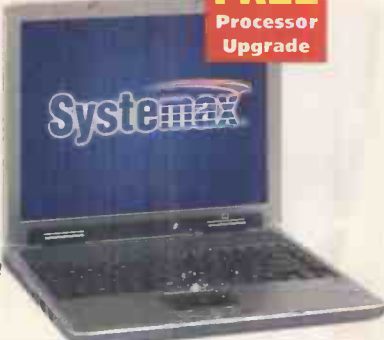
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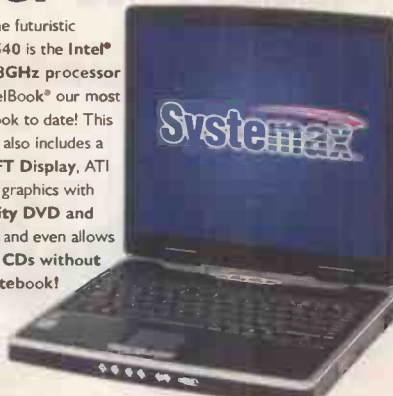
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JL900226	Microsoft® Office XP Small Business	90.00		105.75	
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JL900096	Creative Inspire 4400 Speakers	25.00		29.38	
JL900266	Videologic ZXR-550 5.1 Speaker System	40.00		47.00	
JL900267	Videologic ZXR-750 7.1 Speaker System	65.00		76.38	
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JL900260	X1150 All-in One (Print/Scan/Copy)	60.00		70.50	

TravelBook® Features

- CyberLink Media Carnival (See Page 4 For Details)
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- Award Winning Ability Office 2003
- ATI Mobility Radeon 9000 M9 64MB DDR Graphics
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- 1x PCMCIA Type II, InfraRed & S-Video Out Port
- 4x USB2 Ports & Firewire™
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- 2 Year Hardware Collect & Return Warranty.

TourBook® Features

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- 1x PCMCIA Type II, InfraRed Port & TV-Video Out Port
- 2x USB2 Ports
- Internal 10/100 Ethernet
- Email & Internet Hot Keys
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Palm	Palm Tungsten E	Ex Vat	Inc Vat
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1. Requires installation of included email software, a separately purchased compatible mobile phone and Internet service (for email only). Additional charges from your mobile and/or Internet service provider may apply. 2. Windows compatibility only.

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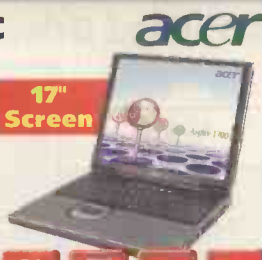
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TOSHIBA	JL73414	SatPro A10 C2.2GHz 256MB	534.47
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		Mod/LAN XP Home	
JL73175		Sat Pro A10 C2.2GHz 256MB	634.89
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JL73233		nx9010 P4DT 2.8GHz	942.13
		40GB 512MB 15" XGA Modem	1107.00
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ACER	JL73312	1352XC A-2200+ 256MB	588.94
		30GB CD-RW/DVD 14" TFT	692.00
		Modem LAN WXP Home	
JL73164		252X P4-P 2.6GHz 256MB	698.72
		40GB 512MB CD 14.1"	821.00
		Modem WLAN XP Pro	
JL70495		TM 803LCi PM 1.6GHz 40GB	1320.00
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JL64686 Athlon™ XP 2400+	56.99	66.96
JL48181 Athlon™ XP 2500+ 333MHz	62.99	74.01

JL64687 Athlon™ XP 2600+ 333MHz	68.99	81.06
JL48024 Athlon™ XP 2700+ 333MHz	93.99	110.44
JL48184 Athlon™ XP 2800+ 333MHz	120.00	141.00
JL48185 Athlon™ XP 3000+ 333MHz	173.00	203.28
JL49246 Athlon™ XP 3200+ 333MHz	303.00	356.03

AMD MP Retail Box	Ex Vat	Inc Vat
JL64714 Athlon™ MP 2200+	84.99	99.86
JL48229 Athlon™ MP 2400+	94.99	111.61
JL48230 Athlon™ MP 2600+	119.00	139.83
JL49582 Athlon™ MP 2800+	159.00	186.83

AMD Opteron Retail Box	Ex Vat	Inc Vat
JL49537 Opteron 240	184.00	216.20
JL49538 Opteron 242	479.00	562.83
JL49539 Opteron 244	454.00	533.45
JL49570 Opteron 246	526.00	618.05

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JL49220 2.4GHz 128K 400MHz	55.99	65.79
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JL64672 2.6GHz 512K 533MHz	129.00	151.58
JL49224 2.6GHz 512K 800MHz	143.00	168.03
JL64673 2.8GHz 512K 533MHz	172.00	202.10
JL49225 2.8GHz 512K 800MHz	181.00	212.68
JL64980 3.06GHz 512K 533MHz	259.00	304.33
JL49226 3.0GHz 512K 800MHz	266.00	312.55
JL49227 3.2GHz 512K 800MHz	404.00	474.70

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3.5" Hard Drives

	Code	Manufacturer	Capacity	Access Time	RPM	Cache	Interface	Ex.VAT	Inc.VAT
ExcelStor Technology	JL49367	ExcelStor	40GB	8.5ms	7200	2MB	UDMA100	33.99	39.94
	JL49368	ExcelStor	60GB	8.5ms	7200	2MB	UDMA100	37.99	44.64
	JL49584	ExcelStor	80GB	8.5ms	7200	2MB	UDMA100	44.99	52.86
HITACHI Inspire the Next	JL49502	Hitachi 7K250	40GB	8.8ms	7200	2MB	UDMA100	36.99	43.46
	JL49503	Hitachi 7K250	80GB	8.5ms	7200	2MB	UDMA100	43.99	51.69
	JL49504	Hitachi 7K250	120GB	8.5ms	7200	2MB	UDMA100	60.99	71.66
	JL49505	Hitachi 7K250	120GB	8.5ms	7200	8MB	UDMA100	77.99	91.64
	JL49506	Hitachi 7K250	160GB	8.5ms	7200	2MB	UDMA100	81.00	95.18
	JL49507	Hitachi 7K250	160GB	8.5ms	7200	8MB	UDMA100	86.99	102.21
	JL49508	Hitachi 7K250	250GB	8.5ms	7200	8MB	UDMA100	184.00	216.20
	JL64678	Maxtor Fireball 3	40GB	<12ms	5400	2MB	UDMA133	36.99	43.46
	JL64713	Maxtor DiamondMax Plus 8	40GB	<10ms	7200	2MB	UDMA133	38.99	45.81
	JL64987	Maxtor DiamondMax Plus 9	80GB	<9.4ms	7200	2MB	UDMA133	48.99	57.56
Maxtor	JL64989	Maxtor DiamondMax Plus 9	80GB	<9.4ms	7200	8MB	UDMA133	49.99	58.74
	JL64988	Maxtor DiamondMax Plus 9	120GB	<9.4ms	7200	2MB	UDMA133	59.99	70.49
	JL64990	Maxtor DiamondMax Plus 9	120GB	<9.4ms	7200	8MB	UDMA133	64.99	76.36
	JL64991	Maxtor DiamondMax Plus 9	160GB	<9.4ms	7200	8MB	UDMA133	86.99	102.21
	JL48364	Maxtor DiamondMax Plus 9	200GB	<9.4ms	7200	8MB	UDMA133	111.00	130.43
	JL49369	Maxtor DiamondMax Plus 9	80GB	<9.4ms	7200	8MB	SATA150	54.99	64.61
	JL49370	Maxtor DiamondMax Plus 9	120GB	<9.4ms	7200	8MB	SATA150	66.99	78.71
	JL49371	Maxtor DiamondMax Plus 9	160GB	<9.4ms	7200	8MB	SATA150	89.99	105.74
	JL49372	Maxtor DiamondMax Plus 9	200GB	<9.4ms	7200	8MB	SATA150	111.00	130.43
	JL64696	Seagate U Series X	20GB	12.7ms	5400	2MB	UDMA100	30.99	36.41
Seagate	JL48210	Seagate Barracuda 5400.1	40GB	12.5ms	5400	2MB	UDMA100	35.99	42.29
	JL48306	Seagate Barracuda 7200.7	40GB	8.5ms	7200	2MB	UDMA100	38.99	45.81
	JL49216	Seagate Barracuda 7200.7	60GB	8.5ms	7200	2MB	UDMA100	44.99	52.86
	JL48307	Seagate Barracuda 7200.7	80GB	8.5ms	7200	2MB	UDMA100	46.99	55.21
	JL48308	Seagate Barracuda 7200.7	120GB	8.5ms	7200	2MB	UDMA100	60.99	71.66
	JL49295	Seagate Barracuda 7200.7Plus	120GB	8.5ms	7200	8MB	UDMA100	65.99	77.54
	JL48309	Seagate Barracuda 7200.7	160GB	8.5ms	7200	2MB	UDMA100	86.99	102.21
	JL49296	Seagate Barracuda 7200.7Plus	160GB	8.5ms	7200	8MB	UDMA100	91.99	108.09
	JL49298	Seagate Barracuda 7200.7	80GB	8.5ms	7200	8MB	SATA150	63.99	75.19
	JL49282	Seagate Barracuda 7200.7	120GB	8.5ms	7200	8MB	SATA150	74.99	88.11
Western Digital	JL49297	Seagate Barracuda 7200.7	160GB	8.5ms	7200	8MB	SATA150	99.99	117.49
	JL64110	Western Digital Protégé	20GB	12ms	5400	2MB	UDMA100	32.99	38.76
	JL64103	Western Digital Caviar	20GB	8.9ms	7200	2MB	UDMA100	33.99	39.94
	JL64113	Western Digital Caviar	40GB	8.9ms	7200	2MB	UDMA100	36.99	43.46
	JL64114	Western Digital Caviar	60GB	9.5ms	5400	2MB	UDMA100	46.99	55.21
	JL64104	Western Digital Caviar	80GB	8.9ms	7200	2MB	UDMA100	46.99	55.21
	JL64105	Western Digital Caviar	120GB	8.9ms	7200	2MB	UDMA100	58.99	69.31
	JL64423	Western Digital Caviar SE	120GB	8.9ms	7200	2MB	UDMA100	70.99	83.41
	JL48091	Western Digital Caviar SE	180GB	8.9ms	7200	2MB	UDMA100	108.00	126.90
	JL48093	Western Digital Caviar SE	200GB	8.9ms	7200	2MB	UDMA100	116.00	136.30

2.5" UDMA Hard Drives

	Code	Manufacturer	Capacity	Height	RPM	Cache	Interface	Ex.VAT	Inc.VAT
HITACHI Inspire the Next	JL64992	Hitachi Travelstar	20GB	9.5mm	4200	2MB	UDMA100	62.99	74.01
	JL64993	Hitachi Travelstar	30GB	9.5mm	4200	2MB	UDMA100	68.99	81.06
	JL64994	Hitachi Travelstar	40GB	9.5mm	4200	2MB	UDMA100	76.99	90.46
	JL49497	Hitachi Travelstar	60GB	9.5mm	4200	2MB	UDMA100	104.00	122.20
	JL49498	Hitachi Travelstar	60GB	9.5mm	7200	8MB	UDMA100	151.00	177.43
	JL49499	Hitachi Travelstar	80GB	9.5mm	4200	8MB	UDMA100	149.00	175.08
FUJITSU	JL48237	Fujitsu	40GB	9.5mm	4200	2MB	UDMA100	78.99	92.81
	JL48238	Fujitsu	60GB	9.5mm	4200	2MB	UDMA100	109.00	128.08
TOSHIBA	JL49250	Toshiba	20GB	9.5mm	4200	2MB	UDMA100	58.99	69.31
	JL49477	Toshiba	40GB	9.5mm	4200	2MB	UDMA100	78.99	92.81
	JL48332	Toshiba	60GB	9.5mm	4200	2MB	UDMA100	106.00	124.55

SCSI Hard Drives

	Code	Manufacturer	Capacity	Access Time	RPM	Cache	Interface*	Ex.VAT	Inc.VAT
FUJITSU	JL64800	Fujitsu Allegro 8	36GB	4.5ms	10K	8MB	U320 68Pin	99.99	117.49
	JL64802	Fujitsu Allegro 8	73GB	4.5ms	10K	8MB	U320 68Pin	231.00	271.43
	JL64804	Fujitsu Allegro 8	147GB	4.5ms	10K	8MB	U320 68Pin	592.00	695.60
HITACHI Inspire the Next	JL48239	Hitachi Ultrastar	36GB	4.7ms	10K	8MB	U320 68Pin	96.99	113.96
	JL48241	Hitachi Ultrastar	73GB	4.7ms	10K	8MB	U320 68Pin	209.00	245.58
	JL48243	Hitachi Ultrastar	146GB	4.7ms	10K	8MB	U320 68Pin	429.00	504.08
Maxtor	JL48245	Maxtor 10K IV	36GB	4.8ms	10K	8MB	U320 68Pin	106.00	124.55
	JL48247	Maxtor 10K IV	73GB	4.8ms	10K	8MB	U320 68Pin	244.00	286.70
	JL48249	Maxtor 10K IV	147GB	4.9ms	10K	8MB	U320 68Pin	559.00	656.83
Seagate	JL64645	Seagate 10K.6	36GB	4.7ms	10K	8MB	U320 68Pin	111.00	130.43
	JL64642	Seagate 10K.6	73GB	4.7ms	10K	8MB	U320 68Pin	246.00	289.05
	JL64639	Seagate 10K.6	146GB	4.7ms	10K	8MB	U320 68Pin	499.00	586.33
	JL64654	Seagate 15K.3	18GB	3.6ms	15K	8MB	U320 68Pin	142.00	166.85
	JL64651	Seagate 15K.3	36GB	3.6ms	15K	8MB	U320 68Pin	208.00	244.40
	JL64648	Seagate 15K.3	73GB	3.6ms	15K	8MB	U320 68Pin	418.00	491.15

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									Ex. VAT	Inc. VAT
64680	ABIT AT7 MAX2 ATX	AMD 462 Pin	VIA KT400	200/266/333	4DDR	5	8x	A/LAR	86.99	102.21
64682	ABIT KD7-RAID ATX	AMD 462 Pin	KT400	200/266/333	4DDR	6	8x	A/LAR	85.99	101.04
49528	ABIT NF7 ATX	AMD 462 Pin	nForce2	200/266/333/400	3DDR Dual Ch.	5	8x	A/L	52.99	62.26
49529	ABIT NF7-S ATX	AMD 462 Pin	nForce2	200/266/333/400	3DDR Dual Ch.	5	8x	A/F/L/SATA	74.99	88.11
48190	ASRock K7VT2 Combo ATX	AMD 462 Pin	VIA KT266A	200/266	2DDR+2DIMM	5	4x	A/L	26.99	31.71
48191	ASRock K7VM2 Combo mATX	AMD 462 Pin	VIA KM266	200/266	2DDR+2DIMM	3	4x	A/AMR/L/V	34.99	41.11
64632	Asus A7N266-VM mATX	AMD 462 Pin	nForce220D	200/266	2DDR	3	4x	A/L/V	35.99	42.29
48179	Asus A7N8X/DLX ATX	AMD 462 Pin	nForce2	200/266/333	3DDR Dual Ch.	5	8x	A/F/L/USR	71.99	84.59
64633	Asus A7S333/A ATX	AMD 462 Pin	Si5745	200/266	3DDR	5	4x	A	51.99	61.09
64712	Asus A7V8X ATX ATX	AMD 462 Pin	VIA KT400	200/266/333	3DDR Dual Ch.	6	8x	A/L	41.99	49.34
49415	Gigabyte 7NNXP ATX	AMD 462 Pin	nForce2	200/266/333/400	4DDR Dual Ch.	5	8x	A/Dual Lan/SATA/V	109.00	128.08
49595	Gigabyte 7N400 Pro2 ATX	AMD 462 Pin	nForce2	200/266/333/400	4DDR Dual Ch.	5	8x	A/L/SATA	71.99	84.59
49597	Gigabyte 7VT600 1394 ATX	AMD 462 Pin	VIA KT600	200/266/333/400	3DDR	5	8x	A/F/L	54.99	64.61
49418	Gigabyte 7VA ATX	AMD 462 Pin	VIA KT400	200/266/333	3DDR	5	8x	A/V	40.99	48.16
49468	Gigabyte 7VM400M mATX	AMD 462 Pin	VIA KM400	200/266/333	2DDR	3	8x	A/L/V	42.99	50.51
49652	Gigabyte GA-K8N Pro ATX	AMD 754 Pin	Nvidia Crush K8	FSB800	Dual DDR400 Slots 3	5	8X	A/F/L/SATA	85.99	101.04
49667	MSI K8T Neo-FIS2R ATX	AMD 462 Pin	K8T800	266/333/400/800	3DDR	5	8x	A/F/L/USR	94.99	111.61
49668	MSI KT6 Delta-FISR ATX	AMD 462 Pin	VIA KT600	200/266/333/400	3DDR	5	8x	A/F/L/USR	60.99	71.66
49669	MSI KT6 Delta-LSR ATX	AMD 462 Pin	VIA KT600	200/266/333/400	3DDR	5	8x	A/L/USR	52.99	62.26
48139	MSI K7N2G-ILSR ATX	AMD 462 Pin	nForce2	200/266/333	3DDR	5	8x	A/ACR/F/L/USR/V	81.99	96.34
49238	MSI K7N2 Delta-ILSR ATX	AMD 462 Pin	nForce2	200/266/333/400	3DDR	5	8x	A/ACR/F/L/USR	68.99	81.06
49675	MSI K7N2 Delta-L ATX	AMD 462 Pin	nForce2	200/266/333/400	3DDR	5	8x	A/ACR/L	50.99	59.91
48201	MSI KT4-L ATX	AMD 462 Pin	VIA KT400	200/266/333	3DDR	6	8x	A/L/CNR	49.99	58.74
48192	ASRock GPRO Combo mATX	Intel P4 478 Pin	Si5650	400/533	2DDR+2DIMM	3	4x	A/L/V	36.99	43.46
48180	Asus P4G8X/DLX/GD ATX	Intel P4 478 Pin	E7205	400/533	4DDR	5	8x	A/F/L/USR	125.00	146.88
48174	Asus P4PE/LAN/GD ATX	Intel P4 478 Pin	i845PE	400/533	3DDR	6	4x	A/L	49.99	58.74
49419	Asus P4C800/DELE ATX	Intel P4 478 Pin	875P	400/533/800	4DDR Dual Ch.	5	8x	A/F/L/USR	118.00	138.65
49420	Gigabyte 8KNXP ATX	Intel P4 478 Pin	875P	400/533/800	6DDR Dual Ch.	5	8x	A/AR/F/L/SATA	129.00	151.58
49596	Gigabyte 8I848EL ATX	Intel P4 478 Pin	848P	533/800	3DDR	5	8x	A/L	59.99	70.49
49599	Gigabyte 8S648FXL ATX	Intel P4 478 Pin	Si5648FX/963	533/800	3DDR	5	8x	A/L	49.99	58.74
48294	Gigabyte GA-SINXP1394 ATX	Intel P4 478 Pin	Si5655	400/533	4DDR	5	8x	A/F/L/USR	68.99	81.06
49240	MSI 875P Neo-FIS2R ATX	Intel P4 478 Pin	i875P	533/800	4DDR	5	8x	A/F/L/USR	116.00	136.30
49241	MSI 865PE Neo2-FIS2R ATX	Intel P4 478 Pin	i865PE	533/800	4DDR	5	8x	A/F/L/USR	94.99	111.61
49672	MSI 865PE Neo2-LS ATX	Intel P4 478 Pin	i865PE	533/800	4DDR	5	8x	L/SATA	66.99	78.71
49673	MSI 848P Neo-LS ATX	Intel P4 478 Pin	i848P	533/800	2DDR	5	8X	L/SATA	59.99	70.49
48297	Supermicro X5DAL-G ATX	Intel Dual Xeon	E7505	400/533	4DDR	4	8x	L	254.00	298.45
48296	Supermicro X5DAE eATX	Intel Dual Xeon	E7505	400/533	6DDR	5	8x	A/L	349.00	410.08
48123	Supermicro P4SAA ATX	Intel P4/Cel 478 Pin	E7205	400/533	4DDR	6	8x	A/L	156.00	183.30
64541	Supermicro P4SGA ATX	Intel P4/Cel 478 Pin	i845G	400/533	2DDR	6	4x	A/L/V	82.99	97.51
64382	Supermicro P4SDA+ ATX	Intel P4 478 Pin	i845	400	3DIMM	6	4x	A/CNR	74.99	88.11
64139	Supermicro P4SBA+ ATX	Intel P4 478 Pin	i845	400	3DIMM	6	4x	A/CNR	71.99	84.59

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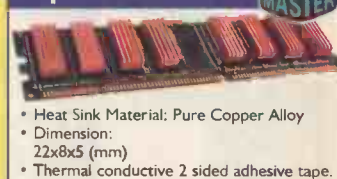
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JL64060 64MB 168 Pin DIMM	12.99	15.26
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JL22575 16MB Non Parity	8.99	10.56
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JL14695 16MB Parity	14.99	17.61
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SUNTEK		Ex Vat	Inc Vat
JL49660	TM-655 Midi Tower 4x5.25" 5x3.5" 300W ATX	48.99	57.9
JL49661	TM-655 Windowed Side Panel	9.99	11.7
JL49662	TM-656 Midi Tower 4x5.25" 5x3.5" 300W ATX	48.99	57.5
JL49663	TM-657 Midi Tower 4x5.25" 5x3.5" 300W ATX	48.99	57.5
JL49664	TM-658 Midi Tower 4x5.25" 5x3.5" 300W ATX	48.99	57.5

The Ultimate Tower Case

- Magic light reflection at front bezel
- Silver Aluminium Front with Verdant Door
- 4x5.25" & 6x3.5" Bays.



IncVat £173.90
ExVat £148.00
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Bubble Effect Case

- 4x5.25" 5x3.5" Bays
- LCD Temperature Monitor
- Window Cut out with Coloured LED Fan
- No PSU.



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Low Noise Power Supplies

- Low Noise
- Adjustable Fan Speed
- Ideal Case Upgrade.

ENERMAX

ENERMAX		Ex Vat	Inc Vat
JL48159	350W Variable Speed Fan ATX	42.99	50.51
JL48158	460W Variable Speed Fan ATX	58.99	69.31
JL48160	550W (no variable speed) ATX	97.99	115.14

Power Supplies

PSU		Ex Vat	Inc Vat
JL48113	200W Dual Outlet AT	13.61	15.9
JL48114	200W Dual Outlet mATX	19.99	23.4
JL64202	300W Dual Outlet ATX	19.99	19.9
JL64732	300W Dual Outlet AS* ATX	21.99	25.6
JL64203	400W Dual Outlet ATX	39.99	46.9
JL64463	400W Dual Outlet AS* ATX	44.99	52.6

Alloy Front Bezel

Cooler Master's Alloy Front Bezel will solve your headaches.

- Special design Alloy Front Bezel that fits most CD/DVD-ROM/RW
- Uses genuine 3M double-sided tape
- Best matched with any alloy chassis.
- Stealth your drives!



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Aluminium Mouse Mat

- World's 1st Aluminium Mouse Pad
- Celebrating Cooler Masters 10th anniversary
- Best matched with any alloy chassis
- Collector's Choice! Only 5000 pieces available. (May not be suitable for some optical mice)



IncVat £11.74
ExVat £9.99
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Fan Converter

This is an ideal product for users who want to install an 80mm fan onto 60mm mounting holes.

- Vortex channeling design to centralise air flow and minimise pressure loss
- No special equipment required.

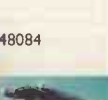


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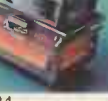
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49393



48084



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49324

Aero 7

- More powerful blowers produce larger air pressure than traditional axial fans.
- External fan speed adjustment on PCI and 3 1/2" bracket allows user to set the desired fan speed (1900-4500RPM).



IncVat £19.96
ExVat £16.99
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XDream

- External fan speed adjustment on PCI bracket or 3.5" drive bay coverallows user to set the desired fan rpm (2000-4800rpm) without opening up the chassis.
- Multilingual Installation Guide included.



IncVat £10.56
ExVat £8.99
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49334 49337
Cases don't include hardware as shown. Delivered as flat packed

Acrylic Cases

	Ex Vat	Inc Vat
JL49334 Akasa Crystal Clear - Drive Bays: 4 x 5.25" 2 x 3.5"	84.99	99.86
JL49335 Akasa Crystal Green - Drive Bays: 4 x 5.25" 2 x 3.5"	84.99	99.86
JL49336 Akasa Crystal Blue - Drive Bays: 4 x 5.25" 2 x 3.5"	84.99	99.86
JL49337 Akasa Crystal Clear - Drive Bays: 2 x 5.25" 2 x 3.5"	64.99	76.36
JL49338 Akasa Crystal Green - Drive Bays: 4 x 5.25" 2 x 3.5"	64.99	76.36
JL49339 Akasa Crystal Blue - Drive Bays: 4 x 5.25" 2 x 3.5"	64.99	76.36

Cold Cathode Case Lights

	Ex Vat	Inc Vat
JL49325 Akasa 12" Cold Cathode - Blue	9.99	11.74
JL49326 Akasa 12" Cold Cathode - Green	9.99	11.74
JL49327 Akasa 12" Cold Cathode - Red	9.99	11.74

Akasa cold cathode lights include on/off switch and PSU connector

Case Fans

	Ex Vat	Inc Vat
JL49328 Akasa 8cm Crystal Fan With 4 Green Led	4.99	5.86
JL49329 Akasa 8cm Crystal Fan With 4 Red Led	4.99	5.86
JL49393 Akasa 12cm Crystal Blue Case Fan with 4 Blue LED	9.99	11.74
JL49395 Akasa 12cm Crystal Red Case Fan with 4 Red LED	9.99	11.74
JL49394 Akasa 12cm Crystal Green Case Fan with 4 Green LED	9.99	11.74
JL48268 Cooler Master 80mm Silent BB* Fan With Thermal Sensor (26dB)	5.99	7.04
JL48269 Cooler Master 80mm Silent SB* Fan With Thermal Sensor (26dB)	3.00	3.53
JL48270 Cooler Master Blue LED 80mm Silent RB* Fan (25dB)	3.99	4.69
* BB=Ball Bearing SB=Sleeve Bearing RB=Rifle Bearing (patented)		
JL48278 Cooler Master 60mm to 80mm Fan Converter	1.99	2.34

CPU Coolers

	Ex Vat	Inc Vat
JL49301 Silver Mountain2Q Athlon Cooler - Copper Base Silver Plated	22.99	27.01
JL49322 AMD XP 3000+, 8 x 8cm heatsink + 8cm fan with 4 green LEDs	12.99	15.26
JL49322 Akasa GREEN LED CPU COOLER (UPTO AMD XP3000+)	12.99	15.26
JL49391 Akasa BLUE LED CPU COOLER (UPTO AMD XP3000+)	12.99	15.26
JL49392 Akasa RED LED CPU COOLER (UPTO AMD XP3000+)	12.99	15.26
JL49323 Akasa Intel P4 3.5GHz Copper base with 4 Blue LEDs	11.99	14.09
JL49324 King Copper Intel P4 3.5GHz + 100% pure Copper heatsink	26.99	31.71
JL48084 Cooler Master Silent Heat Pipe Cooler Skt 370,7,A,462	18.99	22.31

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I-Trigue™

2.1 3300 speakers combine superb style and advanced technology for a better audio experience. The system can be used with laptop PCs, MP3 or CD players and other audio sources.



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IncVat **£46.99**
ExVat **£39.99**
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SoundBlaster MP3+

This compact, lightweight solution supports MP3 and WMA formats and is powered via the USB port, so no power cable is necessary. It has comprehensive connectivity, including analogue and digital inputs and outputs for use with a wide range of external devices such as CD players and Dolby® Digital decoders.



IncVat **£34.06**
ExVat **£28.99**
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Inspire 6.1 700



The Creative Inspire 6.1 6700 speaker system delivers a new level of surround sound in movies, games and music.

- Power Specifications:
- Front and Rear Satellite Power: 8 Watts RMS per channel
 - Centre Satellite Power: 20 Watts RMS
 - Subwoofer Power: 22 Watts RMS
 - Frequency Response: 40Hz-20kHz.

IncVat **£81.06**
ExVat **£68.99**
Order **JL64960**

MuVo

Creative® MuVo™ is a unique, ultra-compact MP3 player based on a finger-sized 128MB MuVo Memory™ module which can store data files or around 30 MP3 tracks and has a built-in USB plug for cable-free connection.

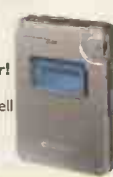


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ExVat **£69.99**
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Juke Box Zen

Fashion, performance and versatility in a pocket sized player!

- 20GB hard disk – Ideal for data as well as MP3 & WMA
- USB 2.0 or 1.1
- Up to 14 hours playback



IncVat **£257.33**
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Order **JL64967**

Sound Blaster 5.1 Audio Surround Kit

- Sound Blaster card supports full 5.1 surround sound in digital and analogue formats. Also compatible with 2- and 4- speaker configurations.
- Realistic EAX and 3D positional audio with supported games.

IncVat **£62.26**
ExVat **£52.99**
Order **JL49426**

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Supports Intel® Pentium® 4 processor up to 2.8GHz. 2 DIMMS up to 2GB, 1 PCI and 1 AGP slot.

This is a barebone system - you need to add the CPU, hard drive, memory and optical drive. We have selected the best components for you to fit this barebone system.



IncVat **£222.08**
ExVat **£189.00**
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Code	Ex Vat	Inc Vat
JL64518 Intel® Pentium® 4 2.4GHz 512K 478 Pin 533MHz	109.00	128.08
JL64671 Intel® Pentium® 4 2.6GHz 512K 478 Pin 400MHz	132.00	155.10
JL64673 Intel® Pentium® 4 2.8GHz 512K 478 Pin 533MHz	172.00	202.10
JL48092 MSI 52x Int EIDE CD Rom Kit	12.99	15.26
JL49535 MSI 52x32x52 BURNProof CDRW Internal EIDE Kit	24.99	29.36
JL48155 MSI 16x DVD-ROM 48x CD-ROM Internal EIDE Kit	20.99	24.66

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Code	Ex Vat	Inc Vat
JL64490 256MB DDR333 PC2700	32.99	38.76
JL64491 512MB DDR333 PC2700	58.99	69.31
JL49367 ExcelStor 40GB 200RPM 2MB UDMA100	33.99	39.94
JL49584 ExcelStor 80GB 7200RPM 2MB UDMA100	44.99	52.86
JL49365 Cooler Master Alloy USB Keyboard	23.99	28.19
JL48329 Videologic ZXR-550 5.1 Speakers	50.99	59.91

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Videologic ZXR-750 - Worlds First 7.1 Channel Speaker System

Connects to all multi-channel DVD players and sound cards. Includes unique ConnX-ITM Technology for complete compatibility with 5.1, 6.1 and 7.1 inputs. Includes unique SurfFETM Technology for stunning 7.1 surround from 5.1 movies. Over 80W RMS output fills the largest room.



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Videologic Sound Cards	Ex Vat	Inc Vat
JL64999 Sonic Xplosion	34.99	41.11
JL64697 Sonic Xplosion DVD	56.99	66.96
Videologic Speakers	Ex Vat	Inc Vat
JL48105 ZXR-200 2.1	28.99	34.06
JL48329 ZXR-550 5.1	50.99	59.91
JL49354 ZXR-750 7.1	76.99	90.46
JL48107 DigiTheatre ZXR	118.00	138.65
JL48106 DigiTheatre Platinum	297.87	350.00

Videologic

DigiTheatre Platinum speakers

- Powerful 220W home cinema speakers system
- Decodes Dolby Digital, Pro Logic and DTS.



Whilst stocks last

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Order **JL48355**

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Lim is In. Max power are the magic words. The 2.1 Stereo speaker System stands out from the crowd with its two lim-style satellites and a powerful subwoofer.

TEAC	Ex Vat	Inc Vat
L49310 PowerMax Traveller 0.5W RMS	19.99	23.49
L49304 PowerMax 100 0.9W RMS	7.99	9.39
L49305 PowerMax 200 1.6W RMS	11.99	14.09
L49306 PowerMax 300 4.5W RMS		
L49308 PowerMax 1300 35W Sub 12.5W Sat (RMS)	36.99	43.46



Logitech Speakers

- Logitech Z680 5.1 Speakers**
- Amazing 450 watts RMS 5.1 speaker system
 - Dolby® Digital and DTS® hardware decoding for true 5.1 digital sound
 - Dolby® Pro Logic II
 - Simultaneously connect four audio sources
 - 2-year guarantee.



Logitech

Logitech	Ex Vat	Inc Vat
JL49553 Z680 5.1 - 450Watts RMS Dolby Digital	212.00	249.10
JL49580 Z640 5.1 - 70 Watts RMS	54.99	64.61
JL49579 Z560 4.1 - 400 Watts RMS THX Certified	126.00	148.05
JL49578 Z540 4.1 - 40 Watts RMS	43.99	51.69
JL49577 Z340 2.1 - 33 Watts RMS	29.99	35.24

Innovative design, amazing sound

- A5.600 Seismic Power**
- 5.1 Multichannel
 - 100W RMS
 - Wireless remote control.



PHILIPS

PHILIPS Speakers	Ex Vat	Inc Vat
JL64710 A5.600 Seismic Power (100W RMS)	78.99	92.81
JL64709 A5.100 Extreme Surround Power (80W RMS)	51.99	61.09
JL63065 A1-2 Fun Power Plus (120W)	13.99	16.44
JL63060 A3.600 Acoustic Surround Power (1200W) Flat Panel	78.90	92.71
Sound Cards	Ex Vat	Inc Vat
JL48344 Sonic Edge 5.1 channel	26.99	31.71
JL48345 Dynamic Edge 4.1 channel	21.99	25.84
JL63194 Rhythmic Edge 4 Channel PCI	36.99	43.46
JL63195 Seismic Edge 5.1 Channel PCI	57.99	68.14
JL63196 Acoustic Edge Digital 5.1 Channel PCI	72.99	85.76



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- USB Flash Drive
- Backlit LCD Screen
- Volume and Tempo Control.

MP3 Players	Ex
JL49232 RockBOX Digital Audio Player MP3 128MB	84
JL66109 Dion CD MP3/WMA Player	79
JL66110 Zillion 64MB MP3 Player	64
JL66111 Zillion 128MB MP3 Player	89

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creation
- Stylish
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Porsche design
- Cables and media included.

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	Ex Vat	Inc Vat
JL73284 Porsche designed USB2 4.7GB DVD+/-RW 4x24x12x & CDRW s/w + cbl + media	163.40	192.00
JL73273 Porsche designed USB2 Mobile 40GB Drive, Bus Pwrld + cbl	113.19	133.00
JL73277 Porsche designed Firewire Mobile 80GB Drive, Bus Pwrld + cbl	213.62	251.00
che Slim USB2 Mobile RW/DVD-ROM 24x24/8x s/w + cbl media	82.54	96.99
che designed drive USB2 RW 52x32x52x s/w cbl + media	55.31	64.99

CD-R Media

Code	Brand	Speed	Quantity	Pack	Ex.VAT	Inc.VAT
JL15819	Maxell	48x	10 pack	Jewel	3.99	4.69
JL15904	TDK	48x	10 Pack	Jewel	3.55	4.17
JL15906	TDK	48x	10 pack	Jewel	3.20	3.76
JL15988	Maxell	32x	10 pack	Jewel	5.10	5.99
JL15627	Sony	48x	10 pack	Jewel	3.85	4.52
JL48215	Plextor	48x	10 pack	Slim Case	3.79	4.45
JL15935	Maxell	48x	25 pack	Spindle	7.25	8.52
JL15763	Imation	48x	25 pack	Spindle	7.35	8.64
JL15873	Sony	48x	25 pack	Jewel	7.99	9.39
JL35085	TDK	48x	50 pack	Cakebox	16.49	19.38
JL35025	Imation	48x	50 pack	Spindle	14.99	17.61
JL15820	Maxell	48x	50 pack	Spindle	14.25	16.74
JL15954	Sony	48x	50 pack	Spindle	13.49	15.85
JL48216	Plextor	48x	50 pack	Spindle	11.99	14.09
JL35099	Maxell	48x	100 pack	Spindle	33.99	39.94
JL15950	Imation	48x	100 pack	Jewel	7.35	8.64
JL35110	Simply	52x	50 pack	Spindle	10.99	12.91

CDRW Media

Code	Brand	Speed	Quantity	Pack	Ex.VAT	Inc.VAT
JL15382	Imation	up to 4x	single	Jewel	0.45	0.53
JL15282	Maxell	up to 4x	single	Jewel	0.50	0.59
JL15318	Sony	up to 4x	single	Jewel	0.79	0.93
JL15776	TDK	up to 12x	single	Jewel	0.80	0.94
JL35112	TDK	up to 4x	10 pack	Jewel	7.25	8.52
JL15955	Sony	up to 10x	10 pack	Jewel	7.99	9.39

52x CDRW Bundle

- 52x Write, 32x Rewrite, 52x Read
- BURN-Proof
- Supports 99min CD-R disks
- Motorized easy touch tray loading
- Enhanced IDE/ATAPI Interface
- 2MB Internal Buffer

Includes 50 Spindle pack of 52x speed media

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files in a cost-
effective way.

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than 3 minutes!
- Simple plug and play functionality, buffer
under-run protection, and Iomega HotBurn
Pro software for easy
CD customisation.

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ExVat £58.71
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PlexWriter Premium CDRW

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- E-IDE Interface
- BURN-Proof
- BMB Buffer
- Mount Rainer ready
- Includes 1 CD-R, 1 CDRW
- CD recording software: Nero and InCD
- Also includes "PlexTools"

Plextor
JL48310 PX-504A DVD+R/RW CDRW Int EIDE
JL49299 PlexWriter Premium 52x32x52 Int EIDE
JL49300 PlexWriter Premium 52x32x52 Int EIDE (Black)

Ex Vat 129.00 Inc Vat 151.99
ExVat 61.99 IncVat 72.88
Order JL48310



Plextor DVD+R/RW

PX-504A

- Writing DVD: 4x, CD: 16x
- Rewriting DVD: 2.4x, CD: 10x
- Reading DVD: 12x, CD: 40x
- 2MB Buffer
- E-IDE (ATAPI) interface
- 1x DVD+R disc, 1x DVD+RW disc
- E-IDE and Audio cable
- Nero 5.5 and InCD software.

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ExVat £20.99
Order JL48155

MSI CR52-M

IncVat £29.36
ExVat £24.99
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- 52x Write, 32x Rewrite, 52x Read
- Supports Mount Rainer Technology
- MSI Flash eyes - shows drive
operating status
- Supports 99min CD-R discs.

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- 16x DVD-ROM
- 48x CD-ROM
- Internal EIDE
- Includes MSI Power DVD 5.1 Channel
- Low Vibration Mechanism
- Support Power Save mode.

MSI

Philips CDRW

IncVat £30.54
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- 52x Write, 24x ReWrite, 52x Read
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- Buffer Underrun protection by Seamless link
- Includes Nero 5 Software.

Philips DVD+RW416K

- Writing Speed: 4x
DVD+R 2.4x
DVD+RW
- High Speed CD
Recording
(16x10x40)
- ATAPI Interface.

IncVat £119.85
ExVat £102.00
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Philips JackRabbit 3

- Mobile DVD Player
- External CD
ReWriter
(32x10x40)
- Audio/MP3 CD
Player
- 12x DVD-ROM.

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PHILIPS

Panasonic DVD Burner II

The Panasonic DVD Burner II is a full DVD
Multi Writer. It writes and reads all DVD
formats approved by the
DVD Forum as well
as CD-R/RW.

IncVat £155.10
ExVat £132.00
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Panasonic

Teac CDRW

- 52x Write, 24x
Rewrite, 52x Read
- IDE/ATAPI
Interface
- BURN-Proof
- Inc Nero Software
- Mount Rainer Compatible.

Teac
JL48001 52x24x52 CDRW
Int EIDE Kit 31.99 37.59
JL49242 16x DVD-ROM 48x
CD-ROM Int EIDE Kit 26.99 31.71

Mitsumi CDRW

- 52x Write, 24x Rewrite, 52x Read
- Recording software: Nero
- InCD (UDF drag and
drop software)
- Supports 80 min disks.

MITSUMI
JL48300 CR487ETE 52x24x52
CDRW Kit 29.99 35.24
JL49228 DVD-ROM 16xDVD 50xCD
Int EIDE 21.99 25.84

Asus 52x CDRW

- 52x Write, 24x Read, 52x Rewrite
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- 100ms Access Time
- Mount Rainer support
- Buffer Underrun
Error
prevention.

IncVat £29.36
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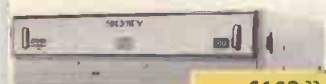
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MSI DR4-A

- Writing Speeds:
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4x DVD-R, 2x DVD-RW
- Anti Bumping System
- BURN-Proof
- 8MB Internal Buffer.

Sony DRU-510A

Writing speeds: 4x DVD+R, 4x DVD+RW,
4x DVD-R, 2x DVD-RW.



IncVat **£163.33**
ExVat £139.00
Order JL49259

TDK DVW+A040212N

- Writing speeds:
4x DVD+R,
2.4x DVD+RW,
2.4x DVD-R,
2x DVD-RW.



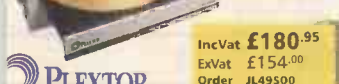
IncVat **£163.33**
ExVat £139.00
Order JL49249

SONY

TDK

Plextor PX-708A

- Writing speeds:
8x DVD+R,
4x DVD+RW,
4x DVD-R,
2x DVD-RW.



IncVat **£180.95**
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Mitsumi DW-7802TE

- Writing speeds:
4x DVD+R,
4x DVD+RW,
4x DVD-R,
2x DVD-RW

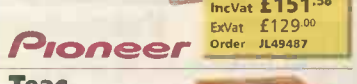


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Order JL49547

MITSUMI

Pioneer DVR-A06

- Writing speeds:
4x DVD+R,
2.4x DVD+RW
4x DVD-R,
2x DVD-RW.

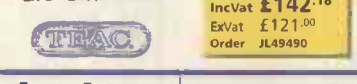


IncVat **£151.58**
ExVat £129.00
Order JL49487

Pioneer

Teac DV-W50DK

- Writing Speeds:
4x DVD+R,
2.4x DVD+RW,
4x DVD-R,
2x DVD-RW



IncVat **£142.18**
ExVat £121.00
Order JL49490

TEAC

DVD Media

Disc Type	Code	Brand	Size	QTY	Pack	Price	
						Ex.VAT	Inc.VAT
	JL35157	Maxell	4.7GB	5 pack	Jewel	8.49	9.98
	JL35053	TDK	4.7GB	single	Jewel	2.50	2.94
	JL35038	Imation	4.7GB	5 pack	Jewel	8.49	9.98
	JL35003	Sony	4.7GB	5 pack	Jewel	9.75	11.46
	JL35036	Imation	4.7GB	5 pack	Jewel	9.25	10.87
	JL35160	Maxell	4.7GB	5 pack	Jewel	8.99	10.56
	JL35004	Sony	4.7GB	5 pack	Jewel	9.75	11.46
	JL35104	TDK	4.7GB	5 pack	Jewel	9.65	11.34
	JL35037	Imation	4.7GB	5 Pack	Jewel	15.99	18.79
	JL35159	Maxell	4.7GB	5 pack	Jewel	14.99	17.61
	JL35001	Sony	4.7GB	5 pack	Jewel	17.25	20.27
	JL35106	TDK	4.7GB	5 pack	Jewel	16.75	19.68
	JL35039	Imation	4.7GB	5 pack	Jewel	15.99	18.79
	JL35158	Maxell	4.7GB	5 pack	Jewel	15.65	18.39
	JL35002	Sony	4.7GB	5 pack	Jewel	18.49	21.73
	JL35108	TDK	4.7GB	5 pack	Jewel	15.49	18.20
	JL15895	Imation	4.7GB	single	Cartridge	5.25	6.17
	JL15823	TDK	4.7GB	single	Cartridge	7.99	9.39
	JL15408	Maxell	5.2GB	single	Cartridge	9.99	11.74
	JL15881	TDK	9.4GB	single	Cartridge	10.89	12.80

Firewire or USB2 Hard Drives

NEW LaCie Drives designed by
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USB2 or Firewire interface up to
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Quick and easy set up and use
Save photos, MP3s, videos
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Larger capacities up to 500GB
available in d2 design
Firewire 800 & USB2 drives
available in d2 design.



LACIE

LaCie		Ex Vat	Inc Vat
L73285	FA Porsche designed 40GB USB2 HDD+cbl	68.93	80.99
L73286	FA Porsche designed 7200rpm 80GB USB2 HDD+cbl	88.91	104.00
L55473	120GB 7200rpm USB2 HDD 'd2 model'+cbl	128.51	151.00
L63229	120GB 7200rpm Firewire HDD 'd2 model'+cbl	133.62	157.00
L70200	200GB 7200rpm Firewire HDD 'd2 model'+cbl	188.94	222.00
L73290	FA Porsche designed 250GB 7200rpm Firewire HDD+cbl	208.51	245.00

Omega Storage



Omega		Ex Vat	Inc Vat
JL66237	Zip 750MB USB2 Ext. Drive	89.36	105.00
JL70374	Zip 750MB + FREE USB2 4-Port PCI Card Starter Kit	97.87	115.00
JL55766	Zip 750MB Firewire External Drive	90.21	106.00
JL55767	Zip 750MB Atapi Internal Drive	90.21	106.00
JL15961	Zip 750MB 10PK Disks	71.48	83.99
JL73025	40GB USB2 / Firewire Mobile HDD	112.34	132.00
JL73338	60GB USB2 Desktop HDD + FREE USB2 Card	94.47	111.00
JL73026	80GB USB2 Desktop HDD	112.34	132.00
JL73027	120GB USB2 / Firewire Desktop HDD	135.32	159.00
JL73028	250GB USB2 / Firewire Desktop HDD	194.89	229.00

USB Personal Storage

Storing up to 1GB, disgo is the ultimate USB personal storage device. Disgo works without drivers on PC, Mac and Linux Systems. It includes an on-board ARM7 32 bit RISC processor and offers TrueFFS technology for faster data transfer offering a variety of functions, including data security (Keysafe) and file synchronisation (MyKey).

Archive a CD album in less than 30 secs*

	Disgo	Ex Vat	Inc Vat
• Download 50MB MPEG2 movie in 8 secs*	JL63343 32MB USB	24.67	28.99
• NT Compatible (drivers required)	JL63344 64MB USB	35.74	41.99
• Range includes disgo Pro, disgo and disgo Lite	JL63345 128MB USB	48.50	56.99
• All of the disgo family of products	JL66405 512MB USB	157.45	185.00
• Include MyKey and Keysafe	JL66720 256MB Pro USB2	106.38	125.00
*Disgo Pro USB2	JL66721 512MB Pro USB2	170.21	200.00
	JL66722 1GB Pro USB2	277.45	326.00

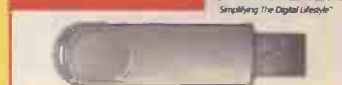
Handy Portable Hard Drives



- Bus powered drives power from your USB port for true mobile computing
- Firewire and USB2.0 connectivity (Crossfire) includes cables
- Fast 40mb/ sec peak transfer rate (Firelite)
- Available from 20GB (FireLite) to 250GB (CrossFire).

SmartDisk		Ex Vat	Inc Vat
JL70386	FireLite USB2.0 40GB 2.5" DD Bus Powered	122.55	144.00
JL70387	FireLite USB2.0 60GB 2.5" DD Bus Powered	166.81	196.00
JL73302	FireLite USB2.0 80GB 2.5" DD Bus Powered	276.60	325.00
JL73299	CrossFire USB2.0/Firewire 120GB 2.5" Drive		
JL73300	CrossFire USB2.0/Firewire 200GB 2.5" Drive		
JL73301	CrossFire USB2.0/Firewire 250GB 2.5" Drive		

USB Flash Drive



- Plugs Directly into the computer's USB port
- No adaptors, cables or power supply required
- Store files, documents, music, videos, MP3's etc..

SmartDisk		Ex Vat	Inc Vat
JL70920	64MB USB Flash Drive	23.82	27.99
JL70921	128MB USB Flash Drive	39.14	45.99
JL70922	256MB USB Flash Drive	54.46	63.99
JL70923	512MB USB Flash Drive	124.26	146.00

FX-50 DVD+/-RW Drive

- Compile, save and share your movies, music, data and photos
- Connects to USB-2 & FireWire/i.LINK
- Buffer under run prevention and Active Write Control (AWC)
- Including complete Video editing and DVD authoring software suite

	JL56351
Order	JL56351
IncVat	£241.00
ExVat	£205.11

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- Iomega HotBurn Pro software included

	JL73330
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Adaptec New DVD Media Center
It's an all-in-one solution for watching, controlling and recording TV on your PC. See below for details

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ExVat **£99.99**
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Connect 3D

ALL-IN-WONDER® 9800 PRO
With 128MB DDR memory and an 8-pixel pipeline, increased rendering power for faster, cinematic quality graphics. This is the engine behind cutting-edge gaming, broadcast and PC entertainment.

Connect 3D	Ex Vat	Inc Vat
JL49588 9800 Pro 256MB DDR DVI+TV	288.00	338.40
JL48319 9800 Pro 128MB DDR + DVI + TV	236.00	277.30
JL48320 9800 128MB DDR + DVI + TV	184.00	216.20
JL49247 9600 Pro 128MB DDR DVI TV	106.00	124.55
JL49589 9600 256MB DDR DVI+TV	82.99	97.51
JL49248 9600 128MB DDR DVI TV	84.99	99.86
JL49590 9200 256MB DDR DVI+TV	55.99	65.79
JL49591 9200SE 64MB DDR DVI+TV	31.99	37.59
JL49592 9200SE 128MB DDR DVI+TV	37.99	44.64
JL49593 All-in-Wonder 9800 Pro	276.00	324.30

MSI Graphics

MSI GeForce FX5600

- Powered by nVIDIA GeForce FX 5600 GPU
- T.O.P Tech Cooler - ultra cooled and silent fansink
- Dual VGA output
- Supports AGP 8X
- Microsoft DirectX 9.0 and OpenGL 1.4 optimisation and support.

MSI	Ex Vat	Inc Vat
JL49312 MSI FX5200-TD64 64MB DDR TV-Out DVI-I	51.99	61.09
JL49313 MSI FX5600-VTD128 128MB DDR Video In TV-Out DVI-I	105.00	123.38
JL49294 MSI FX5600-TD256 256MB DDR TV-Out DVI-I	99.99	117.49
JL49587 MSI FX5900Ultra-VTD256 256MB Video In TV-Out DVI-I	326.00	383.05

Sapphire Graphics

RADEON 9800 ATLANTIS Pro boasts a host of high end features, including:

- 128MB of DDR memory
- Cinematic Rending clock speeds
- Dual-display configuration including VGA, DVI-I and s-video connectors.

Sapphire	Ex Vat	Inc Vat
JL48133 Radeon 9800 Pro Atlantis 128MB DDR DVI 8xAGP		
JL49233 Radeon 9700 Pro Atlantis 128MB Ultimate DDR DVI 8xAGP	272.00	319.60
JL49235 All In Wonder Radeon 9700 Pro 128MB DDR DVI TV 8xAGP	279.00	327.83
JL49236 Radeon 9500 Pro Atlantis 128MB DDR DVI TV Out 8xAGP	121.00	142.18
JL49237 Radeon 7500LE 128MB SDR DVI TV Out	39.99	46.99

GAINWARD

Gainward GeForce4 PowerPack!

	Ex Vat	Inc Vat
JL48301 Ultra/750-8x XP 128MB "Golden Sample" Firewire	114.00	133.6
JL48302 Ultra/750-8x XP 128MB "Golden Sample"	102.00	119.8
JL48021 Ultra/650-8x XP 128MB "Golden Sample"	126.00	148.0
JL48150 Ultra/650-8x TV/DVI 128MB	72.99	85.7
JL48108 Pro/600-8x XP 64MB "Golden Sample"	61.99	72.8
JL48110 Pro/600-8x XP 64MB	59.99	70.4
JL48111 Pro/600-8x TV/DVI 64MB	46.99	55.7

Sparkle GeForce4 FX5200

The nVIDIA® GeForce FX family of GPUs ushers in a new era of graphics and gaming. With a GeForce FX powering your graphics experiences, you can run applications and games at higher resolutions and at speeds never before possible!

Sparkle	Ex Vat	Inc Vat
JL49231 GeForce4 FX5200 128MB DDR	86.99	102.21
JL62123 32MB PCI RIVA TNT2 M64	26.99	31.71
JL62125 32MB AGP RIVA TNT2 M64	24.99	29.36
JL63939 64MB AGP GeForce2 MX400	29.99	35.24
JL63942 64MB AGP GeForce MX440 DDR TV	45.99	54.04

Matrox Video Editing

- Edit your films, make professional looking DVDs and have fun with this award-winning package.
- Capture and record to DV, S-VHS and VHS tapes.
- Realtime Effects - NO RENDERING!
- Includes Full Adobe Premiere Pro and necessary software and cables.



Matrox Video Editing Suites	Ex Vat	Inc Vat
JL49523 RTX10 Xtra - SOHO user	359.00	421.83
JL49524 RTX100 Xtreme - Professional user	679.00	797.83
JL62636 RTX2000 - Professional user	556.00	653.30

Studio Deluxe

- Drag and drop editing
- Your home movies on VHS, CD, DVD or via email
- Add titles, voice-overs, effects and TV style transitions
- Internal capture card + external breakout box
- Capture from an analogue or digital camcorder.

PINNACLE SYSTEMS	Ex Vat	Inc Vat
JL66248 Studio Deluxe V.8	129.00	151.58
JL66250 Studio DV V.8	56.99	66.96
JL49583 Studio MovieBox DV		
JL49478 Studio MovieBox USB	99.99	117.49

Adaptec New Video! DVD Media Center

Video!™
DVD Media Centre is an all-in-one solution for watching, controlling and recording TV on your PC. The solution easily converts analog and digital media into MPEG files. As a personal video recorder (PVR), Media Centre can record TV shows, time-shift and burn to DVD or video CD.

- Watch & control live TV on your PC
- MPEG-2 Hardware Encoding for Highest Video Quality

- Enhance your Video with Sound, Titles and Special Effects
- Burn TV, Home Movies & Photos to DVD & Video CD
- Available as an external USB 2.0 kit or PCI kit.

Adaptec	Ex Vat	Inc Vat
JL49493 Video! DVD Media center 2410 PCI kit	89.99	105.74
JL49494 Video! DVD Media center 2310 USB 2.0 Kit	99.99	117.49
JL64958 Video! DVD	91.99	108.09
JL48016 Video! CD	41.99	49.34
JL48017 Video! PCI	79.99	93.99
JL64959 XHub for Notebooks 4 Port USB 2.0 Hub	24.99	29.36
JL48360 DuoConnect for Notebooks	59.99	70.49
JL48361 SATAConnect Host Controller Kit	31.99	37.59

Screen Filters

- Eliminates 99% of glare, reflection and radiation
- Anti-static
- Simple to install with velcro pads
- Available in three sizes.



Kensington	Ex Vat	Inc Vat
JL13586 14-15" Filter	22.12	25.99
JL13589 16-17" Filter	30.63	35.99
JL13802 19-21" Filter	56.16	65.99

CTX EX700 17" Monitor

- Black and Silver Bezel
- High Contrast Screen
- 110Mhz
- TCO'99
- 3 year on-site warranty*
- UK and Ireland.

IncVat **£110.00**
ExVat **£93.62**
Order **JL65453**



109S40 19" Monitor

- LightFrame™ 3 - 2 x Normal Brightness
- Flat square High Contrast CRT with 0.27mm pitch
- World's shortest 19-inch conventional monitor with maximum depth of only 441mm/17.3"
- Multimedia Base and USB Hub option
- TCO99 certified.

PHILIPS



IncVat **£131.00**
ExVat **£111.49**
Order **JL65123**

LCD MONITOR TV'S

	Ex VAT	Inc VAT
IIYAMA		
JL65598 ProLite C480T 19" MM DVI-I LG	765.11	899.00
JL65586 L1510T 15"	285.96	336.00
JL65587 L1810T 18"	574.47	675.00
SHARP		
JL65580 Aquos LC-15B4E 15" MM	552.34	649.00
JL65576 Vision V-1701 17"	509.79	599.00
JL65577 Aquos LC-20B4E 20" MM	960.85	1129.00
JL65578 Aquos LC-22SV2E 22" MM	1275.74	1499.00
SAMSUNG		
JL65473 SM152MP 15" Silver	349.79	411.00
JL65469 SM172MP 17" Silver	399.15	469.00
JL65471 SM192MP 19" Silver		
JL65428 SM211MP 21" Silver MM	1478.30	1737.00
JL65430 SM241MP 24" Silver MM	1935.32	2274.00

Great Value SM753S 17" CRT

- FST CRT
- Natural Colour™ software helps users synchronise one screen colour with printed colour.



IncVat **£80.99**
ExVat **£68.93**
Order **JL65175**

SAMSUNG

Stylish 192V 19" LCD

Exceptional performance at a price that won't break the bank.

- Slim Silver bezel
- 140° max horizontal viewing angle/ 120° max vertical viewing angle
- 25ms Response Time
- Analogue Interface
- 3 year warranty.

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LG's 17" LCD Monitor features DVI-I digital input, a high resolution and an extremely fast response time of 16ms. In addition, the monitor has an integrated power block and can be easily wall mounted.

IncVat **£336.00**
ExVat **£285.96**
Order JL65116



Great Value L1811S 18.1" LCD

LG's 18.1" LCD monitor combines an analogue input with superior image quality and a slim-line design that can be free standing or wall-mounted. An extra wide viewing angle, high resolution and a vivid range of colours makes the monitor perfect for any working environment.

IncVat **£386.00**
ExVat **£328.51**
Order JL65549



roLite E380S-B 15" TFT LCD

• Features: OPQ mode, removable base/VESA compliant mounting plate, Kensington lock
• TCO-99
• 3 year on-site UK warranty.

IncVat **£340.00**
ExVat **£289.36**
Order JL65322

iiyama

ProLite E431S-S 17" TFT LCD

• Ultra fast 16ms response time
• 2 x integrated stereo speakers
• Gamma and sRGB multi colour control support
• Economy mode to preserve backlight lifetime
• TCO-99 compliant
• 3 year on-site UK warranty.

IncVat **£468.00**
ExVat **£398.30**
Order JL65179



Displays for all

New S Series LCDs

• Stylish "Floating" design
• Ideal for surfing, working and gaming
• Internal power supply
• Backlight control (high/medium/low)
• Analogue interface
• 1.3 Megapixel (MP) res. (1280x1024) / 0.7 MP (1024x768) - (S53)

• 170 degrees (160 on S53 & S73) maximum horizontal viewing angle / 170 degrees (150 on S53 & S73) maximum vertical viewing angle
• Advanced digital smoothing
• Available in Navy, Grey and White
• Swivel stand supplied.

SONY

	Ex Vat	Inc Vat
JL65550 S53 15" LCD	205.11	241.00
JL65551 S73 17" LCD	336.17	395.00
JL65552 S93 19" LCD	476.60	560.00



Professional Range



SONY

	Ex Vat	Inc Vat
65005 P82 18" LCD	586.38	689.00
65016 P232W 23" LCD	1698.72	1996.00

• Designer slim bezel (SDM-P82) and wide-screen LCD (SDM-P232W)
• High contrast and brightness
• Triple input flexibility with DVI-I and two HD15
• ECO mode for 25% power consumption savings
• High resolution.

SONY

Multimedia and Gaming LCDs

• Incredible new displays from Sony
• Amazing anti-reflective screen
• Super fast graphics processor delivers consistently high quality images and video
• High quality stereo speakers
• Adjustable height - Ergostand
• Triple input flexibility with DVI-D and two HD15 connectors
• Three inch sizes, two colours.

SONY

	Ex Vat	Inc Vat
JL65516 X53 15" LCD	246.81	290.00
JL65517 X73 17" LCD	409.36	481.00
JL65518 X93 19" LCD	523.40	615.00



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• LightFrame™ for the brightest, sharpest and most vivid images ever!
• DVI Digital and VGA analogue interfaces
• Embedded universal AC power supply
• sRGB compliance
• Adjustable viewing height
• Adjustable tilt function
• Auto adjustment optimises picture quality.

IncVat **£264.00**
ExVat **£224.68**
Order JL65466



18.1" TFT Photon Monitor

• VGA and DVI to ADC connections
• Base and wall mount options
• Colour calibration optional
• MAC & PC, Plug and play
• Photon 20.1" also available
• 3 year swap-out warranty.

IncVat **£492.00**
ExVat **£418.72**
Order JL70057



17" PV722i LCD + Wireless Keyboard & Mouse Bundle

• MVA Panel
• 25ms response time
• 170° viewing angles
• DVI interface
• Pivot screen**
• 3 year on-site warranty*



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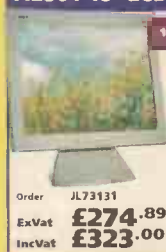
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MONITORS

15" LCD MONITORS

		Ex VAT	Inc VAT
JL65524	CTX S501A MM Beige	165.96	195.00
JL65525	CTX S501AB MM Black	169.36	199.00
JL65526	CTX S521A MM Blk/Silver	168.51	198.00
JL65004	CTX 15" S530	204.26	240.00
JL53989	CTX 15" PV520A	202.55	238.00
JL65375	Iiyama 15" ProLite E380S	188.09	221.00
JL65376	Iiyama 15" ProLite E380S-B	188.09	221.00
JL53954	Iiyama 15" AX3835UT Ivory	298.72	351.00
JL54278	Iiyama 15" AX3835UT Black	298.72	351.00
JL54943	LG 15" L1510S	173.62	204.00
JL65990	LG 15" L1512S	179.57	210.99
JL65192	LG 15" L1512P Pivot	213.62	251.00
JL53469	NEC 15" 1550V	214.47	252.00
JL65312	Philips 15" 150S4FG	167.66	197.00
JL65466	Philips 15" 150P4CS	224.68	264.00
JL65455	Samsung SM152V 15" Ivory	168.51	198.00
JL65456	Samsung SM152V 15" Silver	168.51	198.00
JL65516	Sony 15" SDM-X53 Ivory	246.81	290.00
JL65550	Sony 15" SDM-S53 Ivory	205.11	241.00

AL801 18" LCD



• Slim Bezel
• Analogue Interface
• TCO-99
• Response time 30ms.

Order JL73131
ExVat **£274.89**
IncVat **£323.00**

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17" LCD MONITORS

JL53399	CTX 17.1" PV720A	287.66	338.00
JL65195	CTX 17" S700	229.79	270.00
JL65445	CTX 17" S730	279.15	328.00
JL65174	CTX 17" P722i	321.70	378.00
JL65284	CTX 17" P722E	352.34	414.00
JL65322	Iiyama 17" ProLite E430S	289.36	340.00
JL65323	Iiyama 17" ProLite E430S-B	289.36	340.00
JL65350	Iiyama 17" AS4332 Black	348.94	410.00
JL65992	LG 17" L1710S	251.06	295.00
JL65116	LG 17" L1710B DVI	285.96	336.00
JL65460	Samsung SM172V 17" IVORY	244.26	287.00
JL65461	Samsung SM172V 17" SILVER	244.26	287.00
JL65551	Sony 17" SDM-S73	336.17	395.00
JL65517	Sony 17" SDM-X73	409.36	481.00

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JL70057	Lacie 18" Photon18 Blue	418.72	492.00
JL65549	LG 18" L1811S	328.51	386.00
JL54096	CTX 18.1" PV880C MM	518.30	609.00
JL65179	Iiyama 18.1" AS4612UT	398.30	468.00
JL65180	Iiyama 18.1" AS4612UT/BK	398.30	468.00
JL65253	CTX 19" P922E	454.47	534.00
JL65060	Iiyama 19" AS4821DT/BK	557.45	655.00
JL65552	Sony 19" SDM-S93	476.60	560.00
JL65518	Sony 19" SDM-X93	523.40	615.00
JL70058	Lacie 20.1" Photon20 Blue	878.30	1032.00
JL65190	LG 20" L2010P	967.66	1137.00
JL65177	Iiyama 20.1" AU5131DT	891.91	1048.00
JL65427	Samsung 21" 210T	1085.11	1275.00
JL65429	Samsung 24" 243T	1758.30	2066.00

15" - 17" CRT MONITORS

JL67115	CTX 15" VL500	62.12	72.99
JL65000	Iiyama 15" VM1352	69.78	81.99
JL65146	Iiyama 17" LS704U G	82.54	96.99
JL54945	LG 17" 700M	97.87	115.00

JL67117	CTX 17" VL700	68.08	79.99
JL53386	CTX 17" EX710F	98.72	116.00
JL55263	CTX 17" MS700	91.91	108.00
JL55200	Iiyama 17" VM1413	101.28	119.00
JL65122	Philips 17" 107T41	91.06	107.00
JL65175	Samsung 17" SM753S	68.93	80.99

18" - 22" CRT MONITORS

JL53389	CTX 19" VL950T	107.23	126.00
JL65150	Iiyama 19" VM454	223.83	263.00
JL65223	Iiyama 19" VM506	325.11	382.00
JL54944	LG 19" E900B Studioworks	150.64	177.00
JL65123	Philips 19" 109S40	111.49	131.00
JL65118	Iiyama 22" Pro 513	325.11	382.00
JL51853	Sony 24" GDM-FW900	1134.47	1333.00

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KEYBOARDS & MICE

ACCURATUS MICE

	Ex VAT	Inc VAT
JL53927 Accuratus 1320 Mouse Wht	4.25	4.99
JL53928 Accuratus 1320 Mouse Blk	6.80	7.99
JL52595 Accuratus 4D Roller Mouse	7.65	8.99
JL52596 Accuratus 3 Button Mouse	17.86	20.99

ACCURATUS KEYBOARDS

JL51857 Accuratus 280 M/Media	16.16	18.99
JL33365 ACC210 Standard	17.86	20.99
JL34372 ACC298 Standard	27.23	31.99
JL51858 Accuratus Mini Keyboard	47.65	55.99

BELKIN KEYBOARDS

JL66738 ClassicKeyboard Black,PS/2	8.50	9.99
JL66739 ClassicKeyboard Black,USB	8.50	9.99
JL67003 ClassicKeyboard USB	22.97	26.99

BELKIN MICE

JL66729 3 Button Mouse PS/2 Black	3.40	3.99
JL66730 3 Button Mouse USB Black	4.25	4.99
JL66732 3 Button Mouse USB White	4.25	4.99
JL66726 2 Button Wheel USB/PS/2 Blk	5.95	6.99
JL66727 2 Button Wheel PS/2 Black	4.25	4.99
JL66728 2 Button Wheel PS/2 White	4.25	4.99
JL66736 MiniScroller 2 button USB/PS/2	16.16	18.99

KENSINGTON MICE

JL67922 Mouse-in-a-box Optical	11.91	13.99
JL67025 Mouse-in-a Box Scroll	12.76	14.99
JL52330 Mobile Optical Pocket Mouse	11.06	12.99
JL66475 PocketMouse Pro Wireless	24.67	28.99

LOGITECH MICE

JL66408 Mini Mouse Optical	13.61	15.99
JL66412 Marble Mouse	15.31	17.99
JL66411 MX 300 Optical Mouse	23.82	27.99
JL66410 MX 500 Optical Mouse	24.67	28.99
JL66610 Cordless MouseMan Optical	32.33	37.99
JL66409 MX 700 Cordless Optical	39.14	45.99

LOGITECH KEYBOARD

JL68471 Deluxe Access Keyboard	8.50	9.99
JL66417 Internet Navigator Keyboard	15.31	17.99
JL66416 Cordless Desktop Deluxe	31.48	36.99
JL66415 Cordless Desktop Navigator	51.91	60.99
JL66413 Cordless Desktop Optical	58.71	68.99

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JL68286 Opti-Glo Mouse USB	16.16	18.99
JL68318 Opti-Pro Mouse, USB	17.86	20.99
JL66406 Opti-Freestyle Mouse USB	26.37	30.99

MICROSOFT KEYBOARDS & MICE

JL34621 Basic Mouse	6.80	7.99
JL23592 IntelliMouse 3.0	7.65	8.99
JL86276 Wheel Mouse Optical v1.1	13.61	15.99
JL61613 Trackball Optical	18.71	21.99
JL86287 Notebook Optical Whl Mouse	15.31	17.99
JL86377 Notbk Optcd Whl Mouse Blk	16.16	18.99
JL86269 Optical Mouse Blue	19.57	22.99
JL67168 IntelliMouse Optical	20.42	23.99
JL53754 IntelliMouse Explorer 3.0	24.67	28.99
JL86268 W'less Optical Mouse Blue	25.52	29.99
JL86289 W'less Optical Mouse Black	26.37	30.99
JL52124 Trackball Explorer	26.37	30.99
JL86376 W'less Optical Mouse Ice	24.67	28.99
JL86267 Internet Keyboard PIs 2	11.06	12.99
JL86283 Multimedia Keyboard	17.86	20.99
JL52646 Office Keyboard	22.97	26.99
JL86266 Natural Multimedia Keyboard Pro	27.23	31.99
JL53101 Wireless IntelliMouse Expl	30.63	35.99
JL86285 Wireless Optical Desktop	47.65	55.99
JL86401 Wireless Optical Desktop Special Edition	56.16	65.99
JL66810 Microsoft Wireless Optical Mouse - Steel Blue	29.78	34.99
JL66811 Microsoft Wireless Optical Mouse - Blue Moon	29.78	34.99
JL66812 Microsoft Wireless Optical Mouse - Metallic Red	29.78	34.99

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JL67471 Gel Keyboard Wrist Pillow-Bk	7.65	8.99
JL68550 Gel Height Adjustable Wristrest-Blue	9.35	10.99
JL67956 Underdesk keyboard Drawer	18.71	21.99
JL67957 Desktop Keyboard Drawer	17.86	20.99
JL67973 Mouse Tray	9.35	10.99

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JL66526 Nisis EasyPen G3 6x4.5	28.08	32.99
JL66528 Nisis EasyPen G5 6x4.5	60.42	70.99
JL66529 Nisis EasyPen G6 6x4.5	62.97	73.99

Microsoft Wheel Mouse

- Easy to set up and use
- Ambidextrous design
- Faster wheel scrolling
- 3 Customisable buttons
- PS/2 connection.

IncVat £7.99
ExVat £6.80
Order JL33841



Microsoft Optical Mouse

- Accurate and adaptable optical sensor
- How adaptable? Ever so! PC or Mac, USB or PS/2, left or right handed use, you can even pick your colour!
- Available in blue and special edition red.

IncVat £26.99
ExVat £22.97
Order JL86375



Microsoft Wireless Optical Mouse

- NEW revolutionary Tilt wheel provides both vertical and horizontal (side-to-side) smooth scrolling - great for web pages, spreadsheets and long documents.
- Wireless freedom with longer battery life - many users will average more than 6 months.
- Available in Metallic Red, Steel Blue, and Periwinkle.

IncVat £34.99
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NEW



Microsoft

CTX Wireless Keyboard & Mouse

- Unique A-Shape key structure. Allows hands, wrist and forearms to rest in a natural position when typing.



IncVat £21.99
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CTX

Belkin Wireless Keyboard and Mouse Bundle

- Features digital radio frequency technology
- Works 6 feet from receiver
- Keyboard features 9 multimedia and Internet access keys
- Mouse works with both right and left-handed users
- Belkin Lifetime Warranty.



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ExVat £22.97
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BELKIN

Gel Wrist Supports

- Gel filling provides superior support and comfort
- Alleviates the strain of repeated hand motion
- Transparent coverings are easy to clean.



Fellowes

	Blue	Purple	Ex Vat	Inc V
JL68407 JL68413 K'board wrist rest			7.65	8.9
JL68408 JL68414 Mouse mat			7.65	8.9
JL68409 JL68415 Flex rest			7.65	8.9

ValuMouse

- Quality benefits, branded value
- As an economical replacement for your original mouse, the Kensington® ValuMouse® is in a class by itself. Fits comfortably in either hand.

Kensington

	Ex Vat	Inc Vat
JL60414 2 button PS/2	3.40	4.00
JL60415 3 button PS/2-Serial	4.25	4.99
JL60416 2 button & scroll wheel PS/2-USB	4.25	4.99



Mouse-in-a-Box Optical™

- Optical Technology at an economical price
- 3 button (Including Scroll Wheel) Optical Mouse
- Metallic top with cool translucent base
- Ultra high-speed Optical Sensor gives you smooth accurate movement on almost any surface.

Kensington®



IncVat £13.99
ExVat £11.91
Order JL67922

Mini-Wireless USB Optical Mouse

The Belkin Mini Optical mouse features a compact and light design ideal for mobile users



Belkin	Ex Vat	Inc Vat
JL66796 Wireless USB Optical Mouse		22.12 25.99

Optical Pilot Wheel Mouse

- Optical precision and performance
- Records motion optically without a ball
- Smooth and precise
- Fits right or left hand
- 3-year guarantee
- Plugs into USB or PS/2 port.

Logitech

Logitech	Ex Vat	Inc Vat
JL66609 Pilot Wheel Mouse	10.20	11.99
JL66608 Optical Pilot Wheel Mouse	12.76	14.99



Marble Mouse

- Comfortable fit with optical performance.
- Fits like a mouse, works like a trackball
- Accurate and precise optical technology
- No need for regular cleaning
- Comfortable for left or right hand
- USB and PS/2 connection
- 3-year guarantee.

IncVat £17.99
ExVat £15.31
Order JL66412



Logitech

Cordless Wheel Mouse

- Easy scrolling with cordless freedom
- Cordless comfort and control in a sleek shape that feels good in either hand
- WebWheel™ provides scrolling and fast, easy Internet use.

Logitech

Logitech	Ex Vat	Inc Vat
JL34247 Cordless Wheel Mouse	14.46	16.99
JL66607 Cordless Optical Mouse (USB-PS/2)	27.23	32.00



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HP ScanJet 2400



A slim attractive and affordable scanner that will get you started in no time at all. One-touch buttons provide automatic scanning and colour copying.

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ExVat **£39.14**
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HP ScanJet 3670



Stylish scanner offering real versatility and value for money. One-touch scan, copy and Instant Share designed for Home Users.

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ExVat **£58.71**
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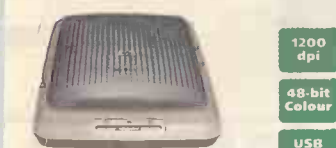
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HP ScanJet 3690



This scanner has been designed for Creative Home users using bundled imaging software. Ability to scan 5mm slides/negatives.

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ExVat **£63.82**
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HP ScanJet 3970



Designed for home users for use with high quality photo projects. Ability to scan 35mm slides/negatives, with easy to use one-touch buttons.

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HP ScanJet 4600



This scanner has exclusive See-through scanning technology, with stitching capability for large format scanning. One can easily reassemble photos scanned in sections.

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ExVat **£112.34**
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Canoscan Lide 20

An easy-to-use, affordable scanner that has the advanced "Z-lid" feature that makes books and magazines easy to scan as single sheets of paper. It also has Canon's powerful "fast multi photo mode" that scans many photos in one.

IncVat **£45.99**
ExVat **£39.14**
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Canoscan Lide 30



Compact Stylish Design. 3 one touch EZ scanning buttons - scan, copy, e-mail. One Pass Multi Photo Mode scans multiple photos collectively.

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ExVat **£44.25**
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Canoscan Lide 50



Beauty, speed and quality, that's what you get with the Lide 50. 4 "EZ" buttons to make regular scanning tasks easier. The extensive software package includes, Adobe® Photoshop® Elements.

IncVat **£65.99**
ExVat **£56.16**
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Canoscan 3000F



Here's a scanner that provides high quality images of your films or documents whether your a power user or a first time user. Advanced CCD technology, allows the output to be clear, sharp and true to the original.

IncVat **£72.00**
ExVat **£61.28**
Order JL66554

Canoscan 8000F



The scanner for professional quality scans. FARE technology eliminates dust and scratches further enhancing your productivity. 4 EZ buttons to make common scanning tasks a simply one-touch operation.

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ExVat **£148.94**
Order JL70898

Canoscan 9900F



The Canoscan 9900F is a professional desktop scanner that rivals the quality of dedicated film scanners, yet delivers great quality and great value, whether you're scanning from originals or negatives.

IncVat **£269.00**
ExVat **£228.94**
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EPSON Perfection 1670

The Perfection 1670 is EPSON's new generation of flatbed scanners specifically designed for the home user. With enhanced quality, performance and ease of use, this scanner is perfect for the beginner and amateur user looking for high quality photo scanning.



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ExVat **£59.57**
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EPSON Perfection 1670 PHOTO

The Perfection 1670 Photo includes a built-in Transparency Unit (TPU) for scanning all types of 35mm film and slides. Featuring outstanding image quality and new easy-to-use photo restoration features.



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EPSON Perfection 2400 PHOTO

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EPSON Perfection 3200 PHOTO

The ultimate flatbed film-scanning solution for the photography enthusiast. Large built-in 4" x 9" Transparency Unit supports all common film formats. Dust and scratch removal with new SilverFast ACR.



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STROBE XP - Mobile Scanning



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- USB Powered.

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Slimmest CCD Scanner on the market.

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ExVat **£91.06**

MICROTEK

SCANNERS FLATBED

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JL63346	Canoscan D1250U2	83.40	98.00
JL66477	Canoscan 5000F	141.28	166.00
EPSON			
JL66210	Epson Perfection 1260 Photo	58.71	68.98
JL66212	Epson Perfection 1660 Photo	74.89	88.00
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JL63988	Scanjet 3570c (USB)	76.59	89.99
JL66448	Scanjet 5550c (USB 2.0)	210.21	247.00
JL50929	HP Support Pack - Scanjets	34.03	39.99
MICROTEK			
JL63693	ScanMaker 4800 USB Photo	77.44	90.99
JL66542	ScanMaker 5900 inc TMA	135.32	159.00
JL66714	ScanMaker 6800	279.15	328.00
UMAX			
JL66462	Astra 4700 USB 2.0	64.67	75.99
JL66463	Astra 6700 USB2.0	107.23	126.00
VISIONEER			
JL66449	One Touch 5800 USB	39.99	46.99
JL66786	One Touch 6600 USB	43.40	51.00
JL66450	One Touch 8700 USB	60.42	70.99
JL66452	One Touch 9000 USB	63.82	74.99
JL66453	One Touch 9020 USB	81.69	95.99
JL66451	One Touch 8920 USB	93.62	110.00

FILM SCANNERS

JL62581	Canoscan F54000US	416.17	489.00
JL63121	Microtek FilmScan 35	99.57	116.99
JL63522	Microtek FilmScan 1800	187.23	220.00
JL63968	Microtek FilmScan 3600	369.36	434.00
JL63113	Minolta Dimage Scan Elite II	388.94	457.00
JL66468	Minolta Dimage Scan Dual III	212.77	250.00

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ExVat **£123.40**
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JL66245	Kodak CX4210	94.47	111.00
JL66693	Olympus C150	98.72	116.00
JL66385	Fujifilm FinePix A202	100.43	118.00
JL66699	Konica KD-220Z	116.60	137.00
JL66246	Kodak CX4230	123.40	145.00
JL66387	Fujifilm FinePix A204 Zoom	138.72	163.00
JL66769	Sony DSC-P32	147.23	173.00
JL66759	Nikon Coolpix 2100	151.49	178.00
JL66702	EXS2DDA	158.30	186.00
JL66580	Sony DSC-U20 Cybershot	169.36	199.00
JL63458	Sony Mavica MVC-FD200	245.96	289.00

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JL66247	Kodak DX4330	168.51	198.00
JL66694	Olympus C350Z	171.06	201.00
JL66781	Kodak DX6340	182.98	215.00
JL73174	Fujifilm A310	217.02	255.00
JL66700	Konica KD-310Z	227.23	267.00
JL66703	Casio EXS3DDA	234.04	275.00
JL70709	Canon IXUS II	254.47	299.00
JL66704	Casio EXZ3DDA	264.68	311.00
JL66399	Fujifilm Finepix F601 Zoom	337.01	395.99
JL70685	Oregon DS9300	182.98	215.00
JL70821	Kyocera L3V	228.94	269.00

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JL70823	Kodak DX6440 - NEW	225.53	265.00
JL66372	Kodak LS443	257.87	303.00
JL66221	Olympus C-4000Z	254.47	299.00
JL66376	Konica KD-400Z	264.68	311.00
JL66695	Olympus MJU400	284.26	334.00
JL66788	Olympus C-750UZ	338.72	398.00
JL70686	Kyocera Finecam S5	273.19	321.00
JL66434	Canon Powershot S45	321.70	378.00
JL66757	Sony MVC-CD500	382.98	450.00
JL66177	Nikon Coolpix 4500	409.36	481.00
JL66706	Casio QV5700DDA	414.47	487.00
JL66433	Canon Powershot G3	400.85	471.00
JL66370	Olympus C-5050Z	432.34	508.00
JL66772	Sony DSC-F717	509.79	599.00

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KODAK			
JL66530	Kodak EasyShare docking station II	39.99	46.99

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HP PHOTO PRINTERS			
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JL55781	Photosmart 230	108.09	127.01
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JL55782	Photosmart 7550	186.38	219.00
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JL55468	i550	86.81	102.00
JL54758	BJ-S820 Colour Inkjet Printer	168.51	198.00
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JL66206	Creative Labs Webcam Pro	27.23	31.99
JL66697	Creative Webcam Pro EX	39.99	46.99
JL66698	Creative PC-Cam 550	47.65	55.99
JL66214	Creative PC Cam 300	59.57	69.99
JL66521	Nisis Quickpix QP1 Digital	24.67	28.99
JL63062	Philips PCVC730K ToUcam	34.89	40.99
	Fun USB Camera		
JL63061	Philips PCVC740K ToUcam	39.99	46.99
	Pro USB Camera		
JL63063	Philips PCVC750K Scanning Webcam Pro 3D 60FPS	57.86	67.99

Continuous Shooting Mode

Lets you take a short burst of pictures so you can capture a moving object more easily.

LCD Screen

Frame your shot or just view your picture before taking the photo.

Connection / Docking Stn

This will allow a quick and easy link to your PC in order for you to download all your photos.

Memory

Whether it's removable memory or internal. In order to get as many great snaps of those precious moments, here is where you can store your memories.



IncVat **£238.00**
ExVat **£202.55**
Order **JL66696**

you can **Canon**

Flash

Optical - Digital Zoom

Digitally enlarge a selected area of your image with Digital Zoom. With Optical Zoom you can get up close but won't lose any image quality.

Resolution - Megapixel

The higher the Megapixel resolution the bigger and better you can make your photos.

CANON Powershot A300

For a first time buyer looking for a digital camera for all the family, the PowerShot 300 is the answer. Comes with all the software you need for viewing photos and sharing them with friends.



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CANON IXUS 400

Canon's smallest zoom camera the digital IXUS 400 is packed with features yet doesn't compromise on style.



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ExVat **£302.13**
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CANON Powershot A70

The compact PowerShot A70 offers a lot of camera for the money, using the same DIGIC processor as top-of-the-line Canon digital cameras, images are always crisp and clear.



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CANON Powershot S50

The PowerShot S50 is a versatile digital camera, with full manual controls for the advanced amateur photographer. ** 12x combined with Optical Zoom.



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CANON Powershot G5

Combining advanced Canon digital technology and flexibility, the PowerShot G5 delivers superb shooting results, consistently. ** 16x combined with optical zoom



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ExVat **£480.85**
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CANON MV6iMC

The beautifully designed MV6iMC is super small and lightweight. Wrapped in a sleek silver case, and a compact 10x optical zoom.



IncVat **£635.00**
ExVat **£540.43**
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CANON MV600i

The MV600i camcorder also has the benefit of an Analogue-Digital converter and DV and Analogue in option.



IncVat **£442.00**
ExVat **£376.17**
Order **JL66689**

CANON MV650i

As well as the Night Mode offered in all the 600 series. The MV650i also has Super Night Mode for shooting colour in almost zero lux.



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EPSON

HYPERTEC Flash Memory

Hypertec Flash memory provides you with non-volatile, high capacity, solid state storage and is available in various formats for a vast range of devices.

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JL66485	32MB	16.16	18.99
JL66486	64MB	22.12	25.99
JL66487	128MB	46.80	54.99
JL66488	256MB	79.14	92.99
JL66489	512MB	147.23	173.00
JL66483	CF PC Card Adapter	6.80	7.99
SmartMedia Cards			
JL66490	32MB	15.31	17.99
JL66491	64MB	24.67	28.99
JL66492	128MB	44.25	51.99
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JL66493	32MB	19.57	22.99
JL66494	64MB	32.33	37.99
JL66495	128MB	58.71	68.99
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JL66496	32MB	29.78	34.99
JL66497	64MB	35.74	41.99
JL66498	128MB	55.31	64.99
JL66499	256MB	147.23	173.00
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2.5x Digital Zoom
16MB xD Card
1.5" LCD Screen

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ExVat £100.43
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FUJIFILM FinePix A203 Zoom

Slim, stylish pocket-sized design marks this mid-range model out as exceptional.



2.0 Mega Pixels
2.5x Digital Zoom
3.0x Optical Zoom
16MB xD Card

IncVat £169.00
ExVat £143.83
Order JL66386

FUJIFILM FinePix A204 Zoom

The FinePix A204 Zoom features Movie mode (20-sec clips at 320x240 pixels) - no sound, and also webcam and video conferencing.



2.0 Mega Pixels
2.5x Digital Zoom
3.0x Optical Zoom
16MB xD Card

IncVat £163.00
ExVat £138.72
Order JL66387

FUJIFILM FinePix A303 Zoom

Perfect mid-range camera that combines sleek styling with FinePix Viewer software takes image download and management equally simple.



3.24 Mega Pixel
3.2x Digital Zoom
3.0x Optical Zoom
16MB xD Card

IncVat £193.00
ExVat £164.26
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FUJIFILM FinePix S602 Zoom

At the heart of the FinePix S602 Zoom lies a 3G Super CCD sensor, delivering an output resolution of 6 million recorded pixels.



3.1 Mega Pixels
4.4x Digital Zoom
6.0x Optical Zoom
16MB SM

IncVat £449.00
ExVat £382.13
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HP PhotoSmart 435

Enjoy Solid performance with the 435. Get great results for sharing photos and capture the action using the video-clip feature.



2.1 Mega Pixel
4.0x Optical Zoom
8MB Int & SD Slot

IncVat CALL
ExVat
Order JL70987

HP PhotoSmart 850

Create exceptional photos with this easy to use SLR type, big zoom camera. Features include a range of manual features, 5cm LCD and Video and Audio recording.



4.1 Mega Pixel
4.1x Digital Zoom
9.0x Optical Zoom
16MB SD Slot

IncVat £304.00
ExVat £258.72
Order JL66709

HP's TOP SELLING CAMERA...

HP PhotoSmart 735

The HP PhotoSmart 735 digital camera delivers outstanding digital snapshots with its Pentax precision lens giving clear, crisp photo prints. Record memories using the video clip feature with audio or add real-life audio clips to still photos or video.



3.1 Mega Pixel
4.0x Optical Zoom
8MB Int & SD Slot

IncVat £166.00
ExVat £141.28
Order JL66708

HP PhotoSmart 635

For families or individuals seeking optical zoom flexibility to capture detail from distance.



2.1 Mega Pixel
4.0x Optical Zoom
3.0x Optical Zoom
16MB Int

IncVat £138.00
ExVat £117.45
Order JL70988

HP PhotoSmart 945

Take a photo - straight from your camera - and choose where it will go the next time the camera is connected to the PC - no attachment, no slow downloads.



5.1 Mega Pixel
7x Digital Zoom
32MB MMC/SD Card slot

IncVat CALL
ExVat
Order JL73229

SONY DSC-P32

The Sony's DSC-P32 Cyber-shot compact digital still camera hands you the power to take great pictures under a variety of conditions.



3.2 Mega Pixel
3x Digital Zoom
Memory Stick Pro

IncVat £173.00
ExVat £147.23
Order JL66769

SONY DSC-P8

Ultra compact camera, the Sony DSC-P8 is the successor of the P7 with innovations to please any amateur.



3.2 Mega Pixel
3x Digital Zoom
Memory Stick Pro

IncVat £295.00
ExVat £251.06
Order JL66771

SONY DSC-P72

Looking for a compact digital still camera that gives you the power to take great pictures under a variety of conditions?



3.2 Mega Pixel
3.2 smart zoom
3x Optical zoom
Memory Stick Pro

IncVat £257.00
ExVat £218.72
Order JL66756

SONY DSC-P10

With the latest 5.0 megapixel technology, 3x optical zoom, a compact aluminium body and the second you pick it up, a knack for spotting a great photo, that's the Sony DSC-P10.



5.0 Mega Pixel
4x Digital Zoom
3x Optical zoom
Memory Stick Pro

IncVat £380.00
ExVat £323.40
Order JL66770

SONY DCR-TRV145

NEW! Compact design Digital8 camcorder with 2.5" colour LCD, built-in light & 20x optical / 560x digital zoom.



2.5" Colour LCD
560x digital zoom
Digital Effects
Built-in light

IncVat £304.00
ExVat £258.72
Order JL70949

SONY DCR-TRV245

NEW! Compact design Digital8 camcorder with 2.5" colour LCD, USB streaming, built-in light & 20x optical / 700x digital zoom.



2.5" Colour LCD
700x digital zoom
Image stabiliser
USB

IncVat £325.00
ExVat £276.60
Order JL70952

SONY DCR-TRV19

DV-In
120x Digital Zoom
Super Steady Shot
USB



SONY

NEW! Sony DCR-TRV19 Mini DV, 800k Pixel CCD, 2.5" LCD Screen

IncVat £485.00
ExVat £412.77
Order JL70957

SONY DCR-PC103

This new, ultra compact DV Handycam is called 'Pocket Compact' because of its lightweight and easy to handle characteristics.

3.0 Mega Pixel
120 Digital Zoom
Super Night Shot
USB

IncVat £650.00
ExVat £553.19
Order JL70958



HP Photosmart 230

Preview your pictures on the 230's 4.5cm LCD screen, then print directly from your camera or digital memory card.



Order JL55781
IncVat £127.01
ExVat £108.09



DIGITAL VIDEO CAMERAS

		Ex VAT	Inc VAT
CANON			
JL66688	Canon MV600	307.23	361.00
JL66216	MV5	521.70	613.00
JL66218	MV5imc	634.89	746.00
SONY			
JL66444	Sony DCR-IP7	846.81	995.00
JL66445	Sony DCR-TRV18	449.36	528.00
	Media Readers & Writers		
BELKIN			
JL63599	USB Reader/Writer for MM Card and Secure Digital	11.91	13.99
JL63596	USB Reader/Writer for CompactFlash I and II	11.91	13.99
JL63597	USB Reader/Writer for Smart Media	11.91	13.99
JL66025	USB Reader/Writer for Memory Stick	11.91	13.99
JL43591	USB 8-In-1 Media Reader/Writer	17.01	19.99

Belkin USB 8-in-1 Media Reader/Writer



Compatible with:

- CompactFlash
- CompactFlash II
- SmartMedia
- Secure Digital
- MultiMedia
- IBM Microdrive
- Memory Gate
- Memory Stick

Order JL43591
IncVat £19.99
ExVat £17.01



OMNIFLASH - USB READERS

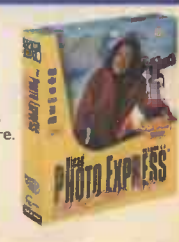
JL66011	Uno Compact Flash	13.61	15.99
JL66012	Uno Smart Media	13.61	15.99
JL66013	Uno Memory Stick	13.61	15.99
JL66014	Uno SD / MMC	13.61	15.99
JL66015	Uno Multi Format	42.54	49.98
JL66016	Int Multi Format	43.40	50.99
ANTEC			
JL61487	PhotoChute 3 USB	29.78	34.99
JL63985	Digital Film Reader		
	Imation Flashgo USB	23.82	27.99
	Memory Card Reader/Writer		

FLASH MEMORY

COMPACT FLASH CARDS			
JL62084	Sandisk 32MB	11.06	12.99
JL62085	Sandisk 64MB	14.46	16.99
JL62086	Sandisk 128MB	24.67	28.99
JL63132	Sandisk 256MB	48.50	56.99
JL63134	Sandisk 512MB	93.62	110.00
JL31820	Memory Plus 64MB	18.71	21.99
JL60863	Memory Plus 128MB	27.23	31.99
JL63723	Memory Plus 256MB	57.86	67.99
JL63724	Memory Plus 512MB	136.17	160.00
SECURE DIGITAL CARDS			
JL63212	Sandisk 64MB	21.27	24.99
JL63213	Sandisk 128MB	38.29	44.99
JL66035	Sandisk 256MB	64.67	75.99
JL66674	Memory Plus 64MB	28.08	32.99
JL66675	Memory Plus 128MB	50.20	58.99
JL66676	Memory Plus 256MB	110.64	130.00

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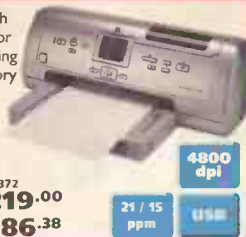
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ExVat **5.99**
Order **JL58395**

HP Photosmart 7960 **NEW**

For use with a Mac, PC or direct printing from memory cards.



Order **JL73372**
IncVat **£219.00**
ExVat **£186.38**



4800 dpi

21 / 15 ppm

CANON INKJET CARTRIDGES

		Ex VAT	Inc VAT
JL57809	BC-01 Black	16.16	18.99
JL57812	BC-02 Black	14.46	16.99
JL16120	BC-05 Tri Colour	17.86	20.99
JL16685	BC-06 Photo Colour	16.16	18.99
JL16069	BC-10 Black Printhead	25.52	29.99
JL16070	BCI-108k Black	10.20	11.99
JL16045	BCI-11e Colour	28.08	32.99
JL16046	BCI-118k Black	6.80	7.99
JL16047	BCI-11C Colour	12.76	14.99
JL16041	BC-20 Black	22.12	25.99
JL57841	BC-21e Tri Colour	32.33	37.99
JL57842	BCI-218k Black	4.25	4.99
JL57843	BCI-21C Colour	12.76	14.99
JL16687	BC-22e Photo Colour	17.01	19.99
JL36711	BC-23 Black	20.42	23.99
JL58333	BCI-248k Black	4.25	4.99
JL58334	BCI-24C Colour	10.20	11.99
JL36854	BC-30e Tri Colour	22.97	26.99
JL36855	BC-31e Tri Colour	27.23	32.00
JL36856	BC-32e Tri Colour	23.82	27.99
JL57252	BC-33e Colour	34.03	39.99
JL57253	BC-34e Photo	31.48	36.99
JL57974	BCI-3eBk Black	7.65	8.99
JL57975	BCI-3eC Cyan	5.95	6.99
JL57976	BCI-3eM Magenta	5.95	6.99
JL57977	BCI-3eY Yellow	5.95	6.99
JL57980	BCI-3ePBk Black	5.10	5.99
JL57981	BCI-3ePC Cyan	5.95	6.99
JL57982	BCI-3ePM Magenta	5.95	6.99
JL57988	BCI-6Bk Black	5.95	6.99
JL57991	BCI-6C Cyan	5.95	6.99
JL57990	BCI-6M Magenta	5.95	6.99
JL57989	BCI-6Y Yellow	5.95	6.99
JL36390	BC-60 Black	22.97	26.99
JL36391	BC-61 Colour	22.12	25.99
JL36713	BC-62 Photo	35.74	41.99
JL36712	BCI-61 Colour	15.31	17.99
JL57845	BJI-2018k Black	5.10	5.99
JL57817	BJI-201C Cyan	4.25	4.99
JL57819	BJI-201M Magenta	5.10	5.99
JL57820	BJI-201Y Yellow	5.10	5.99
JL57811	BJI-642 Black	10.20	11.99
JL57813	BJI-643Bk Black	14.46	16.99
JL57816	BJI-643C Cyan	18.71	21.98
JL57814	BJI-643M Magenta	17.86	20.99
JL57815	BJI-643Y Yellow	18.71	21.98

EPSON PAPER

		Ex VAT	Inc VAT
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JL58392	Glossy photo A4 (S041624) 50	20.42	23.99
JL58309	Glossy photo roll 100mmx8m (S041303)	11.06	13.00
JL58312	Semigloss Photo (S041332) 20	10.20	11.99
JL58749	Semigloss Photo roll 100mm x 8m (S01330)	11.91	13.99
JL58755	Matte heavy weight A4 (S041256) 50	7.65	8.99
JL58296	Double-sided Matte A4 (S041569) 50	11.91	13.99

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FREE Nemo Print Studio CD

* Studio CD included in the above packs of paper whilst stocks last

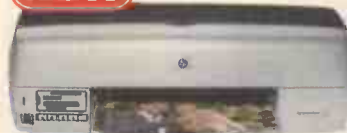
		Ex VAT	Inc VAT
JL58005	Photo quality inkjet	7.65	8.99
JL58282	Photo quality glossy	5.95	6.99
JL58283	Premium glossy photo	9.35	10.99
JL58755	Matte heavy weight	7.65	8.99

HP Photosmart 7260

True to life photos - A4 or borderless from a PC, Mac or direct from a digital camera. Comes with one-touch buttons and easy-to-learn HP Photo & Imaging software.

IncVat **£80.99**
ExVat **£68.99**
Order **JL73144**

NEW



16 / 12 ppm

4800 dpi

USB



		Ex VAT	Inc VAT
JL58721	Black inkjet cartridge	13.61	15.99
JL58448	Colour inkjet cartridge	21.27	24.99
JL58827	Photo inkjet cartridge	15.31	17.99

HP Photosmart 7660

For those who own a digital camera and looking for a photo printer for everyday printing. Can be turned into a versatile printer with its optional black print cartridge and 2-sided printing module.

IncVat **£135.00**
ExVat **£114.89**
Order **JL73149**

NEW



19 / 15 ppm

4800 dpi

USB

		Ex VAT	Inc VAT
JL58721	Black inkjet cartridge	13.61	15.99
JL58448	Colour inkjet cartridge	21.27	24.99
JL58827	Photo inkjet cartridge	15.31	17.99

HP Photosmart P147

Share memories - and photos - in an instant. Quick and easy, print direct from your digital camera with a camera memory card.

IncVat **£88.00**
ExVat **£74.89**
Order **JL73146**

NEW



4800 dpi

USB

		Ex VAT	Inc VAT
JL58448	Colour inkjet cartridge	21.27	24.99

Photo in 90 secs

Stylus Photo 830U

The EPSON Stylus Photo 830U is a 6 colour, A4 home photo inkjet printer offering unbeatable value.

IncVat **£66.99**
ExVat **£57.01**
Order **JL70305**

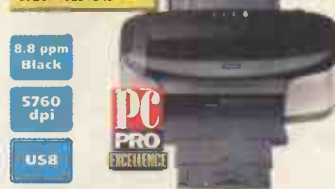


		Ex VAT	Inc VAT
JL58278	Black cartridge	17.86	20.99
JL58279	Colour cartridge	12.76	14.99

Stylus Photo 950

A4 Photo printer with high resolution, individual ink cartridges and flexible paper handling including direct CD printing.

IncVat **£261.00**
ExVat **£222.13**
Order **JL54543**



		Ex VAT	Inc VAT
JL58449	Black ink cartridge	8.50	9.99
JL58450	Cyan cartridge	8.50	9.99
JL58451	Magenta cartridge	8.50	9.99
JL58452	Yellow Cartridge	8.50	9.99

Stylus Photo 915

A4 dedicated Photo printer with built-in intelligence capable of printing your photos without any need for a computer!

IncVat **£113.00**
ExVat **£96.17**
Order **JL55271**



		Ex VAT	Inc VAT
JL58601	Black cartridge	14.46	16.99
JL58602	Twin black cartridge	25.52	29.99
JL58603	Tri-colour cartridge	11.06	13.00

EPSON

Bubble Jet i950

Canon introduces even higher print resolution and smaller ink droplet size, setting new standards for professional photo printing.

IncVat **£247.00**
ExVat **£210.21**
Order **JL56405**



		Ex VAT	Inc VAT
JL57988	Black Ink Tank	5.95	6.99
JL57991	Cyan Ink Tank	5.95	6.99
JL57990	Magenta Ink Tank	5.95	6.99
JL57989	Yellow Ink Tank	5.95	6.99

Bubble Jet i450

The Canon i450 delivers crisp, professional quality photo prints and sharp monochrome text. It gives increased speed performance - a truly breakthrough product for its price.

IncVat **£68.98**
ExVat **£58.71**
Order **JL70465**

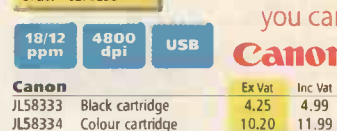


		Ex VAT	Inc VAT
JL57974	Black cartridge	7.65	8.99
JL57975	Cyan cartridge	5.95	6.99
JL57976	Magenta cartridge	5.95	6.99
JL57977	Yellow cartridge	5.95	6.99

Bubble Jet i470D

The Canon i470D demonstrates the height of versatility in direct printing. You can print directly from any of the most popular memory card types available, or from your compatible Canon digital camera or camcorder.

IncVat **£152.00**
ExVat **£129.36**
Order **JL70238**



		Ex VAT	Inc VAT
JL58333	Black cartridge	4.25	4.99
JL58334	Colour cartridge	10.20	11.99

you can **Canon**

High Quality Photo Paper

Instead of printing your photos on ordinary paper, use photo paper for highest quality and maximum life. Pay attention to the 'gsm' rating - the higher it is, the better quality your pictures will be.

		Ex VAT	Inc VAT
JL58530	Canon 20shots 270gsm	7.65	8.99
JL58614	EPSON 20shots 141gsm	5.95	6.99
JL58283	EPSON 20shots 255gsm	9.35	10.99
JL58487	HP 50shots 200gsm	15.31	17.99
JL57145	HP 20shots 236gsm	5.95	6.99

you can **Canon**



EPSON

Don't forget your printer cables...

Not all printers come with a printer cable to connect to your computer. Purchase either a Gold USB 2.0, premium quality cable which is quicker or a parallel cable which supports older computers.

GOLD USB 2.0



IncVat **£8.99**
ExVat **£7.65**
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Parallel



IncVat **£4.00**
ExVat **£3.40**
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hp
invent
17/12 ppm 1200x4800 dpi USB

	Ex Vat	Inc Vat
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JL5830 Colour cartridge	13.61	15.99
JL5827 Photo Cartridge	15.31	17.99

HP DeskJet 5150

Ideal for the creative and explorative customer looking for a versatile printer with advanced photo features, true-to-life photo quality and fast printing speeds, which will support a wide variety of home printing projects

IncVat **£79.99**
ExVat **£68.08**
Order **JL70839**



19/14 ppm 1200x4800 dpi USB

	Ex Vat	Inc Vat
JL58721 Black cartridge	13.61	15.99
JL58448 Colour cartridge	21.27	24.99
JL58827 Photo Cartridge	15.31	17.99

HP DeskJet 1220c

The next step in high-performance wide format (up to A3+) colour printing. Bundled with fantastic HP Smart Software providing the ability to easily produce top quality documents - from business cards to posters.



IncVat **£192.00**
ExVat **£163.40**
Order **JL50949**

11/9.5 ppm 2400 dpi USB & Par

	Ex Vat	Inc Vat
JL58728 Black cartridge	20.42	23.99
JL58730 Tri-colour cartridge	18.71	21.98

Stylus C44UX Inkjet

Quick and easy to use for fun home printing.

IncVat **£50.99**
ExVat **£43.40**
Order **JL70718**



11ppm Black 2800 dpi USB

	Ex Vat	Inc Vat
JL58699 Black cartridge	5.95	6.99
JL58700 Colour cartridge	6.80	7.99

Stylus C64 Inkjet

An advanced multipurpose printer, it is ideal for all types of applications, school projects, web printing and occasional photos.

NEW
IncVat **£64.99**
ExVat **£55.31**
Order **JL73113**



17/9 ppm 2800 dpi USB

	Ex Vat	Inc Vat
JL58528 Black cartridge	22.12	25.99
JL58529 Colour cartridge	18.71	21.98

Stylus C84 Inkjet

Ideal for all types of applications from home projects and photo printing to business documents and presentations.

NEW
IncVat **£88.00**
ExVat **£74.89**
Order **JL73114**



11/9.5 ppm 2400 dpi USB & Par

	Ex Vat	Inc Vat
JL58244 Black cartridge	19.57	22.99
JL58592 Cyan cartridge	9.35	10.99
JL58593 Magenta cartridge	9.35	10.99
JL58594 Yellow cartridge	9.35	10.99

EPSON INKJET CARTRIDGES

	Ex VAT	Inc VAT
JL36549 S020187 Black	15.31	17.99
JL57188 C135020193 Colour	12.76	14.99
JL36861 T001011 Colour	18.71	21.98
JL57254 T007401 Black	15.31	17.99
JL51266 T008401 Colour	11.91	13.99
JL57255 T009 Colour	17.01	19.99
JL58278 T026401 Black	17.86	20.99
JL58279 T027401 Colour	12.76	14.99
JL58449 C13T033140 Black	8.50	9.99
JL58450 C13T033240 Cyan	8.50	9.99
JL58451 C13T033340 Magenta	8.50	9.99
JL58452 C13T033440 Yellow	8.50	9.99
JL58453 C13T033540 Light Cyan	8.50	9.99
JL58454 C13T033640 Light Magenta	8.50	9.99
JL58455 C13T034140 Black	7.65	8.99
JL58456 C13T034240 Cyan	9.35	10.99
JL58457 C13T034340 Magenta	10.20	11.99
JL58458 C13T034440 Yellow	10.20	11.99
JL58459 C13T034540 Light Cyan	10.20	11.99
JL58460 C13T034640 Light Magenta	10.20	11.99
JL58461 C13T034740 Light Black	10.20	11.99
JL58462 C13T034840 Matte Black	8.50	9.99
JL16920 S020089 Colour	17.86	20.99
JL16653 S020093 Black	13.61	15.99
JL16921 S020108 Black	17.01	19.99
JL58527 C135020138 Colour	11.91	13.99
JL36550 S020189 Black	17.01	19.99
JL36862 S020191 Colour	17.86	20.99
JL36835 T003011 Black	20.42	23.99
JL36836 T005011 Colour	24.67	28.99
JL58099 T013401 Black	10.20	11.99
JL58373 T014401 Colour	14.46	16.99
JL58098 T018401 Colour	17.01	19.99
JL58100 T019401 Black	20.42	23.99
JL58101 T020401 Colour	17.86	20.99
JL58297 T028401 Black	22.12	25.99
JL58298 T029401 Colour	18.71	21.98
JL58244 T032140 Black	19.57	22.99
JL58262 T032240 Cyan	9.35	10.99
JL58263 T032340 Magenta	9.35	10.99
JL58264 T032440 Yellow	9.35	10.99
JL58501 C13T036140 Black	10.20	11.99
JL58502 C13T037040 Colour	14.46	16.99
JL58528 C13T040140 Black	22.12	25.99
JL58529 C13T041040 Tri Colour	18.71	21.98
JL58592 T042240 Cyan	9.35	10.99
JL58593 T042340 Magenta	9.35	10.99
JL58594 T042440 Yellow	9.35	10.99

HP INKJET CARTRIDGES

	Ex VAT	Inc VAT
JL16075 S1629A Black 40ml	18.71	21.98
JL16077 S1645A Black 42ml	18.71	21.98
JL36991 C1823D Tri Colour 30ml	22.12	25.99
JL57274 C6615D Black 25ml	17.86	20.99
JL57273 C6625A Tri Colour 15ml	19.57	22.99
JL57292 C6628A Black 30ml	21.27	24.99
JL16076 S1649A Tri Colour 22.8ml	18.71	21.98
JL57057 C6614DE Black 28ml	17.86	20.99
JL57902 C1816A Tri Colour 23ml	19.57	22.99
JL57903 C4584A Photo Colour Kit	25.52	29.99
JL57149 C6578D Tri Colour 19ml	21.27	24.99
JL58074 C6578A Tri Colour 38ml	38.29	44.99
JL6924 S1640A Black 42ml	19.57	22.99
JL36438 C4800A Black Printhead	20.42	23.99
JL36439 C4801A Cyan Printhead	20.42	23.99
JL36440 C4802A Magenta Printhead	21.27	24.99
JL36441 C4803A Yellow Printhead	21.27	24.99
JL36444 C4841A Cyan 28ml	20.42	23.99
JL36446 C4842A Yellow 28ml	20.42	23.99
JL36445 C4843A Magenta 28ml	20.42	23.99
JL36443 C4844A Black 69ml	20.42	23.99
JL58075 C4810A Black Printhead	21.27	24.99
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JL58077 C4812A Magenta Printhead	20.42	23.99
JL58078 C4813A Yellow Printhead	21.27	24.99
JL58063 C4836A Cyan 28ml	20.42	23.99
JL58064 C4837A Magenta 28ml	20.42	23.99
JL58065 C4838A Yellow 28ml	20.42	23.99
JL36510 C3844A Photosmart Cart	22.12	25.99
JL36511 C3845A Photosmart Cart	23.82	27.99
JL58272 C5011AE Black 23ml	13.61	15.99
JL58273 C5010AE Colour 19ml	17.86	20.99
JL58498 C6656A Black 19ml	12.76	14.99
JL58499 C6657A Tri Colour 17ml	21.27	24.99
JL58500 C6658A Photo 17ml	15.31	17.99

Bubble Jet i250

Whether you're choosing your first printer or it's time for a change, Canon makes everything easier and more affordable.

IncVat **£43.99**
ExVat **£37.44**
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12/9 ppm 4800 dpi USB

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JL58334 Colour cartridge	10.20	11.99

BubbleJet i350



IncVat **£62.99**
ExVat **£53.61**
Order **JL70894**

16/11 ppm 4800 dpi USB

	Ex Vat	Inc Vat
JL58333 Black cartridge	4.25	4.99
JL58334 Colour cartridge	10.20	11.99

Bubble Jet i850

The Canon i850 Bubble Jet Printer sets a new performance standard for delivering superior quality and breakthrough speed simultaneously.

IncVat **£142.00**
ExVat **£120.85**
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4800 dpi 2400 dpi USB + Par

	Ex Vat	Inc Vat
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JL58334 Colour cartridge	10.20	11.99

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Protect your PC, printer & household appliances.

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JL57283 Canon A4 Brilliant White Paper 250shts	4.25	4.99
JL58992 EPSON Quality Inkjet A4 Paper	7.65	8.99
JL57148 HP Premium A4 Inkjet Paper	9.35	10.99

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JL57999 Cutsheet Paper (A3) 200	43.40	51.00
JL57938 Cutsheet Paper (A4) 200	17.86	20.99
JL58003 Film (A4) 50	30.63	35.99
JL58004 Paper (A4) 250	14.46	16.99

JL57260 Glossy Photo Paper A4 20	5.10	5.99
JL57261 Glossy Photo Film A4 10	11.06	13.00
JL57284 Glossy Photo Cards 4x6" 20	4.25	4.99
JL57285 BubbleJet Paper A4 200	9.35	10.99
JL57286 BubbleJet Paper A3 20	17.01	19.99

EPSON

JL58296 A4 Dbls/de matte paper 50	11.91	13.99
JL16930 A3+ Photo Inkjet Paper 100	28.93	33.99
JL58314 A3+ Semigloss Photo 20	30.63	35.99
JL58282 A4 Photo Glossy Paper 20	5.95	6.99
JL57291 A4 Photo Paper 20	6.80	7.99
JL58371 A4 Matte Paper 50	6.80	7.99
JL58005 A4 Photo Inkjet Paper 100	7.65	8.99
JL58748 Glossy Photo Paper 20	4.25	4.99
JL58283 A4 Glossy Photo Paper 20	9.35	10.99
JL58392 A4 Glossy Photo Paper 50	20.42	23.99
JL58308 A3 Glossy Photo paper 20	24.67	28.99
JL58309 Glossy Photo Paper Roll	11.06	13.00
JL58310 Glossy Photo Paper Roll	28.93	33.99

HP

JL58481 Bright white A4 250	2.54	2.98
JL16515 Bright white A4 500	4.25	4.99
JL58480 Bright white A3 200	5.95	6.99
JL58021 Premium coated A4 200	11.91	13.99
JL58482 Premium coated A3 100	16.16	18.99
JL57148 Premium h/wght A4 100	9.35	10.99
JL57890 Premium glossy A4 10	10.20	11.99
JL6992 Premium glossy A4 50	28.08	32.99
JL57915 Premium trspcy film, A4 20	11.06	13.00
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JL57145 Prem plus pht glossy, A4 20	5.95	6.99
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JL36717 Premium photo A4 15	3.40	4.00
JL58487 Prem photo glossy, A4 50	15.31	17.99
JL58488 Premium photo A3 20	23.82	27.99
JL58023 Two-sided photo A4 20	5.10	5.99
JL58489 Photo-quality A4 25	4.25	4.99

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JL58848 Bright White 500 ream	5.10	5.99
JL58849 Ultima Glossy/Satin 15	10.20	11.99
JL58850 EveryDay 100	18.71	21.98
JL58851 Ultima small 4x6 20	6.80	7.99
JL58852 Ultima small 5x7 20	6.80	7.99

TDK

JL58395 Photo Paper Glossy (A4)	5.10	5.99
JL58396 Photo Paper Glossy (A3)	15.31	17.99
JL58397 Photo Paper Glossy (A4)	4.25	4.99
JL58398 Photo Paper Glossy (A5)	4.25	4.99
JL58399 Photo Paper Glossy (A6)	3.40	4.00
JL58400 Photo Paper SatinMatt A4	4.25	4.99
JL58401 Photo Paper SatinMatt A5	4.25	4.99
JL58402 Photo Paper Glossy (A4)	3.40	4.00
JL58403 Photo Paper Glossy (A6)	3.40	4.00
JL58404 Coated Paper SatinMatt A4	2.54	2.98
JL57054 Colour Inkjet A4 Transp	11.06	13.00
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HP LaserJet 1010



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Ideal for printing quality black and white documents quickly and easily at home or in the office.

17 ppm 1200 dpi USB & Par

HP		Ex Vat	Inc Vat
JL59450	HP 1010 Black print cartridge	40.84	47.99
JL42883	Gold USB 2.0 A-B cable	7.65	8.99
JL28511	Parallel Printer Cable	3.40	4.00

IncVat **£147.00**
ExVat **£125.11**
Order JL73163

LaserJet 1150

Fast personal monochrome laser printing at an affordable price, the HP LaserJet 1150 printer is a reliable, compact, desktop printer designed for professional results in any size office or at home.



17 ppm 1200 dpi USB & Par

HP		Ex Vat	Inc Vat
JL58892	HP 1150 toner	45.10	52.99
JL42883	Gold USB 2.0 A-B cable	7.65	8.99
JL28511	Parallel Printer Cable	3.40	4.00

IncVat **£210.00**
ExVat **£178.72**
Order JL56899

Samsung ML-1210

The Samsung ML-1210 laser printer saves you valuable time in document printing with its powerful 12ppm engine and controller. It also saves your printing costs with Toner Save Button and N-up Mode. Samsung ML-1210 is a suitable printer for small office users or personal users.

12 ppm 600 dpi USB



SAVE £34!
WAS: £109.00
Inc VAT
NOW: £74.99
Inc VAT

Samsung		Ex Vat	Inc Vat
JL58388	Black toner cartridge	41.69	48.99
JL42883	Gold USB 2.0 A-B cable	7.65	8.99

IncVat **£74.99**
ExVat **£63.82**
Order JL53319

Samsung ML-1510

The standard printer for personal, SOHO users combining small size and excellent price with superior paper handling.

14 ppm 600 dpi USB



Samsung		Ex Vat	Inc Vat
JL58856	Black toner cartridge	50.20	58.99
JL42883	Gold USB 2.0 A-B cable	7.65	8.99

IncVat **£132.00**
ExVat **£112.34**
Order JL56821

EPSON EPL-6100L

The EPSON EPL-6100L is an excellent low-cost A4 laser printer. Perfect for the home or small office due to its compact size, it has been designed specifically for low maintenance, reliable and quick desktop printing. With its professional quality monochrome output, your home office printing will be dramatically enhanced with sharp text and high definition images.

16 ppm 600 dpi USB & Par



Epson		Ex Vat	Inc Vat
JL56265	EPSON EPL-6100L	128.51	151.00
JL58770	Black toner	71.48	83.99
JL28506	USB A-B cable 1.8m	3.40	4.00

IncVat **£151.00**
ExVat **£128.51**
Order JL56265

AcuLaser C900

High performance mono laser. It is also a versatile and productive colour laser printer of great quality that performs just as well as a laser printer twice its price.

From 1st October - 30th November with every purchase of AcuLaser C900/N, you get a FREE Stylus CX5200

16/4 ppm 2400 dpi USB & Par



Epson		Ex Vat	Inc Vat
JL56134	EPSON AcuLaser C900N	485.11	570.00
JL58739	Black toner	34.03	39.99
JL42883	Gold USB 2.0 A-B cable	7.65	8.99

IncVat **£452.00**
ExVat **£384.68**
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Brother HL-1430

Entry level mono laser printer ideal for the home office. Quick and easy to install with the consumables being cost effective and easy to replace.

RECEIVE 1 FREE TONER

14 ppm 600 dpi USB & Par



Brother		Ex Vat	Inc Vat
JL57192	Black Toner	31.48	36.99
JL28511	Parallel Printer Cable	3.40	4.00
JL42883	Gold USB 2.0 A-B cable	7.65	8.99

IncVat **£119.00**
ExVat **£101.28**
Order JL70925

Magicolor 2300W DeskLaser

This compact colour laser printer is smaller than many computer monitors, allowing it to be conveniently placed on a desktop, ready to print crisp documents quickly, when and where you need them.

4/16 ppm 1200 dpi USB & Par



Brother		Ex Vat	Inc Vat
JL58734	Black Toner	51.91	60.99
JL42883	Gold USB 2.0 A-B cable	7.65	8.99
JL28511	Parallel Printer Cable	3.40	4.00

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ExVat **£378.72**
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Keep your personal information safe from prying eyes

- Destroy your statements & cash till receipts!
- Compact design, perfect for the home or small office.

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Share your printer between up to four different computers.



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ExVat **£15.31**
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Printer Stand

Don't squeeze your printer where you can't use it - give it a stand. Fully mobile with storage for paper. Easily supports most personal laser printers.

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WIRELESS NETWORKING

		Ex VAT	Inc VAT
D-LINK			
JL43535	D-Link 22Mbps Access Point	57.86	67.99
JL43904	D-Link Wireless ADSL Router/4-Port Switch	97.02	114.00
JL43569	D-Link 22Mbps USB Adaptor	39.99	46.99
JL43531	D-Link 22Mbps PC Card	28.93	33.99
JL43532	D-Link 22Mbps PCI Apaptor	33.18	38.99
JL44796	D-Link 54Mbps Wireless Access Point	67.23	79.00
JL44797	D-Link 54Mbps Wireless Notebook PC Card	34.89	41.00
JL44798	D-Link 54Mbps Wireless Desktop PCI Card	43.40	51.00
JL44799	D-Link 54Mbps Wireless Broadband Router	85.10	99.99
LINKSYS			
JL44625	Linksys 54Mbps Access Point	85.10	99.99
JL44721	Linksys 54Mbps PCI Adaptor	45.10	52.99
JL42285	Linksys 11Mbps Access Point	50.20	58.99
JL43890	Linksys 11Mbps Cable/DSL Router	88.51	104.00
JL42291	Linksys 11Mbps USB Adaptor	34.89	41.00
JL42289	Linksys 11Mbps PC Card	35.74	41.99
JL42288	Linksys 11Mbps PCI Adaptor	39.14	45.99

NEW Wireless Media Adapter

- Connect your Home Entertainment Centre to a Wireless-B (802.11b) network
- Listen to your MP3 and WMA digital music collection through your stereo system
- Browse your digital pictures on your television (JPG, GIF, TIF, and BMP)
- Select songs and pictures from on-screen menus with the easy-to-use remote control
- Requires XP Home Edition or Professional

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54Mbps Broadband Bundle

- 54Mbps Wireless Broadband Router
- 54Mbps Wireless Notebook Adaptor.

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*NETGEAR Special offer. This offer is valid to 31st December 2003 while stocks last. Please make your claim by sending a copy of your invoice to: Special Offer, NETGEAR, Atrium Court, 100 The Ring, Bracknell RG12 1BW. This offer is only available within the UK.

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802.11g 54Mbps Wireless PC Card

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- Share broadband Internet access and resources
- Works with both IEEE 802.11b and draft 802.11g (both 2.4 GHz)
- 5 x faster than 11Mbps (802.11b).

802.11g 54Mbps Wireless Cable/DSL Router

IncVat **£89.99**
ExVat **£76.59**
Order JL44687

- Freedom to move from room to room with your notebook connected
- Share your Internet connection, with or without wires
- Works with both IEEE 802.11b and draft 802.11g (both 2.4 GHz).

NETGEAR 802.11b and 802.11g Wireless		MFR No	Ex VAT	Inc VAT
JL44674	802.11g 54Mbps Wireless Access point	WG602	62.12	72.99
JL45074	802.11g 54Mbps Wireless PCI Adapter	WG311	42.54	49.98
JL45075	802.11g 54Mbps Wireless Ethernet Bridge	WGE101	64.67	75.99
JL44973	802.11b 11Mbps Wireless ProSafe Access Point	ME103	79.99	93.99
JL45071	802.11b 11Mbps Wireless CardBus Adapter	MA521	28.08	32.99

BELKIN 54g Wireless

54g Wireless Cardbus Card

- Features wireless 64- and 128-bit WEP Encryption
- Works with Windows 98, 98 SE, 2000 Me and XP.

IncVat **£39.99**
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54g Wireless Cable/DSL Gateway Router

- 6 months of FREE Parental Control Web Content Filtering
- Securing your home PC from harmful Internet Sites
- Belkin Easy Install Wizard - Online in under 3 minutes.

Belkin	54g Wireless Access Point	Ex VAT	Inc VAT
JL44768		67.23	79.00

Wireless Access Point, PCI Card & Notebook PC Card Bundle!

ONLY £149.00 (£126.81 Ex VAT) JL45261

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54g Wireless PCI Adapter

- Installs with Plug-and-Play convenience
- Works with Windows 98, 98 SE, 2000 Me and XP
- Offers interoperability with all 802.11b 2.4GHz wireless devices.

IncVat **£93.99**
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Wireless Access Point & 2 x Notebook PC Cards Bundle

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LINKSYS ADSL Modem/Router & Wireless PC Card Bundle

- 11Mbps wireless speed
- Provides Secure ADSL-to-Network Connection
- Share Internet Access with Wired or Wireless Networking.

Linksys	ADSL Modem/Router & Wireless PC Card Bundle	Ex VAT	Inc VAT
JL45224		£114.89	£135.00

LINKSYS 54g Wireless

Notebook PC Card

- Wireless-G (draft 802.11g) connectivity for your notebook computer
- Incredible data rates up to 54Mbps in the 2.4GHz radio band
- Also interoperates with Wireless-B (802.11b) networks at 11Mbps.

Linksys	54g Wireless Notebook PC Card	Ex VAT	Inc VAT
JL44626		£45.10	£52.99

Broadband Router

- All-in-one Internet-sharing Router, 4-port Switch, and Wireless-G (draft 802.11g) Access Point
- Shares a single Internet connection and other resources with Ethernet wired and Wireless-G clients.

Linksys	54g Wireless Broadband Router	Ex VAT	Inc VAT
JL44722		£76.59	£89.99

Actiontec 54g Wireless

Wireless Access Point

- Connect to the ethernet network
- Wireless speeds up to 54Mbps
- Connectivity at up to 300 feet indoors.

Actiontec	54g Wireless Wireless Access Point	Ex VAT	Inc VAT
JL45267		£59.57	£69.99

Wireless PC Card

- Connect to the Internet via Wireless Access point or Cable/DSL Router
- Wireless speeds at up to 54Mbps
- Technically excellent affordable product.

Actiontec	54g Wireless Wireless PC Card	Ex VAT	Inc VAT
JL45268		£30.63	£35.99

Wireless USB Adapters

- Connect any PC with a USB port
- Share internet access without wires
- Wireless speeds at up to 11Mbps.
- Simple Plug and Play Installation.

TWIN PACK!	Wireless USB Adapters	Ex VAT	Inc VAT
JL42740		£79.99	£93.99

ME101 Wireless Ethernet Bridge

Network your game console!

- Allows your Gaming Console or PC to directly access your 802.11b wireless network
- Greater range and signal strength than most other 802.11b wireless products
- Wall-Mountable to save valuable desk or floor space.

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ExVat **£48.50**
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Wi Fi
The Standard for Wireless Fidelity.

Bluetooth

Bluetooth covers a range of up to 10m. It is a technology for short range wireless links between mobile PCs, mobile phones and other handheld devices, and connectivity to the Internet.



Belkin	Bluetooth Adaptor	Ex VAT	Inc VAT
JL43986	Belkin Bluetooth Adaptor, 100m Range	29.78	34.99
JL44789	Belkin Bluetooth Adaptor, 10m Range	21.27	24.99
JL43988	Belkin Bluetooth PCMCIA Card	38.29	44.99
JL43987	Belkin Bluetooth PDA Adaptor Card	39.14	45.99
JL43996	TDK Bluetooth PC Card	79.14	92.99
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IEW - DG834 ADSL Firewall Router with Integrated Modem

Built-in ADSL modem & FREE ADSL phone filter
Four ultra-fast 10/100Mbps LAN Ports
True-firewall business class-security
Easy, web browser-based set-up.



IncVat **£99.99**
ExVat **£85.10**
Order **JL45285**

NEW



RP614 - Cable/DSL Web Safe Router with Content Filtering

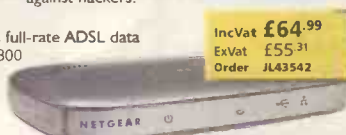
- Unique Smart Wizard and Install Assistant make setup a breeze
- Lightning fast cable/DSL Internet sharing with integrated 4-port switch
- NAT Firewall with VPN pass-through protects against hackers.

IncVat **£42.99**
ExVat **£36.59**
Order **JL44408**

WM602 ADSL Modem

lets you use your telephone whilst online, delivers full-rate ADSL data transfer at speeds up to 8 Mbps downstream and 800 kbps upstream for lightning-fast Web surfing.

ADSL modem and NAT router
Ethernet & USB Ports
Use 10Mbps port, USB port or simultaneously.



IncVat **£64.99**
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NETGEAR

		Ex Vat	Inc Vat
42613	ADSL Router with Integrated Modem	75.74	88.99
44409	Router/Firewall with 4 x 10/100 Ports and Printer Server	63.82	74.99
43315	Router/Firewall/8 User VPN with 8 x 10/100 Ports	102.13	120.00
44059	Router/Firewall/100 User VPN with 8 x 10/100 Ports	251.06	295.00

Four Products in One: ADSL Modem, Wireless Access Point, Switch, Firewall

DG824M - Integrated DSL Modem & 802.11b Wireless Router



- Built in ADSL Modem & Access Point
- Easy, Web browser-based setup
- Free ADSL phone filter.

IncVat **£128.00**
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Order **JL43759**

WIRELESS NETWORKING

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JL43983	USR 22Mbps Wireless Cable/DSL Router	69.78	81.99
JL43538	USR 22Mbps PC Card	29.78	34.99
JL43539	USR 22Mbps PCI Card	32.33	37.99
BUFFALO			
JL44400	Buffalo 54Mbps Wireless Broadband Router	83.40	98.00
JL44814	Buffalo 54Mbps Wireless Cardbus Notebook PC Card	36.59	42.99
JL44815	Buffalo 54Mbps Wireless Bband Router Card Bundle	108.94	128.00
JL45259	Buffalo 54Mbps USB 2.0 Wireless Adapter	57.01	66.99
3COM			
JL45127	3Com 54Mbps Wireless Access Point	64.67	75.99
JL45134	3Com 54Mbps Wireless Cable/DSL Router	79.99	93.99
JL45128	3Com 54Mbps Wireless Notebook PC Card	38.29	44.99

BROADBAND

JL44444	D-Link ADSL 22Mbps Router & Access Point w/4x10/100	97.02	114.00
JL43041	D-Link ADSL Router & 4 x 10/100 ports	74.03	86.99
JL43040	D-Link ADSL Ethernet Router	63.82	74.99
JL44435	D-Link ADSL Ethernet Modem	54.46	63.99

LINKSYS High Speed Broadband Internet Access!

Cable/DSL Router with 4-Port Switch



- Connects to a Broadband Modem
- Built in 4-Port 10/100 Switch
- Connect All of Your PCs to the Internet
- NAT Firewall to Protect Your PCs From Outside Intruders.

IncVat **£41.00**
ExVat **£34.89**
Order **JL42278**

Instant Broadband Cable/DSL Firewall Router with 4-Port Switch



- Perfect solution for connecting PCs to a high-speed broadband Internet connection or a 10/100 Ethernet network
- For enhanced protection against intruders from the Internet, the Router features an advanced Stateful Packet Inspection firewall
- Built in 4 Port Switch.

IncVat **£57.99**
ExVat **£49.35**
Order **JL44567**

USB 2.0 10/100 Network Adapter



- Connect to any 10/100 Ethernet network without having to open your PC
- USB 2.0 10/100 Network Adapter draws power from the PC - requiring no external power cord
- Connects at a full 100Mbps via USB 2.0, up to 8 times faster than a USB 1.1 adapter.

IncVat **£19.99**
ExVat **£17.01**
Order **JL45059**

Actiontec Broadband Technology Made Easy!

ADSL USB Modem



- External ADSL USB Modem
- Upto 8 Mbps
- Easy Installation
- 1 FREE Microfilter.

IncVat **£39.99**
ExVat **£34.03**
Order **JL44003**

Home ADSL USB/Ethernet Modem



- USB + Ethernet Router Modem
- Web Site Blocking
- 1 FREE Microfilter.

IncVat **£52.99**
ExVat **£45.10**
Order **JL44004**

4 Port Wireless Cable Broadband Router



- Up to 100Base-T speed
- 11Mbps Wireless
- 128 & 64bit WEP Security Encryption
- Easy Connectivity.

IncVat **£88.00**
ExVat **£74.89**
Order **JL43230**

ADSL Microfilter

With ADSL service, phone lines are used to send and receive voice and data on the same line. The Micro-filter enables simultaneous use of Internet and voice by isolating the noise caused by analog telephone devices such as telephone, answering machine, fax machine, cable/satellite.

Cut out Phone Noise
Order **JL43592**
IncVat **£7.99**
ExVat **£6.80**

ROUTERS / FIREWALL

JL42798	Allied Telesyn ADSL Modem Router	77.44	90.99
JL43759	Netgear Wireless DSL Modem/Router+4-Port Switch	108.94	128.00
JL43414	Netgear Cable/DSL Firewall/Print Server	104.68	123.00
JL43315	Netgear Cable/DSL Firewall	102.13	120.00
JL43314	USR ADSL Modem Router	72.33	84.99

MODEMS

ADSL			
JL44004	Actiontec ADSL Modem-Ethernet	45.10	52.99
JL43739	Dynalink Connexant PCI ADSL Modem	40.84	47.99
JL43343	Dynamode ADSL PCI Modem	22.97	26.99
JL43094	USR Sureconnect USB ADSL	51.91	60.99
INTERNAL (56K & ISDN)			
JL41405	Dynamode V.92 Internal CNR (Auto Mode)	9.35	10.99
JL41406	Dynamode V.92 Internal AMR Modem	10.20	11.99
JL42625	MRI V.92 Internal 56K Modem	11.91	13.99
JL42935	Swann Internal (Conexant) 56k V.92	13.61	15.99
JL42064	USR ISDN PCI Card T/A	37.44	43.99
JL40988	Zoom Accura V.92 PCI Int	40.84	47.99
EXTERNAL (56K)			
JL40734	Dynalink V.92 56Kbps	28.08	32.99
JL40783	Dynamode 56k (Conexant)	36.59	42.99
JL40989	Hayes Accura V.92	48.50	56.99
JL40729	USR 56K USB V.92	32.33	37.99

ADSL Modem

- Upto 8Mbps High performance
- Supports G.dmt full rate and G.lite
- Auto-handshake for different ADSL lines
- Standard 10Base-T Ethernet port
- Windows-based GUI for easy setup.

IncVat **£63.99**
ExVat **£54.46**
Order **JL44435**

D-Link
Building Networks for People

ADSL Router



- Includes 2 FREE Microfilters.

IncVat **£60.99**
ExVat **£51.91**
Order **JL43094**

Works with:
CABLE, ADSL, ISDN, analog modem.

		Ex Vat	Inc Vat
JL43314	USR Sureconnect ADSL Router	72.33	84.99

Internet Phone

- Turn your PC into a fully featured internet phone
- Full duplex handset
- Free unlimited PC to PC calls
- Includes software

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Omnicube KVM Switch

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Saves you time, saves you space AND saves you money.



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TELECOMS

ANSWERING MACHINES

	Ex VAT	Inc VAT
JL41683 BT Response 123 plus	18.71	21.99
JL41449 BT Paragon 400	37.44	43.99

TWO WAY RADIO

JL68454 Motorola Talkabout	66.37	77.99
Twin Pack & Charger Black		

USB

USB PCI CARDS

JL31410 USB 1.1 2 Port PCI Card	15.31	17.99
JL41134 USB 1.1 4 Port PCI Card	20.42	23.99
JL42879 USB 2.0 2 Port PCI Card	15.31	17.99
JL41333 USB 2.0 5 Port PCI Card	21.27	24.99

USB HUBS

JL42923 USB 1.1 7 Port Hub	18.71	21.99
JL42881 USB 2.0 4 Port	17.86	20.99

ECONOMY HUB

JL41334 USB 2.0 4 Port Hub	26.37	30.99
JL43586 USB 2.0 3 Port Pocket Hub	18.71	21.99

SURGE PROTECTION

BELKIN PRO GOLD SERIES

JL67231 Pro Gold Series 425VA	60.42	70.99
JL67232 Pro Gold Series 525VA	68.08	79.99
JL67233 Pro Gold Series 625VA	83.40	98.00

APC

JL41717 Back-UPS 350CS	45.10	52.99
JL41718 Back-UPS 500CS	55.31	64.99
JL32529 Back-UPS 650VA	79.99	93.99

Power Surge Protection

The SurgeMaster Home Series is the perfect choice for protecting home PCs, printers, kitchen and other household electrical appliances.

NOW FROM £5.99



Belkin	Data Rec Warranty	Ex Vat	Inc Vat
JL44756 4 Way SurgeMaster 2m	£50,000	12.76	14.99
JL44757 4 Way SurgeMaster 2m	£50,000	12.76	14.99
JL44758 4 Way SurgeMaster 2m	£25,000	5.95	6.99
JL44759 4 Way SurgeMaster 2m	£25,000	5.10	5.99
JL44760 1 Way MasterCube	£35,000	6.80	7.99
JL44761 1 Way SurgeCube	£35,000	4.25	4.99

Belkin UPS

Power protection for the small office or home office user. No more concerns about surges, spikes, blackouts and lightning.



Order **JL41303**
IncVat **£60.00**
ExVat **£51.06**

Belkin CAT5 Cables

What is a Category 5e patch cable? Think of it as the street that links the houses on your block and all the destinations in town. In actuality, it's a cable used to connect all the hardware destinations in a Local Area Network (LAN). The RJ45 Cat 5e patch cable is perfect for use with 10/100 Base-T networks. A selection of colours are available for identifying the different parts of your network.

Length	Grey	Blue	Red	Green	Black	Ex Vat	Inc Vat
0.5m	JL31290	JL31300	JL31295	JL31305	JL31315	1.69	1.99
1.0m	JL31291	JL31301	JL31296	JL31306	JL31316	2.54	2.99
2.0m	JL31292	JL31302	JL31297	JL31307	JL31317	2.97	3.49
3.0m	JL42914	JL42916	JL42915	JL42917	JL42918	3.40	4.00
5.0m	JL31293	JL31303	JL31298	JL31308	JL31318	3.82	4.49
10.0m	JL31294	JL31304	JL31299	JL31309	JL31319	5.10	5.99
15.0m	JL42413	JL43977	JL43976	JL43978	JL43979	6.80	7.99

10/100 PCI Network Card

- Quick one-step installation
- Auto-sensing 10/100Mbps RJ-45 Ethernet interface.



IncVat **£7.99**
ExVat **£6.80**
Order **JL41754**

NETGEAR

Belkin USB

USB 2.0 now offers ultrafast speeds of up to 480Mbps (with USB 2.0 devices). The Belkin Gold series offers 24K gold-plated connectors and contacts for optimum conductivity and error-free transmission. All the cables here can be used with USB 1.1.



USB Switch



IncVat **£17.99**
ExVat **£15.31**
Order **JL42887**

The ideal solution for sharing a printer or any USB device, with up to four USB computers.

Belkin Firewire

FireWire is the ultrafast connectivity standard offering 400Mbps, giving you rapid data transfer for large files. With automatic configuration you can also connect FireWire computers using Peer-to-Peer technology without fear. All FireWire technology is compatible with IEEE1394 and Sony iLink.



FireWire 4 Port Hub

- Connect 3 additional FireWire devices
- Bus powered for storage and multimedia devices



IncVat **£42.99**
ExVat **£36.59**
Order **JL67307**

BELKIN

Basic Starter Kit

Everything you need to have two desktop computers sharing files and printers. Belkin PCI Cards allow your computers to communicate at 10/100Mbps speed

IncVat **£23.99**
ExVat **£20.42**
Order **JL43223**

Home Networking Starter Kits

Advanced Starter Kit

Have up to 5 desktop computers sharing files and printers.

IncVat **£41.00**
ExVat **£34.89**
Order **JL45270**

- Kit consists of:
- 5 Port 10/100 Switch
 - 2 10/100 PCI Cards
 - 2 x 5m Cables.



NOW FROM £2.98

Belkin	Range	Style	Length	Ex Vat	Inc Vat
JL28506	Pro	A-B	1.8m	3.40	4.00
JL31489	Pro	A-B	3.0m	4.25	4.99
JL42883	Gold	A-B	1.8m	7.65	8.99
JL42884	Gold	A-B	3.0m	10.20	11.99
JL28505	Pro	A-A	1.8m	2.54	2.98
JL31490	Pro	A-A	3.0m	5.95	6.99
JL42886	Gold	A-A	1.8m	10.20	11.99

USB Infrared

The USB Infrared SmartBeam lets you easily transfer files, images and data from your handheld computer, mobile phone or laptop to your PC via Infrared.

IncVat **£27.99**
ExVat **£23.82**
Order **JL42928**



USB to Parallel cable

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ExVat **£17.86**
Order **JL31033**

USB 4 Port Hub

Make connecting USB devices a snap! Connect an almost limitless number of USB modems, printers, scanners, disk drives, speakers, digital cameras and other USB devices.

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ExVat **£17.01**
Order **JL41390**

FireWire PCI Card

- Provides 3 additional 400Mbps FireWire ports
- Instantly connect other FireWire devices
- Includes video editing software.



IncVat **£39.99**
ExVat **£34.03**
Order **JL67175**



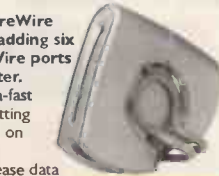
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Belkin	Style	Length	Ex Vat	Inc Vat
JL40932	6 pin 6 - 6	1.8m	7.65	8.99
JL40933	6 pin 6 - 6	4.5m	8.50	9.99
JL40934	6 pin 6 - 4	1.8m	5.95	6.99
JL40935	4 pin 6 - 4	4.5m	11.91	13.99
JL40936	4 pin 4 - 4	1.8m	9.35	10.99
JL40937	4 pin 4 - 4	4.5m	13.61	15.99

FireWire 6 Port Hub

Expand your FireWire capabilities by adding six 400Mbps FireWire ports to your computer.

- Create an ultra-fast network by getting FireWire ports on your machines
- Massively increase data transfer rates - ideal for video enthusiasts or just anyone who doesn't like waiting.



IncVat **£58.99**
ExVat **£50.20**
Order **JL41302**

FireWire/USB Combo Card

- Instantly add 2 FireWire and 3 USB 2.0 ports to your computer
- The combo card brings revolutionary FireWire speed to your PC, along with an astonishing 480Mbps USB 2.0 speed.



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Whether you hang it on the wall or combine it with the TS760 home entertainment system, the Plasma's picture and sound quality will blow you away every time. This great combination is a must for every movie fan!

Home Entertainment from SANYO

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DSC-TS760 Home Theatre System

- 220 watts total output RMS
- MP3 / CD-R/RW compatible
- Dolby Digital / DTS / Dolby Pro Logic
- Remote control
- 5 speakers and subwoofer included
- 1 year parts and labour warranty.



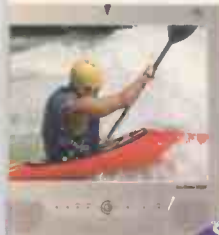
HV-DX2E Combi DVD / VCR Recorder

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17"

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LG's L1510T 15" LCD monitor has a TV tuner as well as AV and PC inputs making it extremely versatile and the Picture in Picture function allows you to view two different signals simultaneously.



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L1510T



15"

- 1024x768
- 400:1
- 300cd/m²

1730V with Webcam



17"

- High Saturation panel
- Webcam and Microphone
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- Built-in USB2.0 hub
- S-Video input
- Picture In Picture.

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C480T

- 19" (48cm) LCD TV with superwide viewing angles
- Multi-source Picture In Picture facility
- 25msec response time with motion enhancement to 11.96msec (average)
- Range of inputs including scart, antenna, component video and DVI-I
- Detachable NICAM speakers
- Auto channel set-up & fastext.



IncVat **£469.00**
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Order **JL65469**



19"

- 1280x1024
- 600:1
- 430cd/m²

PROJECTORS

	Ex VAT	Inc VAT
SONY		
JL66265 Sony VPL-CS5 SVGA	964.26	1133.00
JL66266 Sony VPL-CX5 XGA	1445.96	1699.00
INFOCUS		
JL65248 InFocus X1	828.94	974.00
JL65107 InFocus LP240 SVGA	697.87	820.00
MITSUBISHI		
JL65231 Mitsubishi SL2 SVGA	884.26	1039.00
PHILIPS		
JL65279 Philips bSure SV2 SVGA	1094.47	1286.00
NEC		
JL65211 NEC VT460 SVGA	984.68	1157.00
JL65213 NEC VT560 XGA	1394.89	1639.00
TOSHIBA		
JL65263 Toshiba TLP-S30	984.68	1157.00
JL63783 Toshiba TLP-260 SVGA	1107.23	1301.00
SANYO		
JL65054 Sanyo Z1 Home Cinema 700 Lumens Contrast 800:1	1066.38	1253.00
JL65612 Sanyo PLC-SW30 SVGA 1200 Lumen 1.9kg	855.32	1005.00
EPSON		
JL65454 EPSON EMP-S1 1200 Lumens	825.53	970.00
JL65591 EPSON TW-10 Home Cinema	838.30	985.00
+ FREE Screen		

Watch those DVDs



IncVat **£994.00**
ExVat **£845.96**
Order **JL65254**

The new range of LCD projectors from CTX can provide a solution whatever your home, office or institution need. This range of price/performance products combine great designs, features and prices with CTX quality.

Projectors

PLC-SW20

- 2.9kg
- Digital Zoom
- Manual Zoom and Focus
- Soft Case Included
- 3 year RTB warranty
- Ultra quiet operation
- Up to 2000 hours lamp life.

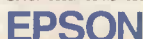


FREE Stylus Photo 830U* EPSON EMP-S1

The EMP-S1 is an excellent value-for-money multipurpose mobile projector

- Ultra quiet 33db
- 2000hrs lamp life, low cost of replacement bulbs
- Remote control kit
- Electronic keystone correction
- Fast start-up and shut down time
- 3 year, on-site repair or replace warranty

*Offer valid for purchases between 1st June - 31st December 2003 Redeemed via voucher in box.



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Movies on the big screen



IncVat **£1249.00**
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Order **JL65529**

VPL-CS6 is a high quality portable projector that is a cost effective choice for smaller audiences.

- 2.7kg
- Digital zoom
- Auto Keystone correction
- Powered tilt adjuster
- On-board audio support
- Carrying bag included.

Projector Jargon Buster

ANSI Lumens (AL) is a measure of the brightness from a projector. The higher the rating the brighter the projector.

Resolution refers to the number of pixels or dots the projector uses to make up an image. It is measured as horizontal dpi against vertical dpi (dots per inch). SVGA, XGA and SXGA are standard resolutions.

SVGA has a resolution of 800 x 600dpi
XGA has a resolution of 1024 x 768dpi
SXGA has a resolution of 1280 x 1024dpi

Contrast Ratio (e.g. 300:1) is the ratio between white and black. The larger the contrast ratio the greater the ability of a projector to show subtle colour details and tolerate extensive room light.

Keystoning is when your image appears wider at the top or bottom due the projector being positioned somewhere other than the center of the screen. **Keystone correction**, or lens shift, corrects this rectangular distortion.

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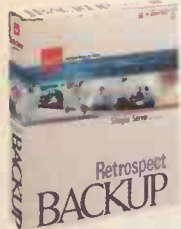
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SystemSuite 4.0

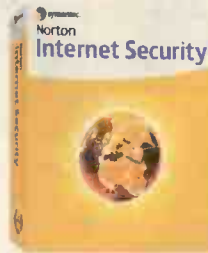


The complete solution for PC maintenance and security, to keep your investment running just like the day you bought it.

IncVat **£33.99**
ExVat £28.93
Order JL84474

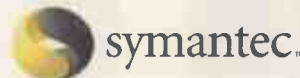
Symantec Total System and Internet Protection

Norton Internet Security™ 2004

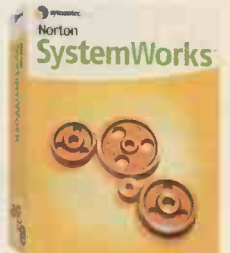


Norton Internet Security™ 2004 provides essential protection from viruses, hackers, and privacy threats. Included are full versions of Norton AntiVirus™ and Norton™ Personal Firewall, which efficiently defend your PC from the most common Internet dangers. You also get Norton™ Spam Alert to block unwanted email, and Norton™ Parental Control to protect your children online.

Symantec	Ex Vat	Inc Vat
JL78002 Internet Security 2004	36.59	42.99
JL78003 Internet Security 2004 Upgrade	22.12	25.99



Norton SystemWorks™ 2004



Norton SystemWorks™ 2004 is the smartest way to solve computer problems. It includes award-winning Symantec products and additional utilities that help you protect your PC from virus threats, optimize performance, fix and prevent problems, recover from system failures, clean out Internet clutter, and keep dial-up connections active when you're online.

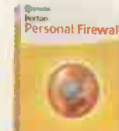
Symantec	Ex Vat	Inc Vat
JL78008 SystemWorks 2004	43.40	50.99
JL78009 SystemWorks 2004 Upgrade	26.37	30.99

Norton Antivirus 2004



Norton AntiVirus™ defends against both known and emerging threats, removes viruses automatically, and protects email and instant messages

IncVat **£33.99**
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Norton Personal Firewall 2004

Symantec's Norton™ Personal Firewall 2004 keeps hackers out and personal data in. It hides your PC from hackers, protects your privacy, and blocks online intrusions automatically.

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Guaranteed 200% Increase in performance!

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Power Quest	Ex Vat	Inc Vat
JL84035 Partition Magic 8	31.48	36.99
JL84043 Upgrade	22.97	26.99



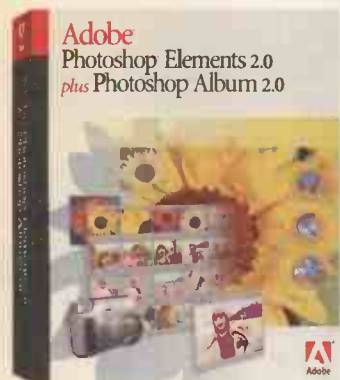
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- Custom creations - Easily create slide shows, photo albums, cards, calendars, and more in AdobePortable Document Format (PDF) so anyone can view them with free Adobe Reader® software.



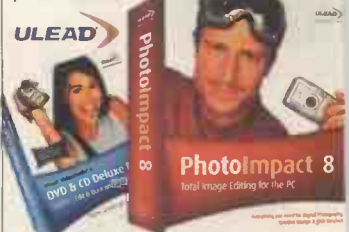
Adobe	Ex Vat	Inc Vat
JL78756 Adobe Photoshop Elements 2.0 + Photoshop Album	76.59	89.99
JL84086 Adobe Photoshop Elements 2.0	57.86	67.99
JL84276 Adobe Photoshop Album	31.48	36.99
JL84465 Adobe Acrobat Standard	213.62	251.00
JL83436 Adobe Photoshop 7.0	487.66	573.00
JL83437 Adobe Photoshop 7.0 Upgrade	110.64	130.00

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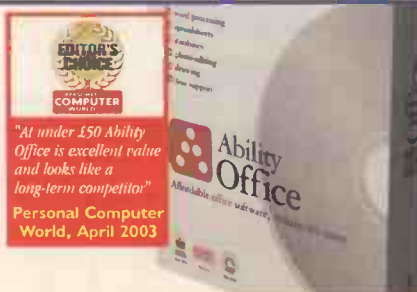
Ulead	Ex Vat	Inc Vat
JL84410 VideoStudio 7	32.33	37.99
JL84096 Photo Express 4.0	19.57	22.99
JL84401 Cool 3D Studio	49.35	57.99
JL84097 DVD Workshop	119.15	140.00
JL84392 DVD PictureShow 2	23.82	27.99
JL84391 DVD MovieFactory 2	22.97	26.99
JL84030 Photo Impact V8.0	55.31	64.99

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Ability Office is an integrated suite of five software applications - a word processor, a spreadsheet, a database, a photo-editor, and a drawing module - and is ideal for use both in the office and at home.

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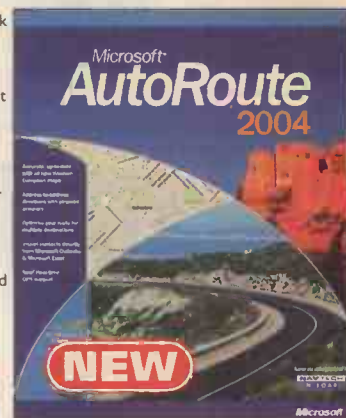
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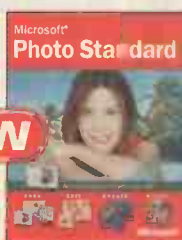
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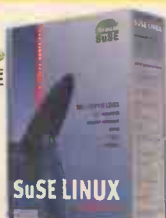
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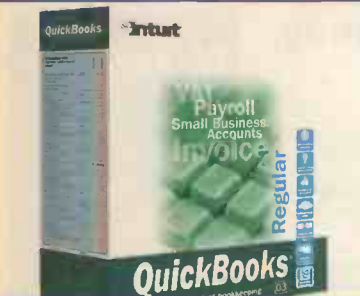
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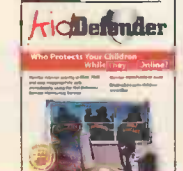
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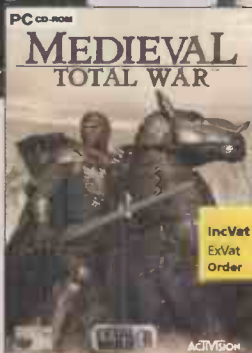
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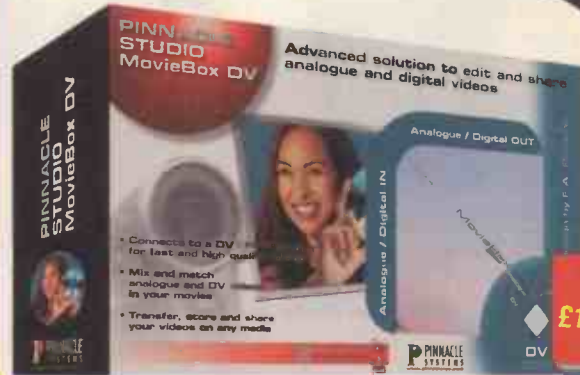
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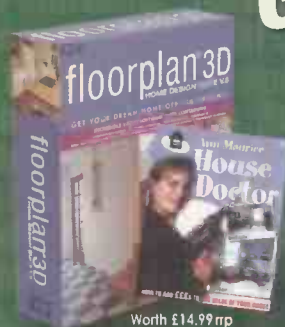
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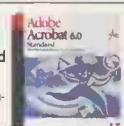
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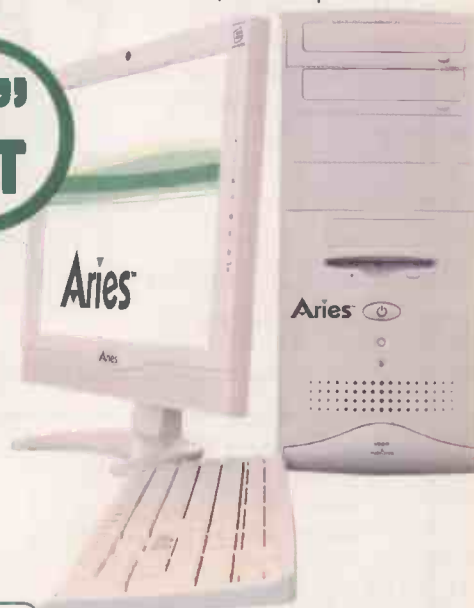
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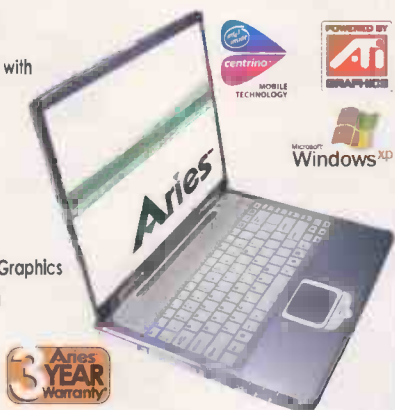
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10270934	244LC Celeron - P 2.6 / 30GB / 256MB / Combo / 15" TFT / XP Pro	730.00	857.75
10268581	252XC P4 2.6 / 30GB / 256MB / Combo / 14.1" TFT / XP Pro	779.00	915.33
10270935	252LC P4 2.6 / 40GB / 256MB / Combo / 15" TFT / XP Pro	870.00	1022.25
10270936	252LM P4 2.6 / 40GB / 512MB / DVD-RW / 15" TFT / XP Pro	990.00	1163.25
10268583	290LCI Centrino 1.3 / 30GB / 512MB / Combo / Wireless / 15" TFT / XP Pro	853.00	1002.28
10268584	290LM Centrino 1.3 / 30GB / 512MB / DVD-RW / Wireless / 15" TFT / XP Pro	969.00	1138.58

BenQ

JOYBOOK 5000

On the road, or off, enjoy the latest technology everywhere.

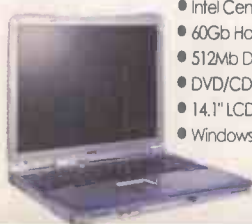
Get it all. The latest Intel® Centrino™ mobile computing technology for wireless networking when and where you want. See it all. A 6-hours battery life means the pleasure lasts longer. Do it all. A slimmer and lighter design matches your on-the-go, never slow lifestyle.

Enhanced 3D gaming and movie viewing

The joybook 5000 will take your eyes on a ride they won't forget. With a unique ultra bright 200-nit LCD screen, images are crisper with more details, while contrast and color performance are both enhanced.

The Perfect Digital Hub - everything you ever dreamed of comes together

The Joybook 5000 includes three USB 2.0 ports, a FireWire (IEEE 1394) port, two PCMCIA slots, a three-in-one memory card reader (supporting the SD, MMC, and MS formats), and an infrared port.



- Intel Centrino 1.6GHz processor
- 60Gb Hard Drive
- 512Mb DDR RAM
- DVD/CDRW Combo Drive
- 14.1" LCD Display
- Windows XP Pro

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JVC

XP7230 and XP5230

Mobile Mini Notes

The NEW! 2ND generation JVC Mobile Mini Notes PCs are the smallest in the world to incorporate the Ultra Low Voltage Mobile Intel® Pentium® III with a 933MHz-M processor.

Microsoft Windows XP Professional Operating System, high-speed communication capabilities including Wireless LAN (IEEE802.11b)*, USB2.0 interface and i.LINK (IEEE1394) makes these models ideal for mobile computing solutions.

*Wireless LAN (Wi-Fi) - MP-XP7230 only.



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XP7230
Pentium3-M 933/
30Gb / 256Mb/
XP Pro / 8.9" TFT

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PartCode 10265023
£1363 INC VAT

XP5230
Pentium3-M 933/
20Gb / 128Mb/
XP Pro / 8.9" TFT

HP Compaq

Business Notebook nX9010

The HP Compaq Business Notebook nX9010 helps you achieve your business goals through cutting edge and powerful proven technology, available wireless capability and reliability all combined at an affordable price.



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P4 DT 2.66GHz / 256MB / 40GB / 15" TFT / DVD-CDRW / XP Pro

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VIDEO CONFERENCING

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10270356	Creative WebCam NX Pro	29.00	34.08
10270357	Creative WebCam Notebook	32.00	37.60
10248805	Creative Labs PC Cam 300 1.3MP	59.00	69.33
10263934	Creative PC-CAM 550	49.00	57.58
10268009	Creative PC-CAM 880	85.00	99.88
10257544	Logitech Quick Cam Messenger USB	25.00	29.38
10263509	Logitech QuickCam for Notebooks Pro	49.00	57.58
10233603	Logitech ClickSmart S10 Dual Cam 8mb	82.50	96.94
10270972	Philips Toucam II PVC820K	22.00	25.85
10270973	Philips Toucam Fun II PVC830K	34.00	39.95
10270974	Philips Toucam Pro II PVC840K	49.00	57.58
10263827	Terratec TeraCam 2 move	49.00	57.58
10263828	Terratec TeraCam USB	22.00	25.85
10263830	Terratec TeraCam 2 move 1.3	68.00	79.90

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PHILIPS ToUcam Fun II

Flicker-free video up to 30 frames per second

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- Perfect webcam for broadband Internet • "XP Plug & Play"
- The ToUcam FUN II packs a great performance webcam into a stylish housing to help you get the best from fast broadband Internet connection.
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- Experience flicker-free on-line chatting and live video thanks to natural video with 30 frames per second refresh rate.
- No more unreal, jerky motion! Software is provided for recording and editing your clips.

£34 Ex VAT

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CREATIVE

WebCam Notebook

The Creative WebCam Notebook is about the size of an AA battery and delivers true VGA output for crisper, clearer video and stills. With total weight just 40g, and powered via the USB port, it attaches to notebook displays using a special spring-loaded clip and comes complete with powerful software for image management, editing and sharing.

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- Internet Video Conferencing
- Video Observation Software

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PartCode 10263828

£25.85 Inc VAT



iPAQ h2210

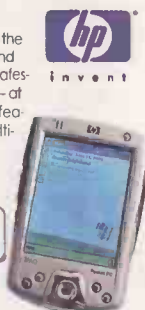
The small and sleek HP iPAQ Pocket PC h2210 has the optimal combination of features, performance, and expandability that allow individuals and mobile professionals use of their pocket pc seven days a week — at home, at work, and on the go. A broad range of features, Bluetooth™, expansion capabilities and multimedia make the HP iPAQ Pocket PC h2200 series essential for you to communicate, access and manage information when you want.

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£279 Ex VAT

PartCode 10268194

£327.83 Inc VAT



ZIRE 71

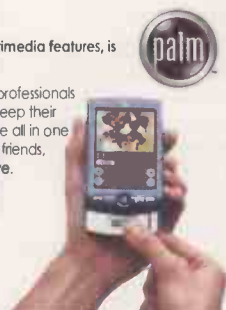
The Zire™ 71 handheld, with rich multimedia features, is ideal for everyday personal use.

It's just the thing for students, young professionals and even busy mums who want to keep their contacts, appointments and software all in one place, share images with family and friends, and listen to MP3 music on the move.

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e740 Pocket PC

Phenomenal power - the latest, most advanced processor runs highly demanding applications at extraordinary speed

Totally expandable - instantly add extra storage and enhance functionality via built-in SD™ and CF™ slots

Maximum independence - advanced battery technology provides extended mobile power

Ultra-stylish & ergonomic - combines stunning design with brilliant ease of use

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PartCode 10248354

£393.63 Inc VAT



HANDHELD COMPUTERS

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10261923	Acer n20 Pocket PC Handheld 64Mb	316.34	371.70
10264923	iPaq H1910/EN 16MB WPC	173.00	203.28
10268193	iPAQ H1940 200MHz 32/64 SDIO Bluetooth	234.00	274.95
10268195	iPAQ H5550 400MHz Bluetooth WiFi Biometrics	399.00	468.83
10257772	Palm Zire	63.00	74.03
10266473	Palm Tungsten C	276.50	324.89
10265244	Sony Clie S122 PDA/Handheld	117.00	137.48
10264030	Sony Clie S133 PDA/Handheld	139.95	164.44
10265245	Sony Clie TG50 PDA/Handheld	229.85	270.07
10264068	Sony Clie NR70V Handheld	325.00	381.88
10268234	Sony Clie NX73 Handheld	344.00	404.20
10264031	Sony Clie NZ90 PDA/Handheld	459.00	539.33
10266623	Toshiba PocketPC e730 - WiFi	425.00	499.38
10268235	Toshiba PocketPC e730 - Bluetooth	374.00	439.45
10248305	Handspring Treo 90/EN 8MB PalmOS USB W9x	159.00	186.83

SONY. Clie PEG-SJ22

A compact and stylish designed CLIE, equipped with all the basic applications to fulfil all your everyday needs

- Palm OS version 4.1 • Dragonball VZ 33MHz
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- Memory Stick slot • Infra red
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- Battery life up to 12 days at average usage of 30 min a day without wireless function
- Buzzer sound



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£233.83 Inc VAT



PROJECTOR UNITS

PCode	BENQ	Ex VAT	Inc VAT
10263203	D5550 Projector 1200 ANSI SVGA	819.00	962.33
10265324	DX650 Projector 1600 ANSI SVGA	1153.00	1354.78
10270337	7765PA Projector 1100 ANSI XGA	1295.00	1521.63
10270919	EMP-TW10 Home LCD Projector	840.00	987.00
10263876	EMP-S3 LCD Projector	1185.00	1392.38
10264049	EMP-73 LCD Projector	1362.00	1623.85
10258813	EMP-720 LCD Projector	1814.00	2131.45
10265847	b5sure XG2 1500 ANSI XGA	1699.00	1996.33
10265848	b5sure SV2 1500 ANSI SVGA	1349.00	1585.08
10271151	b5sure XG2-Brightness 2200 ANSI XGA	2349.00	2740.08
10271152	b5sure SV2-Brightness 2500 ANSI SVGA	1799.00	2113.83
10263404	PLC-XU38 Projector 2000 ANSI XGA	2520.00	2961.00
10264972	PLC-SU40 Projector 1750 ANSI SVGA	1399.00	1643.83
10264973	PLC-XU40 Projector 2000 ANSI XGA	2009.00	2340.58
10264974	PLC-XU45 Projector 2500 ANSI XGA	2499.00	2936.33
10264977	TDP-D1 DLP Projector 2000 ANSI XGA	1699.00	1996.33
10263414	TDP-P5 DLP Projector 1100 ANSI XGA	1999.00	2348.83
10261817	TLP 330 LCD Projector 1400 ANSI SVGA	999.00	1173.83
10261841	TLP 150 LCD Projector 1400 ANSI XGA	1425.00	1674.38
10268329	TLP 260 LCD Projector 1500 ANSI SVGA	1149.00	1350.08

MT100 SVGA Projector

The MT100 is a dual purpose projector that complements the home cinema market as well as appealing to the business user on a budget.

- DLP SVGA (800x600) resolution
- Faroudja DCDi Video Processor built in
- 1000 ANSI lumens
- 2000:1 Contrast Ratio
- 3.1 kg
- 16:9 or 4:3 switchable



Free Surround Sound System worth £300*

£975 Ex VAT

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TOSHIBA

*Whilst stocks last.

SANYO

PLC-XW20 XGA LCD Projector

- 1100 ANSI lumens brightness
- Ultra compact design - weighing only 2.8kg
- Super quiet operation - just 37dB
- Component inputs for DVD
- Automatically adjusts for 16:9 images
- XGA data resolution
- Free software
- Built-in speaker
- Electronic keystone correction
- Manual zoom/focus



FREE LAMP worth £300

£1299 Ex VAT

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BenQ

PB8220 Projector

"State of Art Technology"

The latest digital projector from the BenQ line of digital media products. Supporting the latest DLP™ DDR, DCMS (Dynamic Colour Management System), the BenQ PB8220 delivers high contrast digital images, consistently producing flawless pictures and maintaining its original clarity for true reliability.



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EPSON

EMP-S1 Projector

Best value-for-money multipurpose projector

- 1200 ANSI lumen, fully featured SVGA multipurpose projector
- Ultra quiet 33db for effective presentations
- 2000hrs lamp life, low cost of ownership
- Brand new stylish silver design
- Presentation remote control kit giving enhanced ease of use
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- Fast start-up and shut down time
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Aries 15" Slimline TFT

The incredibly thin profile of this LCD panel brings new meaning to space-saving. Business users and IT managers will appreciate the low-maintenance sophistication.

Max resolution: 1024 x 768
Speakers: 2 x 0.5 watt
Warranty: 3 year swap out.

£169 Ex VAT

PartCode 10267977

£198.58 Inc VAT

Aries 17" Smart Panel TFT

The new 17" Smart panel from Aries. Harnessed in the latest of Smart panel technology, practicality and its brand new slim design, this is one thing your desktop shouldn't be without.

Max resolution: 1280 x 1024
Warranty: 3 year swap out.

£249.95 Ex VAT

PartCode 10261057

£293.69 Inc VAT

Aries 17" Slimline TFT

Just the ring thing for your eyes. The exclusive display is recommended for professional office and graphics applications with economic energy consumption.

Max resolution: 1280 x 1024
Speakers: 2 x 0.5 watt
Warranty: 3 year swap out.

£249 Ex VAT

PartCode 10224223

£292.58 Inc VAT

SONY GDM-F520/CC 21"

The GDM-F520 21-inch (19.8-inch viewable image size) FD Trinitron display that offers the smallest aperture grille pitch in the industry.

Visually flat, high resolution Flat Trinitron CRT a larger viewing area, stylish appearance brilliant colours and sharp images.

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What more could today's demanding computer users ask for?

SDM X52 15" TFT

Exceptional 15" TFT LCD display with high contrast (400:1) and brightness (300 cd/m2) LCD panel. Perfect gaming and video viewing with state of the art 200 MHz high-speed graphics processor and fast 30 ms panel response time. Dual input flexibility with DVI-D (digital) and HD15 (analog) for easy switching between multiple PCs

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VisionMaster Pro 454

- 19" (18" viewable) DiamondIron M2
- Horizontal sync: 30-132kHz
- Max resolution: 2048 x 1536 @ 80Hz or 1600 x 1200 @ 100Hz
- Integrated USB hub and speakers
- TCO-99
- 3 year on-site, swap out warranty

£234 Ex VAT

PartCode 10233525

£274.98 Inc VAT

iiyama

ProLite E430 17" LCD

- 17" TFT LCD
- Resolution: 1280 x 1024
- Brightness & contrast: 250cd/m2, 350:1
- Features: Integrated speakers, removable base/VESA compliant, mounting plate, Kensington lock
- TCO-99
- 3 years on-site, swap out warranty

£285 Ex VAT

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iiyama

M730V 17" LCD Monitor

Forget trailing wires and expensive separate units, the M730V provides everything you need from your display in one convenient, easy-to-use box.

With connections for a PC or Mac, DVD player, games console, cable, satellite or terrestrial receivers, camcorder or even a VCR, the multi-purpose M730V fulfills all your computing and multimedia needs in one package. Use the in-built web cam for video net meetings or to record picture and sound files. Experience SRS surround sound through the dual, stereo speakers.

£430 Ex VAT

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P922E 19" LCD Monitor

The new P922E is CXTX's biggest LCD screen yet. This top-of-the-range product uses UltraVision™ technology to create brilliant pictures every time. Ideal for executives or those demanding large screen performance.

The P922E has a native resolution of 1280 x 1024, high contrast ratio of 500:1, low response time of 25ms and wide viewing angles of 170° in both directions. However, the P922E doesn't just produce outstanding pictures time after time. Its Movie Mode, DVI compatibility, USB2.0 hub and built-in speakers add functionality to performance.

£449 Ex VAT

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£527.59 Inc VAT

LM919 19" Monitor

Seek profile. Compact footprint. Lightweight. Crisp 1280x1024 resolution. Surprisingly low-maintenance. 3 year parts and labor warranty.

- 19" VIS, TFT LCD • VESA, XGA, SVGA, VGA Compatible
- Digital & Analogue Input • EPA Energy Star
- VESA 75 Hz Preset Refresh Rate • 1280 x 1024 Resolution
- USB 2.0 Hub - 1up 4down
- Build-In Speakers, 2W x 2

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PHILIPS 170B4BS Business 17" Flat Panel Monitor

- 17" Colour Monitor with excellent display performance
- Dual input-accepts DVI-D digital & VGA analog inputs
- Embedded AC power supply • Advanced AUTO adjustment optimizes picture quality
- Adjustable tilt and swivel function
- sRGB compliant

£307 Ex VAT

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180B2S 18" LCD Monitor

- 17" Silver and Black LCD monitor with excellent display performance • VGA Analog inputs
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FP591 15" LCD Monitor

- Rant it with style
- Vision comes to life
- SRS Surround Sound
- 16ms fast response time; now makes TFT great for Games, Video & DVD
- Super bright 500 cd/m2, high 450:1 contrast
- Includes built in digital photo frame, for viewing & downloading media cards

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AL718 Slim 17" LCD Monitor

The slim AL718 17" LCD monitor is an attractive entry into the larger screen arena, offering the benefits of LCD technology for users of any budget.

The compact, lightweight design takes up less space than a conventional monitor, making it ideal for areas with space restrictions. A valued solution for the small office or home entertainment area delivering a clearer picture.

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PartCode 10270964

£292.58 Inc VAT

acer

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10264170	AL701 17" TFT TCO'99	255.00	299.62
10265424	AL801 18" TFT TCO'99	337.00	419.47
10264169	AL712 17" Multimedia	275.00	323.12
ADI LCD			
10270918	MicroScan 1500 15" Panel	229.00	269.07
10264488	MicroScan S500 15" MM - Grey	189.00	222.07
10268078	MicroScan A701 17" - White	234.00	274.95
10268079	MicroScan A715 17"	309.00	363.07
BENQ			
10264762	FP791DPF 17"	389.00	457.08
10264764	FP2081 20.1" Black	1100.00	1292.50
10264266	FP747 17" Black	265.00	311.37
10265320	FP747 17"	269.00	314.08
CTX			
10268154	SS01A 15" Beige Multimedia	185.00	217.37
10259846	SS30 15" zero dead pixel	199.00	233.82
10265659	S730 17" zero dead pixel	272.00	319.60
10262168	S700 17" Beige	237.00	278.47
10265457	S7008 17" Black	245.00	287.87
10233079	PV720A 17" + Speakers	269.00	316.07
10265658	PV722E 17" MVA	349.00	410.07
IIYAMA			
10233519	AX3835U - 15" USB + Rot.Pri	299.00	351.32
10264471	ProLite E430S 17" + Speakers	285.00	334.87
10224849	AS4611UT - 18"	344.00	404.20
10224850	AS4630D - 18.1"	599.00	703.82
10224852	AU4631D - 19" TFT	625.00	734.37
NEC			
10261711	LCD1501 15" Black/Silver	185.00	217.37
10263482	LCD1701 17" black/Silver Case	309.00	363.07
10263550	LCD1860CNX 18" + Height Adj.	419.00	492.32
10248600	LCD1920CNX 19" Black Case	519.00	609.82
PHILIPS			
10264432	150S4FG 15"	208.50	244.96
10267934	150B4AS 15"	239.00	280.82
10267935	150P4CG 15"	259.00	304.32
10267939	170S4FG 17"	259.00	304.32
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10248607	180B2S 18.1"	385.00	452.37
10234787	Brightness 180P28 18.1"	439.00	515.82
10248608	180MT 18.1" Monitor/TV combi	729.00	856.57
SONY			
10248591	SDM-X52 15.1" Multi Media	269.00	316.07
10265200	SDM-S71R 17" two tone grey	359.00	421.83
10257702	SDM-P82 18"	597.00	701.47
10233807	SDM-S818 18.1" black	489.00	574.57
10265193	SDM-S91 19" two tone grey	569.00	668.58
SAMSUNG			
10268146	SM172V 17" [Simple] Ivory	269.00	316.08
10263577	SM171T 17" [Digital] Ivory	359.00	421.83
10263580	SM191N 19" [Angle/Privat] Silver	445.00	526.40
10265896	SM191T 19" [Angle/Privat] Silver	525.00	616.87

CRT MONITORS

10010312	15" EnergyPro	59.00	69.325
10010826	17" EnergyPro	69.00	81.075
10010834	19" EnergyPro	96.00	112.8
ADI			
10268533	MicroScan V57 15"	55.00	64.625
10268534	MicroScan V77 17"	71.00	83.425
10264487	MicroScan P900 19"	127.78	150.1415
BENQ			
10262274	G781 17" TCO	108.00	126.9
10262275	V991 19" TCO	129.00	151.375
CTX			
10197544	VL700 17"	75.00	88.125
10009938	VL 9501 19"	1115.00	1335.125
10264032	EX1300F 21" Flat CRT	307.00	360.725
IIYAMA			
10212294	VisionMaster 1352 15"	75.00	88.125
10224855	17" Vision Master Pro 413	121.00	141.75
10224856	19" Vision Master 1451 FST	105.00	123.375
MITSUBISHI - CRT Products			
10250124	Diamond Plus 9358 19"	170.00	199.75
10250126	Diamond Plus 230 22"	409.00	480.575
PHILIPS			
10266485	107E51 17"	75.00	88.125
10261418	109S40 19"	111.00	130.425
10000360	201840 21"	285.52	335.46
10248065	202P40 Brilliance 22"	333.00	391.275
SONY			
10233809	CPD-E330 21" FD	495.00	581.625
10197806	CPD-G520P 21" FD	575.00	675.625
SAMSUNG			
10212314	SM733S 17" DynaPatX	70.00	82.25
10263556	SM957P 19" DynaPatX	116.00	136.3
10265894	SM1200NF 22"	413.00	485.275

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256Mb Memory



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10268397	P4S8X-KLAN 533FSB HT/DDR LAN	40.50	47.59
10268138	P4S333-MX SDR/DDR & on-board VGA	39.50	46.41
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10268106	60Gb UDMA133 7200rpm 8.9ms	49.00	57.58
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10264497	ST3120023A 120Gb 2Mb ATA 100 8.2ms	45.90	53.93
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10267112	Lite-on DVD/CDRW 48x24x48x16x	39.99	46.99
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10268288	Amacom EZ-2-Disk 40GB	59.00	69.33
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10267140	AV120 Jukebox 20GB USB2.0	275.00	323.13
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DVD-P215 Compact Silver DVD Player

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The Aries multi-region DVD player with its stunning design provides incredible picture quality and unbelievable surround sound. Complete with many of the features attributed to the more expensive DVD manufacturers, such as Digital & DTS support. Effortless connection to most TVs via SCART, SVideo or Composite!

Aries Scart Cable (gold plated connectors) Make that quality connection! Only £4.99 Ex VAT

PHILIPS DVDRW416K DVD+R/RW

The Ultimate in Digital Recording

- Records on 4x speed DVD+R write-once media and 2.4x speed on DVD+RW rewritable media
- DVD ReWriter and CD ReWriter in one
- Up to 4.7GB storage on one DVD disc
- High speed CD Recording (16x10x40x)
- Seamless Link Buffer underrun protection
- Compatibility without compromise
- Intelligent & reliable

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SONY DRU-510A DVD+/-RW

The amazing DRU510A burns DVD+R, DVD+RW, DVD-R/DVD-RW and even CD-R/CD-RW discs. It reads CDs at 24x, records them at 16x and rewrites them at 16x (max. speeds), while reading DVDs at 4x, recording them at 4x, rewriting them at 1x and rewriting DVD+RW at 2.4x (max. speeds). It features an ATAPI EIDE interface, with Power-Burn buffer underrun protection technology and an 8MB buffer to prevent "coasters" from recording errors. This drive includes an impressive software bundle as well.

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DVR-A06 4x DVD+/-RW

Writes and reads DVD-R/W, +R/W & CD-R/RW formats DVD/CD buffer under-run protection

4x writing speed for DVD-R / 2x writing speed for DVD-RW / 4x writing speed for +R / 2.4x writing speed for +RW.
DVD data capacity of 4.7GB per single-sided disc

Bundled Software:

- Pinnacle Instant CD/DVD v7
- Pinnacle Studio v8 SE

Pioneer £157.45 Inc VAT

PX-708A DVD Combo +/- 8x DVD

Writes DVD's at 8-speed, rewrites at 4-speed using the DVD plus format. With the DVD minus format, this drive writes at 4x and rewrites at 2x. The PX-708A reads DVD-ROMs at 12x.

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Plextor, one of the leading companies for the development and production of CD-ROM drives, CD-Recorders and CD-ReWriters is expanding its range with its first Dual Format drive: PX-708A, which writes DVD's at 8-speed, rewrites at 4-speed using the DVD plus format. With the DVD minus format, this drive writes at 4x and rewrites at 2x. The PX-708A reads DVD-ROMs at 12x.

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CREATIVE Inspire L-3450

- 30W RMS sub with 9W RMS satellites
- Audio Control Pod - Wired remote control with power on/off, volume control, bass control, power LED indicator, Auxiliary line input, headphones out and a revolutionary M-PORT connector for streaming music from compatible MuVo players (without the PC)
- Cool white satellite speaker ID with 2 Titanium micro drivers and a Lateral Firing Transducer (LFT)

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MuVo²

The Creative[®] MuVo² is the tiny, powerful MP3 player with a 1.5GB micro-size hard disk that stores 850+ songs or files, photos and other content. The USB 2.0 interface ensures fast file transfer, the blue backlit display makes the entire system easy to manage, and Creative MediaSource[™] software makes audio archiving and management simple yet powerful.

*Based on 3.5 minute songs at 64kbps in WMA, 425 songs in MP3 at 128kbps.

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10263405	Philips sbc605 sonic edge 5.1	28.50	33.49
10270371	Philips sbc605 Aurelion Ed.	55.00	64.43
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10270500	Creative Inspire 7.1 17700	102.00	119.85
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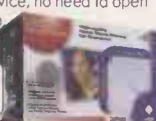
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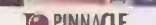
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10270382	Photosmart 7240	69.50	81.66
10270383	Photosmart 7460	115.00	135.13
10003532	Deskjet 1220C	169.00	198.58
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10267623	1605 USB	37.60	44.52
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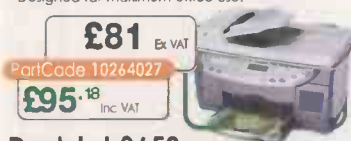
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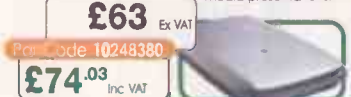
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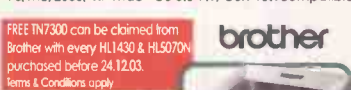
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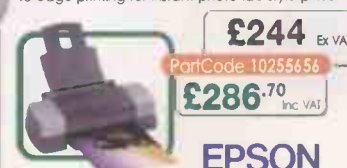
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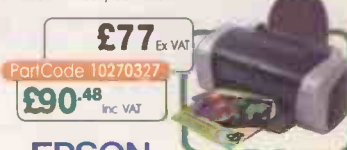
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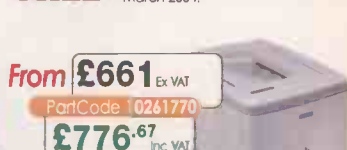
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From notebook computers to Pocket PCs, mobile and wireless technologies are helping companies reach new heights in productivity, efficiency and cost savings.

Falck Security received a welcome surprise after arming its 650 roving Dutch guards with an HP-based, wireless handheld computing solution. The mobile system led to so many efficiencies that it's helping the worldwide security firms save £494,000 annually and will pay for itself six months sooner than expected. And, the system has proven to have such effective security, Falck's own guards have not been able to crack it.



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MOBILITY MATTERS

Engineers at Powerski International's U.S. headquarters use what CEO Bob Montgomery describes as "an extreme product package" when testing his company's new Jetboards at the beach. That package—HP notebooks running powerful Parametric Technology Corp. (PTC) engineering software—is helping Powerski speed its motorised surfboards to market and driving up orders 30 percent.

All over the world, businesses of every size and in diverse industries are discovering how going mobile can improve the bottom line and add value to their organisations. Despite these challenging economic times, adoption of mobile and wireless technologies continues to grow.

"Companies tend to be spending about the same amount on mobile technologies as they're spending on Web services," notes Carl Zetie, an analyst with Forrester Research of Cambridge, Mass. "It's the forward thinking, creative, early-ish adopter-type companies that tend to be getting into both and typically for the same reasons—greater flexibility in how and where they do business. Mobile technology is making it much more flexible for a company to do business with its employees in the field. Web services allow a company to connect its own systems and connect to its suppliers' and business partners' systems with more flexibility."

ELIMINATING CHAOS

Companies typically move through three stages when adopting mobile technologies. "In the first stage, companies ask themselves, Who in my company is mobile, and how can I enhance their job with IT?" says Zetie. "Those are the obvious people like delivery drivers, field service and field sales."

"The first stage is typically about efficiency, but there are also elements of accuracy and responsiveness," adds Zetie. "Especially in chaotic situations, if you can enable people to be more responsive to fast-changing events, you can see really significant increases in efficiency. We've seen people improve their productivity and asset utilisation by anywhere from 10 percent to 25 percent in that kind of chaotic environment."

A case in point is Falck, a security firm headquartered in Rijswijk, Netherlands. The U.S. arm of Falck, Wackenhut, provides security for landmarks including the Statue of Liberty and Ellis Island, as well as nuclear plants and airports. In the Netherlands, guards who comprise the company's patrol and response operation handle more than 8,000 pre-planned security checks per day plus 1,000 different emergencies and other sudden changes in their rounds. Guards used to carry small band radios to communicate with central dispatch, a system described as "very poor" by Ron Knaap, Falck's business development manager.

"We had a lot of guards on duty because we had a lot of customers to take care of, but nobody was really sure where the guards were or what they were doing," says Knaap.

Last November, Falck replaced the radios with HP iPAQ Pocket PCs. The Pocket PCs are fitted with GSM (Global System for Mobile Communications) jackets containing Vodafone SIM (Subscriber Identity Module) cards. GSM is the European standard for digital cellular service. Falck's Pocket PC setup allows assignments, special instructions, and other data messages between the company's central system and its guards to be sent securely over Vodafone's GPRS (General Packet Radio Service) network.

"With the new data messaging system, the guards constantly tell us what they are doing, where and when they are doing it, and that enables us to most efficiently put people into place," says Knaap. If an alarm goes off at a customer's site, for example, Falck's central system quickly sees which guard is nearest that location and available to send, and immediately directs that guard to the site.

Having a real-time window into all of its guards' whereabouts and activities helped to enable Falck to redraw routes, eliminating unproductive rounds and consolidating others to achieve gains in productivity.

Switching from voice calls to less expensive data messaging has slashed Falck's communications costs 60 percent, according to the company, and is helping generate higher revenue. Under the old system, about 6 percent of customer jobs were never invoiced because guards forgot to turn in the paperwork. Now, as guards input real-time data about their activities into the iPAQ, the information goes straight into Falck's central system which triggers an invoice to the customer.

In fact, Falck has achieved so many operational efficiencies thanks to its new wireless system that the company is doing the same amount of work with fewer guards and fewer administrative staff, contributing to an estimated savings of £494,000 annually.

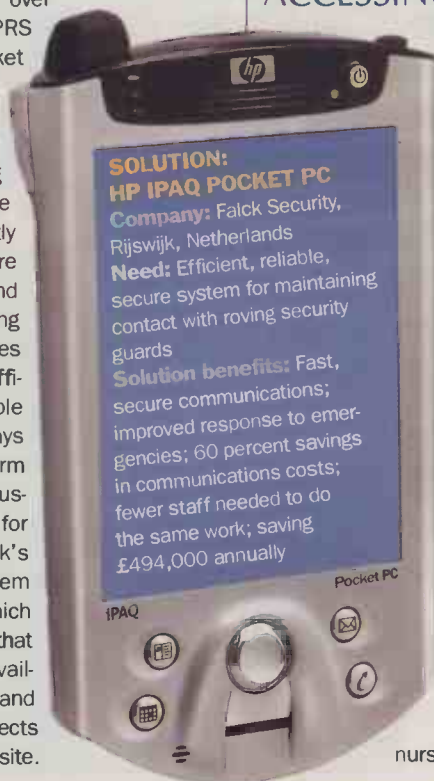
"Having initially estimated a 24-month return on investment, we now realise that the system will have paid for itself within 18 months," says Knaap. It's proven so valuable that Falck plans to deploy the same system in the U.K. this autumn.

ACCESSING VITAL DATA 24/7

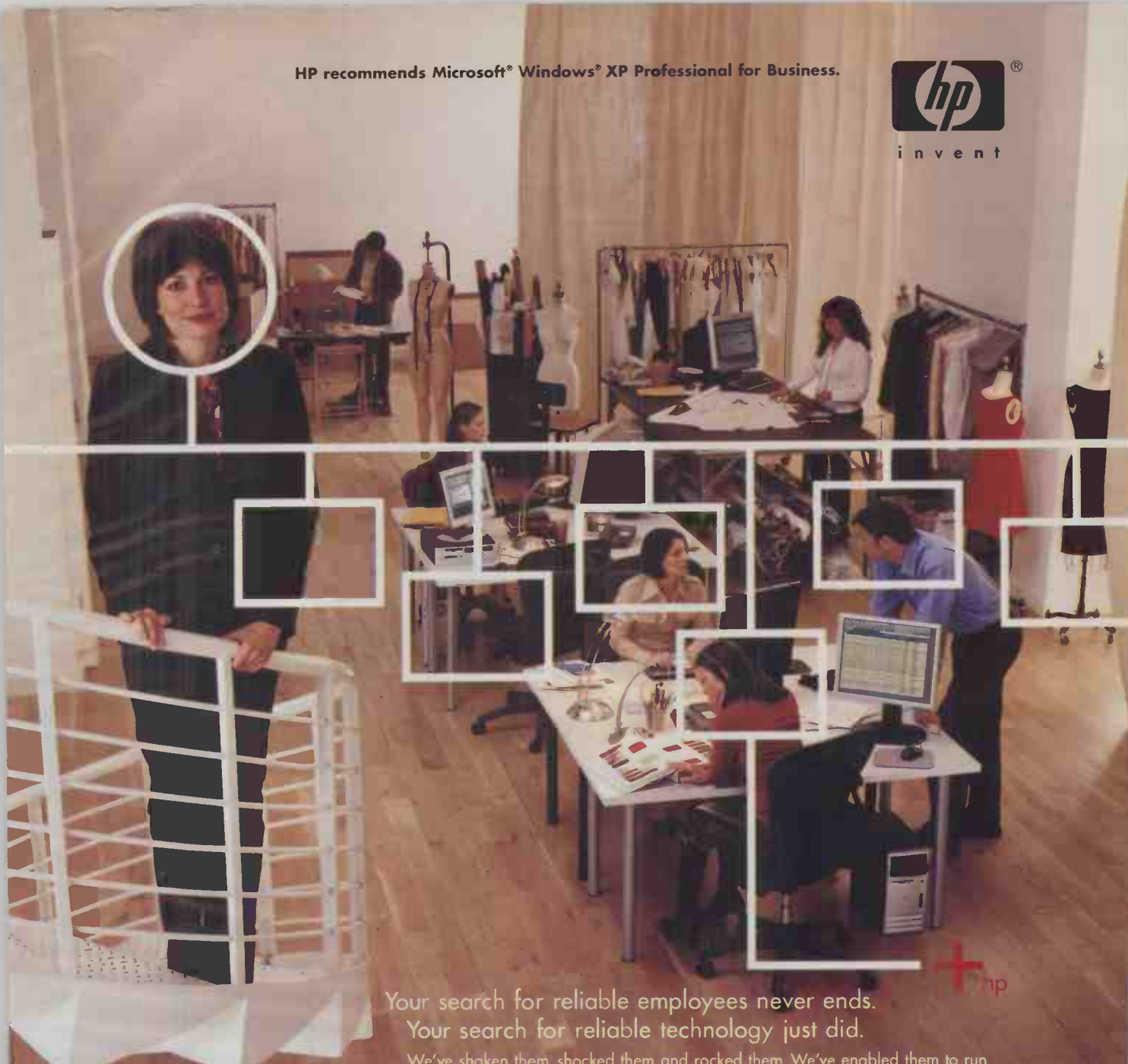
Similarly, Royal District Nursing Service (RDNS) in Victoria, Australia, is using an HP-based wireless system to enhance the jobs of employees who are already on the go.

RDNS is Australia's largest home-based nursing service. It is an independent, charitable organisation whose nurses and staff conduct more than 1.3 million visits annually to clients in their homes. The service operates 24/7 every day of the year.

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MOBILITY MATTERS

informed of a patient's condition from the moment they knock on the patient's door, RDNS is equipping its mobile nursing staff with a powerful tool that enables easy and immediate access to real-time information—the HP Compaq Tablet PC running Microsoft Windows XP Tablet PC Edition, with a GPRS mobile phone card.

Nurses and staff use the technology to upload and download important information while making their daily rounds. They can retrieve the latest appointment times and clinical information, check e-mail, complete client registrations and assessments, and record details of on-site visits while still in a patient's home.

"It was a necessity that RDNS' staff be equipped with the most advanced technology to administer to their clients, hence the decision to purchase Tablet PCs," says Ian Cash, general manager of Information Services for RDNS. "The HP Compaq Tablet PC's unique versatility really appealed to us, as many of our staff have complex and varied roles and require different levels of portability and flexibility."

Another company that is using HP Compaq Tablet PCs to benefit both staff and customers is Jetmagic, a new business-class airline based in Cork, Ireland. According to Jason Boyle, acting IT manager, the decision to use Tablet PCs is being driven by the need to add value to the business.

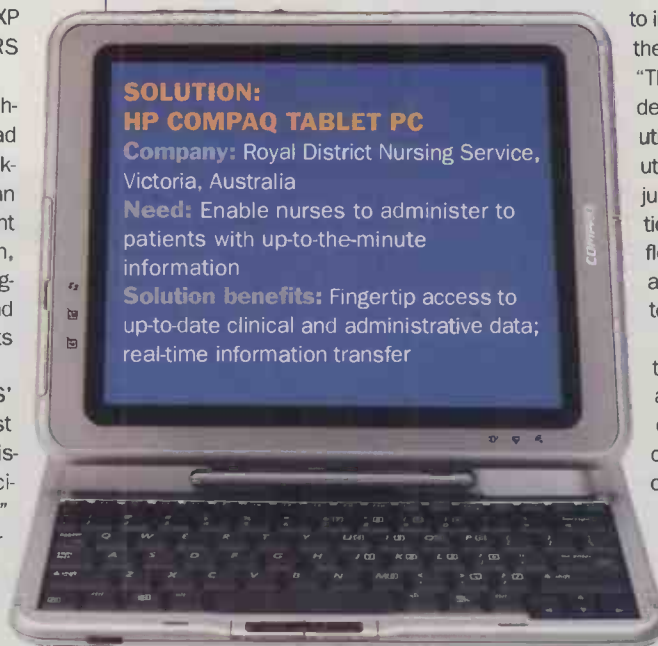
"The ethos of our business from the beginning is that we do things differently and try to be innovative in the solutions we use behind the scenes and when interacting with customers," Boyle explains.

To that end, Jetmagic is working with local partner PFH Computers and various regulatory authorities to put HP Compaq Tablet PC devices into the hands of both its pilots and customer service representatives. For pilots, the aim is to improve efficiencies by reducing the amount of time spent completing forms by hand at each airport they visit.

It is hoped that Jetmagic customers

"Having initially estimated a 24-month return on investment, we now realise that the system will have paid for itself within 18 months."

—Ron Knaap, Business Development Manager, Falck Security



will also reap benefits from the newly deployed Tablet PCs. Now, passengers should be able to book their tickets and check in from anywhere in the airport, but they also don't have to stand in line to complete the task.

"We have plans to use this capability to offer 'remote check-in' for our preferred customers with hand luggage only," Boyle relates. "This should give them the ability to ring ahead and meet one of our customer service staff at the security gate, where they can immediately check in through the Tablet PC and receive their boarding cards." This service will help Jetmagic to bolster its image as an innovator that can provide cutting-edge benefits to its business clientele.

After companies such as Falck, Jetmagic and RDNS have addressed what Zetie calls the "low-hanging fruit of already mobile workers," they typically start moving into the second stage of mobility. They begin looking at ways to untether knowledge workers from their desks.

"As companies get more sophisticated they tend to ask, Who in my company is tied

to information, and how can I make them more mobile?" says Zetie. "That's where companies start deploying wireless e-mail to executives, for example, so that executives are not chained to the desk just for the sake of communication. Wireless e-mail introduces flexibility into people's days and allows them to be more valuable to the organisation."

"Then, you get companies that go one step beyond that and ask, How can we radically change our processes or radically change the markets we operate in with wireless or mobile technology? What's usually true of those really exciting, process-changing applications is that mobile technology is a very small part of a much bigger process change," Zetie adds.

SPEEDING PRODUCT TO MARKET

In San Clemente, Calif., for example, Powerski engineers use lightning-fast HP Workstations running PTC engineering tools to help speed the company's new Igniter 2000 Powerski Jetboard to market. But when engineers are at the beach conducting field tests, they rely on the equally impressive HP Compaq n800w mobile workstation, a high-powered notebook computer that delivers workstation-class graphics and performance for the most demanding applications.

"Field testing is a critical element in our design process," says CEO Montgomery. "We learn a lot about our product on the local lake and while doing demonstrations across the U.S. We wanted a way to immediately implement and model the changes we desired, and as we envisioned them in testing. HP and PTC provided us with a powerful solution specifically adapted for a mobile environment. It's an incredible level

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HP7

"HP and PTC provided us with a powerful solution specifically adapted for a mobile environment. It's an incredible level of mobility that's been absolutely critical in moving us toward mass production."

—Bob Montgomery, CEO, Powerski International

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video clips right there in the booth and then play these clips to show the excitement of our products. We've been able to book up to 30 percent more orders because of the power of the workstation and its ability to process video clips and pictures during these events."

In the future, Powerski plans to implement a wireless connection which Habig estimates will increase productivity among engineers, sales and marketing staff by another 20 to 30 percent.

Habig is thrilled, and somewhat awed, by the power of the HP mobile workstations. "To be able to communicate seamlessly with vendors around the world—so quickly and so efficiently—we feel like we're reaching into the future," he says.

WHAT, ME WORRY?

Security is top of mind for many businesses today, particularly for those considering wireless LANs. Rest assured that there are many solutions available that can help. First, users should be outfitted with a good virus protection software application. For those deploying wireless LANs in the office, it's important to look closely at the standards your hardware supports. HP and others are embracing the new Wi-Fi Protected Access (WPA) standard, which provides data encryption support for wireless traffic.

For users who frequent wireless hotspots, further security measures should be taken. Virtual private networking (VPN) provides additional data protection when accessing your business network through hotspots or other public networks. Personal firewall software—including capabilities built into Microsoft Windows XP or through other software packages—provides further protection from would-be hackers on the public Internet.

Knaap doesn't worry about intrusions

into Falck's systems which run on HP hardware. The company has a VPN and a dedicated line from Vodafone to Falck's central system. When a guard comes on duty he uses his iPAQ to log onto the system. But before he can reach the dedicated line, Falck's system verifies that the IMEI (International Mobile Equipment Identity) number of the GSM jacket in the guard's PDA belongs to a legitimate user and that the telephone number the guard is calling in on is part of the company's closed user group.

"When the guard gets on the dedicated line, he will be confronted by our firewall," says Knaap. "And when he's up there by our firewall, we're checking to see if we're expecting his call. If he's using his PIN and ID code but he's not on the schedule to call, he can't get into the system. The system doesn't accept any unexpected calls. It will throw an unexpected caller off the air in a second.

"A lot of our guards try to crack our system so they can go onto the Internet with their PDAs," adds Knaap. "But nobody's succeeded yet. We have secured the system so they can't get out."

Just as IT executives aren't letting security concerns stop them from implementing mobile technologies, many say the risks are worth it.

"One of the interesting things about mobile technologies is that the ROI numbers often come in looking completely ridiculous—like, thousands of percent," says Zetie. "The reason for that is that very often a mobile project involves a relatively small expenditure to make better use of an existing large investment. You already have these huge fixed investments that you made to bring the application to the desktop. It doesn't cost much more to bring you to a mobile user, and yet the productivity gains are very large." ■

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of mobility that's been absolutely critical in moving us toward mass production."

Back at the office, field engineers plug their notebooks into the network and upload the new information so it can be shared. They use PTC's Windchill ProjectLink, a Web-based collaborative software solution, to connect with engineering, production and marketing partners.

Powerski's sales and marketing folks use HP notebooks coupled with HP iPAQ MP series microportable projectors to perform many tasks on the road, from checking e-mail and placing customer orders to running PowerPoint presentations at sales meetings and QuickTime videos at boat shows. They can even perform video editing in the field with Avid Technology's video post-production software package.

"At events," says James Habig, Powerski's vice president of sales and marketing, "We are able to edit small

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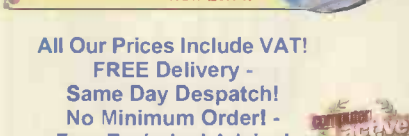
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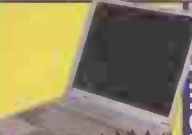
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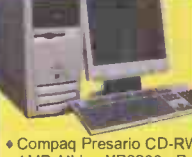
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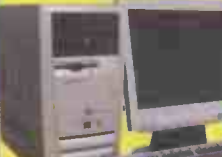
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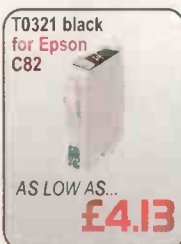
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Firegraphic 6 Express
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XMLSpy 2004 Home Edition
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Acronis Partition Expert 2003



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 run pcw.exe on the root of the disc.

Problems?

Please note that we cannot give support on individual programs contained on this disc.

If you have problems running the disc or any of its content, please note these guidelines:

FAULTY DISC > If the disc is physically damaged and will not load, return it to this address for a replacement:

PCW December 2003 cover disc

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quoting reference 'PCW Vol 26 No 12'.

PROBLEMS INSTALLING/RUNNING THE SOFTWARE >

Check the support page on the disc, or check the manufacturer's site.

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Express and Server Editions
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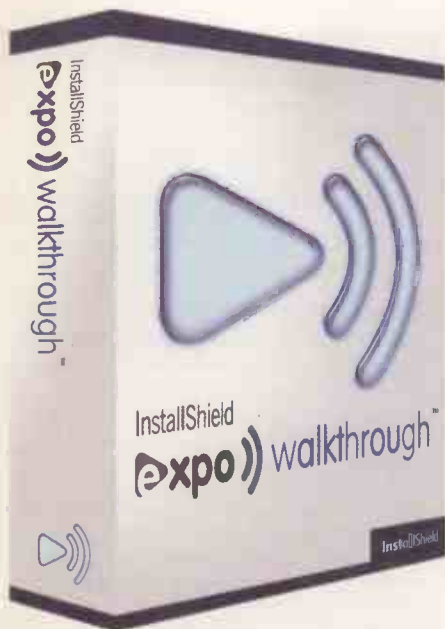




Expo Walkthrough

Create Flash-animated guides and tutorials the easy way with automatic screen capture, annotations and voiceovers

**FULL
PROGRAM**



You've spent an age designing your application, writing components, testing and debugging, but there are still Help files, marketing, training and support issues to sort out. A developer's work is never done, or so it often seems.

But before you start churning out static pages of text to explain a particular point, take a look at Expo Walkthrough. This powerful tool lets you build a Flash-animated guided product tour within minutes. Upload the finished result to the web or add it to a CD, and you're ready to go.

If you're not familiar with Flash development, don't worry – that doesn't matter here. Expo Walkthrough sorts out all the fine detail in the background, leaving you to concentrate on showing your product to its best advantage. And that's easy here, thanks to a particularly intuitive interface. Sample projects, informative Help and built-in Tutorials mean anyone can create a walkthrough – no development experience is required.

Image capture

Every walkthrough starts with an image capture session. Conventionally this either involves recording a movie of your on-screen activity or tedious manual captures, both of which have their own problems.

Fortunately Expo Walkthrough takes a different approach. Once you've told it which program you want to capture, it sits in the background monitoring your activities. A grab is then taken whenever you navigate to a new point in the application.

Need more control? Use a customisable hot key to take snaps manually, or define the screen region you want to grab. When

you've finished, Expo Walkthrough presents all your screen captures in a storyboard. If an image has been included that you don't need, just delete it. Anything you've forgotten can be added, just by pasting an image from the clipboard.

The grab order can be freely rearranged by drag and drop until you're happy, but will others agree with your choice? Expo Walkthrough lets you print multi-scene handouts, so your colleagues can give their own opinion.

Annotations

By this point you've got yourself a perfect movie illustrating something in your application, but what exactly? The Annotation stage assists in describing the point you want to make.

In its simplest form, this just involves adding caption balloons or boxes to each scene, then adding appropriate text. If you need to convey more information, then include a voiceover track describing what the viewer is seeing. Sometimes you may want to highlight a particular area of the screen. No problem, just add arrows or overlay a translucent shape over that location.

Once it's all finished, Expo Walkthrough can publish your project to the web, Intranet, CD-Rom, in HTML Help or more. The program takes you through the process, automatically creating an HTML page to host your walkthrough.

If you want to see just how the finished product can look, go to www.installshield.com/products/walkthrough. Installshield has used the product on its site, so you can see a Flash Walkthrough explaining, how to create your own.

Need to know

System requirements

Windows 98 or later; 128MB of Ram; Macromedia Flash Player 5 or higher

Information

www.installshield.com/products/walkthrough

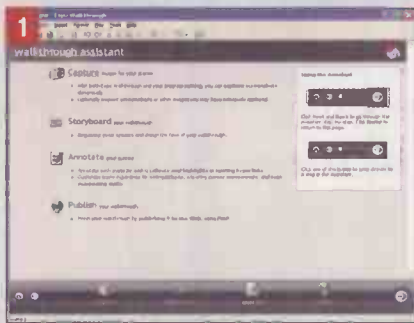
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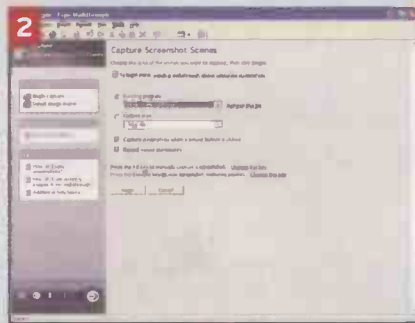
Key features

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- Optional manual screen capture
- Integrated spell checker
- Storyboard to fine tune your walkthrough
- Text or sound can be added to each scene
- Include hyperlinks or add a scene
- Display walkthrough without compiling it
- Publish walkthrough to different media
- Optional loop to create product tour

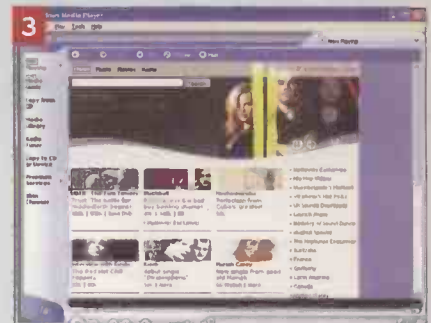
Building your first walkthrough



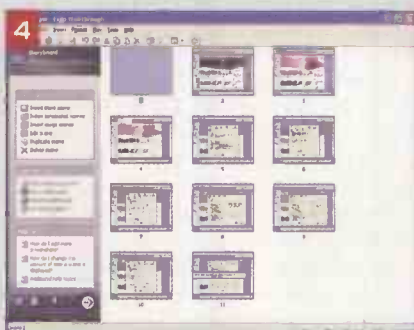
1 Launch Expo Walkthrough and click on 'Create a new project' to get started. This launches the 'walkthrough assistant', which lets you navigate each step by clicking on icons at the bottom of the screen. Click on 'Capture' to begin grabbing the screenshots you need.



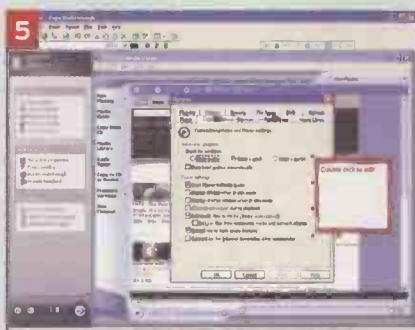
2 If you haven't launched your application, do so now, then select it in the 'Running Programs' list. Note that you can manually capture a screen by pressing F2. If this key is used in your target program, change it to something else, then click on 'Begin'.



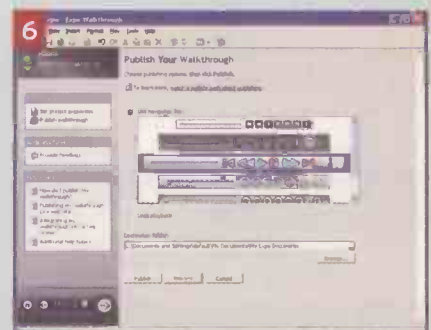
3 Switch to your application (we've chosen Windows Media Player), and use it as normal. The green border around the window tells you the area Expo Walkthrough is capturing, and you'll here a shutter 'click' every time you navigate to a new part of the program.



4 Press 'Esc' when finished, and the captured images are displayed in the Storyboard. Our first one is blank, oddly, but we just select it and click on 'Delete Scene'. Drag and drop the others to re-order them, if required, and check the 'Scene Tasks' pane for other options.



5 Double-click on a scene if you want to add an annotation. To include some text, for example, select 'Add a callout', then click on the scene. Double-click on the callout to edit it – right-click on it and select 'Properties' for more detailed configuration settings.



6 Select 'Publish' to complete the process. A navigation bar may optionally be included, allowing the user to navigate through the walkthrough at their own pace. Click on 'Publish' when you're done, and the Walkthrough will be compiled and saved to the specified folder.

Upgrade offer >> Expo Walkthrough 2

New products

- >> Expo Walkthrough 2
- >> Expo Educate
- >> Expo Autoplay

Installshield is busy finalising a range of new Expo products, including the forthcoming Expo Walkthrough 2, Expo Educate and Expo Autoplay.

Expo Educate is aimed at the elearning market, while Expo Autoplay will enable you to create standalone executable

presentations. Expo Walkthrough 2 should ship with a whole host of new features and PCW readers will be able to upgrade and save.

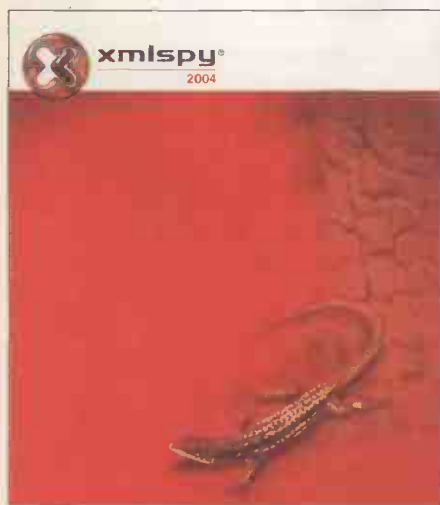
For further information about the new Expo range, and the special prices, visit www.installshield.com/expofree.



XMLSpy 2004 Home

**FULL
PROGRAM**

No matter how you're using XML, this industry-standard development environment has the tools to help, whether you're a beginner or an advanced user



Need to know

System requirements

Windows 98 or later; 120MB of free hard disk space; Internet Explorer 5.5 or later

Information

www.altova.com

Registration

Use the 'Obtain free evaluation key' option when the program is launched – this will turn your software in to a full 'Enterprise' Edition for 30 days, and then revert to the full Home Edition

Limitations

Enterprise Edition reverts to Home Edition after a 30-day trial period

It's become a storage format, the power behind web services and a means of data exchange that will underpin the next generation of Internet software.

XML is here to stay, and there's no better way to work with it than XMLSpy 2004.

From the moment you select File > New it's obvious this is a very comprehensive tool. The program includes templates for the most commonly used XML document types – 40 in total. Choose one, and XMLSpy 2004 adds the necessary DTD (document type definition) or schema, ensuring it's immediately valid.

Creating documents is made much easier with a host of editing tools, including context-sensitive choices for elements or attributes and auto-completion as you type. Checks for well-formedness and document validity (compared against the official W3C XML Schema 1 final recommendation or any DTD) will trap any errors, then you can use the unlimited Undo feature to recover a previous version.

Sample documents

Help like this is very useful, but if you're an XML beginner then you will probably need a lot more. So it's fortunate that XMLSpy 2004 has plenty of other assistance on hand.

This starts with the excellent selection of examples. Expand 'Org-Chart', for instance, then double-click on the XML file to see the Organisation Chart it contains. You could examine this in a plain-text form, but the hierarchical structure is much easier to understand in XMLSpy 2004's grid.

And if you'll be working on web services, then the Soap Debugger example will be of

particular interest. This acts as a proxy between the web services client and server, displaying WDSL files, single-stepping through transactions, defining conditional breakpoints and more – very impressive.

You won't pick all this out from the example alone, but 'Using soap debugger' in the Help file acts as a handy tutorial. While you're there, take the time to browse the rest of the Help file. It's detailed, but still easy to follow, and should be a useful reference point for every level of user.

Advanced features

A quick glance through the sample projects is impressive enough, but there are lots of hidden features available just beneath the surface.

Double-click on a schema, for instance, and by default you'll see a simple table of defined particles (elements, complex types and so on). Click on the little tree symbol to the left of each particle, and its attributes will be displayed in a tree form. Drag and drop to move elements around or right-click on them for additional options.

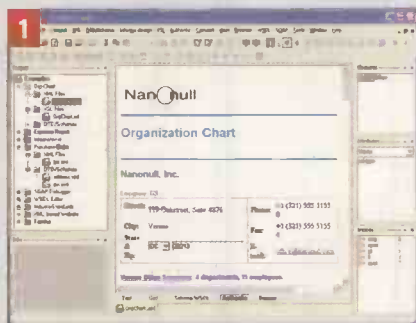
Exploring the menus reveals many other powerful features. How about a code generator which produces Java, C++, or Microsoft C# class files, based on the elements defined in an XML Schema, or the ability to generate documentation in HTML or Word .doc format? Everything can be tied together with XMLSpy 2004's scripting environment, which lets you create forms, macros and event handlers.

There's plenty more to discover, so install the program and try it out. It won't take long to find out why XMLSpy 2004 is the industry standard XML development system.

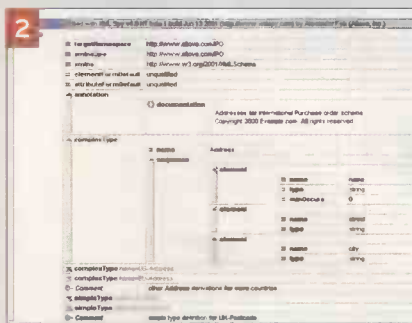
Key features

- Create, edit and validate XML documents
- View and modify XML Schemas
- Integrates with ADO or ODBC databases
- Enhanced Grid View
- Comprehensive stylesheet editor
- Soap & WDSL Client Interfaces are complemented by a Soap debugger
- Automatically generates XML Schemas
- Integrates with Microsoft-compatible source code provider

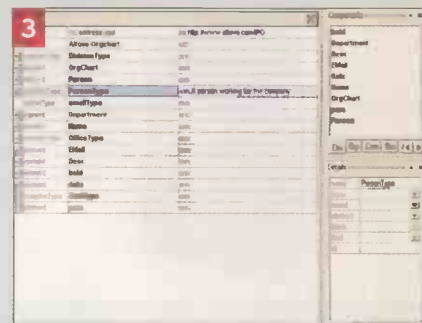
Finding your way around XMLSpy 2004



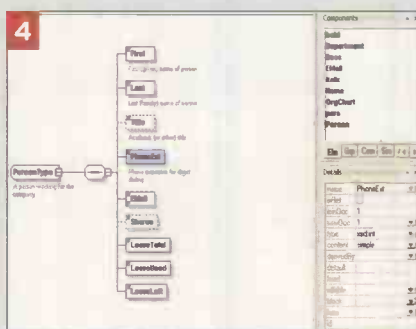
1 XMLSpy 2004 offers several ways to view XML documents. To try them out, open the 'Examples' folder, then find and double-click on orgchart.xml. The plain text view won't tell you much, so click on the user-defined 'Authentic' view to see how the document should appear.



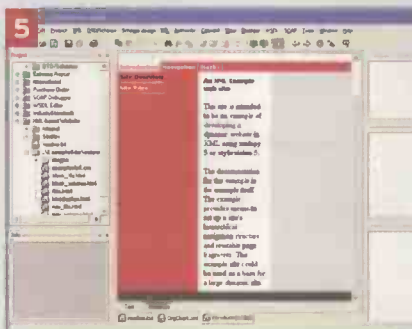
2 Now select the Schema address.xsd, and take a look at the Text view. That's unclear to put it mildly, so try the 'Grid' view instead. This displays every detail of the document hierarchy, and each element can be collapsed or expanded to zoom in on the data you need.



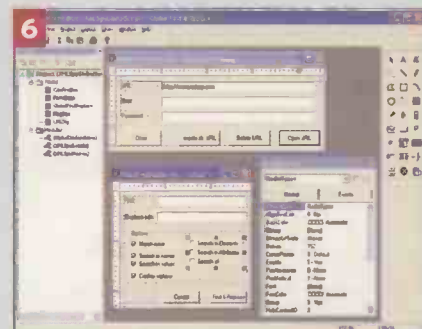
3 Choosing the Schema/WSD view for orgchart.xsd reveals every component of that particular Schema. Click on one of them and some information is displayed in the right-hand panel, but we need more. What is a 'Persontype', for instance, and how can we edit it?



4 Click on the tree symbol to the far left of 'Persontype', and XMLSpy 2004 displays it in the Schema Design View. Very pretty, but this view is functional, too. Drag the boxes around to rearrange them, or right-click on one and select 'Insert' to add something new.



5 Some examples are far more than just static documents. Soap Debugger forms the basis of a tutorial in the Help file, for instance, and 'XML-based website' explains how you can produce a complete XML-based website via an XSL transformation – see the readme.txt for more details.



6 You'd expect some kind of scripting feature and, as usual, the program more than delivers. But just in case the powerful form editor and scripts aren't enough, a Com-based API makes XMLSpy 2004 functionality available to other applications (see Help for more details).

Upgrade offer >> XMLSpy Enterprise Edition

New features

- >> Microsoft Visual Studio .Net integration
- >> XML differencing
- >> Xpath 2 Analyzer
- >> Enhanced database connectivity
- >> Generate project files
- >> Usability and performance enhancements

After 30 days this version of XMLSpy will revert from the Enterprise to Home edition. That's still good, but it doesn't include Authentic Document view, web services support and more.

The Enterprise Edition of XMLSpy 2004 can be yours for \$959 (£600 approx) from <https://shop.altova.com>. Choose 'Upgrade' and enter the key code from your original registration email.

**SAVE \$31
OFF RRP**

Partition Expert 2003

FULL PROGRAM



With this Personal Edition, managing partitions is easy

Need to know

System requirements

Windows 98 or later; 15MB disk space

Information

www.acronis.com

Registration

www.acronis.com/mag/pcw/

Limitations

None

Partitioning your hard drive can increase free space, improve performance and help keep your files organised, and that's where Acronis Partitionexpert 2003 Personal can help you. It runs from within Windows, and the familiar XP-like interface means you'll be using the program immediately.

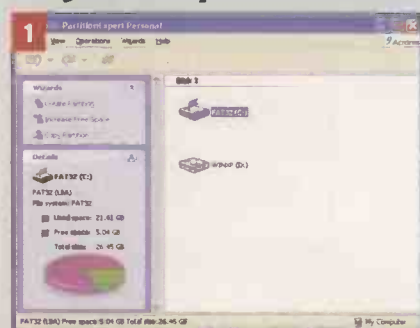
Three straightforward wizards provide most of the functionality. You start by creating a partition, a surprisingly simple process: pick a current drive or partition, wait for Partitionexpert to analyse your drive (this may take a while, so be patient), then choose the size you need. Next, you can copy the partition. This is handy as a backup option, perhaps saving your system partition before performing some major task like installing a new operating system.

Finally, Partitionexpert can increase the free space in one partition by grabbing some from another.

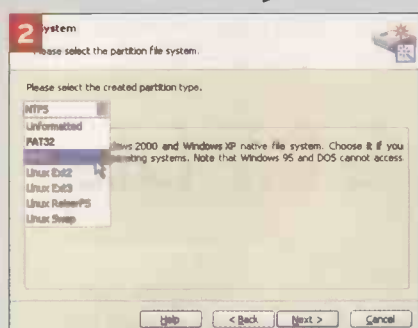
This kind of disk management tool can often be extremely technical, but there's a distinct shortage of jargon here. When you are asked for key details, like choosing the type of partition you want to create (Active, Primary or Logical), a clear description explains the purpose and consequences of every option.

A detailed Help file offers further explanations, but this also covers features that apply to Acronis Partitionexpert 2003. So, although you can read about various Manual Mode operations, they're not accessible from the Personal Edition (see the Upgrade offer below if you're interested in trying them out).

Organise your hard drive with a new partition



1 It looks just like a part of Windows XP, but this really is the first screen you'll see when launching Acronis Partitionexpert Personal. To create a new partition, select the 'Create Partition' Wizard, then choose the drive which will be supplying the free space.



2 There's a pause while Partitionexpert figures out how big the partition can be (defragmenting beforehand will increase this figure). Choose the partition size and type you need, and select the File System (Fat32, NTFS and four different Linux formats are supported).



3 You'll probably want to choose a drive letter for the new partition, so select one from the list, and that's it. Partitionexpert displays the new hard drive structure you've just chosen. If it meets with your approval, select Finish > Commit to create the new partition.

Upgrade offer >> Acronis Partitionexpert 9

New features

- >> Adds manual options to Personal features for extra control
- >> Format, delete, defragment, resize and move partitions

As a reader of PCW, you can upgrade to Acronis Partitionexpert 9 for only \$29.99 (£18 approx), rather than the normal retail price of \$49.99. For further information, and to upgrade, head to www.acronis.com/mag/pcw.

SAVE £12 OFF RRP

Firegraphic 6 Express

FULL PROGRAM

Need to know

System requirements

Windows 98 or later; 8MB of free hard disk space; Internet Explorer 5 or later

Information

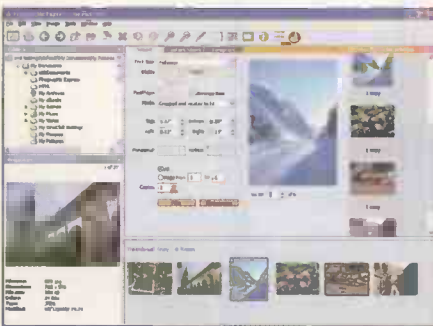
www.firegraphic.com

Registration

Enter code **FIRE6-EXPRK-KS6V8-R2197**

Limitations

None



Firegraphic 6 Express offers more printing controls than any tool we've ever seen

If digital photos are scattered all over your hard drive, then Firegraphic 6 Express is just the tool to restore order. It starts with a friendly Explorer-type view, displaying thumbnails and image properties as you navigate through your folders.

See a few pictures you like? Drag and drop them into the 'Thumbnail Tray'. They stay where they are on your hard drive, but Firegraphic can now process them as a group. You can view them in a slideshow, perhaps, print them out using a comprehensive set of options or email them with just a few mouse clicks.

Firegraphic also offers very capable image acquisition features, grabbing

pictures from scanners, digital cameras and more. You can add tags to an image to define who took it, or perhaps keywords like 'Christmas 2003', then search for matching pictures later on.

There are even some basic image-editing tools: Crop, Rotate, Resize, Brightness/Contrast adjustment and so on. These are a cut above what you'd expect too – jpeg rotation is lossless, for instance. You'll need more powerful features occasionally, but Firegraphic understands that too. With a moment's configuration time, it will launch your photo editor on demand, making this an ideal way to integrate your graphics tools.

Upgrade offer >> Firegraphic 6

Moving from Express to the full Firegraphic 6 gets you more image file support (gif, tif etc), processing for multiple photos in one operation, extra editing tools, CD burning, exif features and more.

Purchasing Firegraphic 6 from the website would normally cost you \$49.95 (£31 approx), but a great special deal means it can be yours for a mere \$29.95. Read more at www.firegraphic.com/req.

Hide Folder 2.7 & 2.7 Lite

FULL PROGRAM

Need to know

System requirements

Windows 98/ME (Hide Folder Lite) or Windows NT/2000/XP (Hide Folder); 1MB of free hard disk space

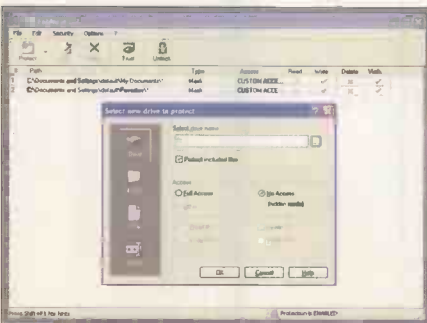
Information

www.hide-folder.com

Registration

Hide Folder 2.7 **DdEX-K942-65Dv-14T4**

Hide Folder 2.7 Lite **r87F-w92J-DG42-qN8p**



Hide Folder is secure, but also very straightforward to use – you won't need to read the manual

Your PC probably has a firewall to protect you from hackers and Internet worms. Your anti-virus tool blocks other threats and downloading operating system patches helps to keep you safe. But if other people use your PC, then it may still be possible for them to access (even accidentally) any personal information it might hold.

Installing Hide Folder can protect against this, by making some resources completely invisible to other users. You can protect individual files, entire folders, drives, even network drives from unauthorised access or you can simply conceal a few system folders, like 'My

Documents' or 'Favorites' to restrict access to other users.

A host of different security options makes it easy to set up the system you want. You can password-protect a resource, for instance, or make it read-only. Unusually, 'trusted processes' may be given access to the folders, so, for example, your anti-virus program can still scan them.

The protection process works by installing a driver which intercepts calls to files, folders and drives, so it's all very safe (none of your files are modified in any way). Hide Folder is easy to use too, so if you have data that needs protecting, then give it a try.

Upgrade offer >> Hide Folder 3

The latest version of Hide Folder allows you to encrypt your chosen files, from a choice of nine different industry-standard algorithms, and a new Access Mode can prevent changes to your Desktop.

As a special deal, developer the Pilot Group is offering PCW readers a 25 per cent discount off Hide Folder 3. You can upgrade for only \$39.95 (£24 approx), rather than the usual price of \$59.95. Visit www.hide-folder.com/pcw for the details.

Photoartmaster Classic 1.5

**FULL
PROGRAM**

Need to know

System requirements

Windows 98/ME/2000/XP; 256MB of Ram; 500MB of free hard disk space (for temporary files during image processing)

Information

www.fo2pix.com

Registration

www.fo2pix.com/vnu



Can you create a sunflower pic to compete with Van Gogh? Answer: no – but it's fun to try

With digital cameras it's easy to produce pictures in an instant, but will they be eye-catching, stylish pieces of art?

If your digital images are short on inspiration, then Photoartmaster Classic could make all the difference. To check out some of the possibilities, just open your image, then select Editors > Studio. Here you can select your image from 'My Sources', choose from one of the 28 different brushes available, then begin drawing on the canvas.

Depending on the settings, you'll soon have an image that looks like an oil painting or charcoal sketch. But if

you don't like the results, just try playing around with the various image controls.

There are sliders for brightness, contrast, hue and saturation, along with several different ways to tweak the palette, and with the Zoom control and Colour Picker, it's easy to modify the smallest of details.

Sounds too much like hard work? Then you might like to try a shortcut. Photoartmaster Classic automatically generates 20 sample pictures for you, based on your original (choose the 'Hints: Photo Art' tab to see them).

Pick one you like, and start experimenting to see the different artistic effects you can produce.

Upgrade offer >> Photoartmaster Gold

Photoartmaster Gold is the premier application from Fo2pix and ships with over 300 sources to turn your digital photos in to the next masterpiece. It also gives you complete control on how you to mix and manage your next masterpiece.

PCW readers can upgrade from Classic to Gold and save 25 per cent, enabling you to purchase for £75, rather than the normal £99.99. To upgrade, and for further information, go to www.fo2pix.com/vnu.

Special offer price for Xara X

Xara X is an advanced graphic illustration package for Windows that offers unrivalled speed so you can produce professional illustrations quickly and easily using the sophisticated drawing tools.

Many of the built-in drawing tools and advanced features, such as transparency and realtime anti-aliasing, were pioneered by Xara and can be applied to both vector and bitmap images.

Xara X can produce compact, highly optimised graphics, making it an ideal choice for creating web graphics. Creating rollover buttons along with the necessary HTML and Javascript is simple and straightforward. You can also export to Flash and Xara X seamlessly integrates with Macromedia's Dreamweaver web editor.

Xara has put together an exclusive offer for PCW readers who can purchase the full version of Xara X for only \$119 (approx £72) rather than the normal price of \$159 (approx £96). Even better, a CD-only version is available for a lower price of \$111 (approx £69), if you can live without the box and pdf manual. Prices exclude shopping costs or VAT (prices shown online, when ordering).

To take advantage of this special offer, go to <http://offers.xara.com/xarax/pcw>

**SAVE OVER
£20
OFF RRP**



ON OUR
COVER DVD

Bitdefender 7.1 Standard Edition

FULL
PROGRAM

AntiVirus

Need to know

System requirements

64MB of Ram (128MB recommended);
40MB of free hard drive space; Windows
98/NT-SP6/ME/2000/XP; Internet Explorer
4.0 or later

Information

www.bitdefender.com

Limitations

Six months of free anti-virus updates

Protect your PC with this fully featured anti-virus tool

Keeping your PC virus-free is a complex business, but do you really want to know about the details? Bitdefender certainly doesn't require much in the way of maintenance.

Once the program is installed, it just works. Your emails will be scanned for infected messages, regardless of the mail client you're using (and no extra configuration is necessary), while P2P transfers and downloaded files are checked in real time. This version also includes six months of free virus database updates (all handled automatically), ensuring new threats are detected just as soon as they've been identified.

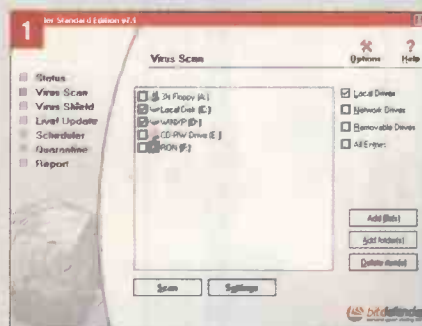
The default settings won't suit everyone, but Bitdefender also provides a host of ways to customise its behaviour. These start under

Virus Scan > Settings, where you can choose exactly which areas of your system to be checked, the scanning methods to be used, and what should happen when an infected file is discovered.

Other configuration options under 'Virus Shield' help you decide what level of protection you need for downloads, P2P transfers, Registry checking and email. Alternatively, you can customise how your system is scanned. By setting up multiple events, Bitdefender could scan your mail folders every hour, packed files every three hours and everything else on a daily basis.

For extra flexibility, there's a new option to your Explorer context menu, so if you discover a suspicious file, right-click on it, select 'Bitdefender anti-virus', and wait for the verdict.

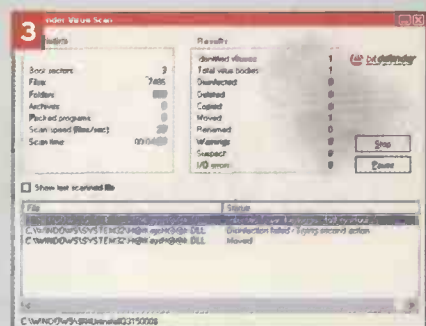
Viruses? Just set Bitdefender to 'search and destroy'



1 Double-click on the Bitdefender icon in your System Tray, select 'Virus Scan', and choose the drives you want the program to scan. Other useful options under 'Settings' let you define which file types should be scanned, and what should be done with any infected files.



2 Checking your PC takes some time, so why not automate the process? Click on the 'Scheduler' option, choose 'New', and you can instruct Bitdefender to scan your system overnight, or check mail files every hour or your master boot record every week – it's up to you.



3 If you're around when a scan is running, then the Status screen will show you what's going on. Details of any viruses detected (and what's happened to them) are displayed in the lower pane. You can also view a detailed summary of any scan from the Reports section.

Upgrade offer >> Bitdefender Professional 7.1

New features

- >> Monitor ActiveX controls, Java applets and scripts for malicious behaviour
- >> New privacy controls
- >> Another year of free virus definition updates

To upgrade to Bitdefender Professional 7.2, visit www.bitdefender.com/promotions and choose the 'Personal Computer World' deal. Enter **pcworld09** as the coupon code in the checkout page, and you'll get 30 per cent off the current price of \$39.95 (£24 approx).

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- 40GB UDMA 133 EIDE 7200RPM HD
- Logitech Internet PS/2 Keyboard
- Logitech 3 Button Wheel Mouse
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- ASUS (Burnproof) 52x24x52 CDRW
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- 80GB UDMA 133 EIDE 7200RPM HD
- Logitech Internet PS/2 Keyboard
- Logitech 3 Button Wheel Mouse
- 1.44MB Floppy Disk Drive
- ASUS (Burnproof) 52x24x52 CDRW
- Nero CD Burning Software
- Integrated UniChrome 3D Graphics
- Integrated 10/100 Network Card
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- Free Software Installation Manual

Monitor & Software (OS) not included

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XP2500+ DDR x8AGP PC**

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- 2x Front USB 2.0
- AMD Athlon XP 2500+
- 256MB DDR PC2700
- On-Board 6 Channel Audio
- 80GB UDMA 133 EIDE 7200RPM HD
- Logitech Internet PS/2 Keyboard
- Logitech 3 Button Wheel Mouse
- 1.44MB Floppy Disk Drive
- ASUS (Burnproof) 52x24x52 CDRW
- Nero CD Burning Software
- ASUS V9520 Magic GeForce FX5200 128MB x8AGP Inc.TV Out
- Integrated 10/100 Network Card
- 56.6K V92 Modem
- 2 Year Parts & Labour Warranty
- Free Software Installation Manual

Monitor & Software (OS) not included

**WAS £449.95
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Save £50!

**Power Gamer
XP2500+ DDR x8AGP PC**

NEW SPEC!

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- 1x Agp8 5x PCI 4x USB 2.0 1x Parallel
- 2x Front USB2.0
- Serial Raid Controller
- AMD Athlon XP 2500+
- 512MB DDR PC2700
- On-Board 6 Channel Audio
- 120GB Serial ATA 7200RPM 8MB Cache HD
- Logitech Internet PS/2 Keyboard
- Logitech 3 Button Wheel Mouse
- 1.44MB Floppy Disk Drive
- ASUS (Burnproof) 52x24x52 CDRW
- Nero CD Burning Software
- ASUS 16x DVD 48x CD
- ASUS V9560 FX5600 256 MB 8xAGP Inc.TV Out
- Integrated 10/100 Network Card
- 56.6K V92 Modem
- 2 Year Parts & Labour Warranty
- Free Software Installation Manual

Monitor & Software (OS) not included

**WAS £699.95
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**Power Intel P4
2.4Ghz DDR x8AGP PC**

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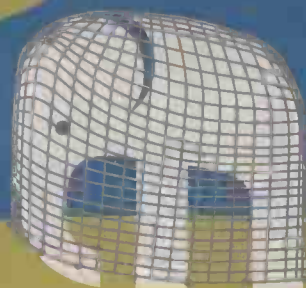
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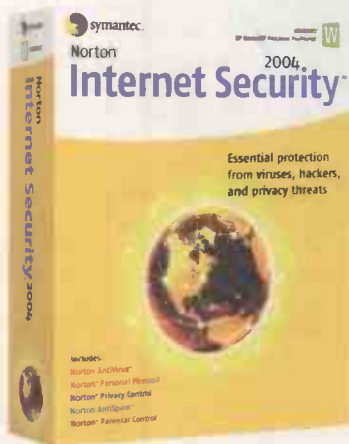
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Modern technology demands education

Closing chat rooms to protect children is absurd, says Ed Henning. Kids should be better educated instead!

The increasing use of modern technology by our society demands significantly improved education, for everybody, not just an elite. The PC is in many ways the focus for this, particularly as PC

technology drifts ever closer towards the living room.

Hardly a week passes without some major news item that brings all this home – symptoms of one kind or another of the problems created by the relentless driving down of standards.

I think Microsoft is completely wrong in its decision to close some of its major chat rooms, particularly on the pretext of protecting children. Kids want interaction. They love a bit of secrecy and find it fun playing games and pretending to be somebody they are not. These things in themselves are nothing new, but the medium is.

Where do you want them doing these things? The PC is usually in the home, it can therefore be monitored by the parents – assuming that they care and have some vague inkling of their responsibilities. Activities on the PC can also be traced electronically, messages sent monitored, extreme ones interrupted and blocked – these things are all getting easier – and there is no actual physical contact with others.

Where do you want the kids to be playing – out in some playground, where you may be distracted from the ever watchful lookout for the somewhat unusual man in the dirty overcoat? Or worse, on some street corner where you can't see them?

The problem is not Microsoft's to fix – although there is a great deal a company like that can do to help, particularly along the lines of monitoring these chat rooms, searching for key phrases, and so forth. The problem is entirely one of parental control.

When my son was a teenager, unbeknown to him I used to monitor where he went online. I found a couple of sites that came close to being a bit 'laddish', and loads of sites for PC game cheating – funny priorities, but nothing worth raising a fuss about.

Now some parents may not know how to do this, but they should be able to get help (Microsoft, IBM, Dell, anybody interested?). And there's also the simple tactic of keeping a watchful eye and checking what is on screen. Show some interest at least!

It was recently reported that many kids are starting primary school these days almost unable to talk properly, and needing special help. The report concluded that their parents just dropped them in front of the TV instead of giving them early education and proper stimulation.

A few years later, will these parents monitor their young teenagers when they are surfing the new broadband digital entertainment centre with its 3D animated chat rooms? Of course not.

But this is not Microsoft's fault, nor the fault of the simple existence of its chat rooms. Sadly, there probably always will be a small percentage of people wanting to take advantage of young kids, regardless of the technology involved. The only real protection lies with the parents, and I would make the case that a properly educated population would monitor its children appropriately, and would have a better understanding of the appropriate ways to use all kinds of technology.

This awful trend of kids starting primary school barely able to communicate is clearly a direct result of the huge drop in education standards over the past 30 years. We have already seen how universities are having to provide top-up courses to freshers, and so this trend has permeated the whole system, and now the unfortunate victims of this trend are having children of their own, and the cycle is just getting worse.

The problem regarding technology is that advances in it usually bring greater power. The fact that I can create more written words, edited to my satisfaction, in a shorter time on this PC than it used to take using a typewriter and Tippex, is a clear benefit. But more power also brings more danger, a greater need for care and, crucially, understanding. You don't drive a car until you have learned how to use it and something about how

it works, and having passed your driving test you don't jump straight into a Formula One car at Silverstone and expect to survive.

I have tried to bring out the technological reasoning here, but there is of course also a political (in other words, economic) point. In my view, education is the single most important investment a society can make. It should be completely free to all, but the long-term results would be savings all round. A properly educated society would be a stronger democracy, would take care of its health better, would have lower unemployment, would be more law abiding, less violent, and so on.

Now, I can understand, albeit with great difficulty, some people not agreeing with that personal assessment, but not the technology needs. If we are not prepared to invest properly in education to produce a more knowledgeable and skilful society, then we would probably be better off (and our children safer) by shunning the technology, and going back to working on the land and making everything by hand.

'Kids want interaction. They love secrecy and pretending to be somebody they're not'



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